RULES
OF
TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
BUREAU OF ENVIRONMENT
DIVISION OF AIR POLLUTION CONTROL

CHAPTER 1200–3–16
NEW SOURCE PERFORMANCE STANDARDS

TABLE OF CONTENTS

1200–3–16–.01 General Provisions
1200–3–16–.02 Fossil Fuel-Fired Steam Generating for Which Construction is Commenced After April 3, 1973.
1200–3–16–.03 Electric Utility Steam Generating Units for Which Construction Commenced After September 18, 1978
1200–3–16–.04 Incinerators
1200–3–16–.05 Portland Cement Plants
1200–3–16–.06 Sulfuric Acid Plants
1200–3–16–.07 Nitric Acid Plants
1200–3–16–.08 Hot Mix Asphalt Facilities
1200–3–16–.09 Petroleum Refineries
1200–3–16–.10 Standards of Performance for Storage Vessels for Petroleum Liquids for which Construction, Reconstruction, or Modification Commenced After April 21, 1976 and Prior to May 19, 1978
1200–3–16–.11 Standard of Performance for Storage Vessels for Petroleum Liquids for which Construction, Reconstruction, or Modification Commenced After May 18, 1978
1200–3–16–.12 Secondary Lead Smelters
1200–3–16–.13 Secondary Brass and Bronze Ingot Production Plants
1200–3–16–.14 Iron and Steel Plants
1200–3–16–.15 Sewage Treatment Plant Incinerators
1200–3–16–.16 Phosphate Fertilizer Industry: Wet Process Phosphoric Acid Plants
1200–3–16–.17 Phosphate Fertilizer Industry: Super Phosphoric Acid Plants.
1200–3–16–.l8 Phosphate Fertilizer Industry: Diammonium Phosphate Plants
1200–3–16–.19 Phosphate Fertilizer Industry: Triple Superphosphate Plants.
1200–3–16–.20 Phosphate Fertilizer Industry: Granular Triple Superphosphate Storage Facilities
1200–3–16–.21 Primary Aluminum Reduction Plants
1200–3–16–.22 Coal Preparation Plants
1200–3–16–.23 Primary Copper Smelters
1200–3–16–.24 Primary Zinc Smelters
1200–3–16–.25 Primary Lead Smelters
1200–3–16–.26 Steel Plants: Electric Arc Furnaces Constructed After February 9, 1977, and On or Before August 17, 1983.
1200–3–16–.27 Ferroalloy Production Facilities
1200–3–16–.28 Lime Manufacturing Plants
1200–3–16–.29 Kraft Pulp Mills
1200–3–16–.30 Grain Elevators
1200–3–16–.31 Stationary Gas Turbines
1200–3–16–.32 Ammonium Sulfate Manufacture
1200–3–16–.33 Glass Manufacturing Plants
1200–3–16–.34 Automobile and Light Duty Truck Surface Coating Operations
1200–3–16–.35 Asphalt Processing and Asphalt Roofing Manufacture
1200–3–16–.36 Industrial Surface Coating: Large Appliances
1200–3–16–.37 Surface Coating of Metal Furniture
1200–3–16–.38 Metal Coil Surface Coating
1200–3–16–.39 Graphic Arts Industry: Publication Rotogravure Printing
1200–3–16–.40 Beverage Can Surface Coating
1200–3–16–.41 Metallic Mineral Processing Plants
1200–3–16–.42 Pressure Sensitive Tape and Label Surface Coating Operations
1200–3–16–.43 Equipment Leaks of VOC in the Synthetic Organic Chemical Manufacturing Industry
1200–3–16–.44 Bulk-Gasoline Terminals
1200–3–16–.45 Synthetic Fiber Production Facilities
1200–3–16–.46 Lead Acid Battery Manufacturing Plants
1200–3–16–.47 Equipment Leaks of VOC in Petroleum Refineries
1200–3–16–.48 Flexible Vinyl and Urethane Coating and Printing
1200–3–16–.49 Petroleum Dry Cleaners
1200–3–16–.50 Phosphate Rock Plants
1200–3–16–.51 Equipment Leaks of VOC from Onshore Natural Gas Processing Plants
1200–3–16–.52 Electric Arc Furnaces and Argon-Oxygen Decarburitzation Vessels
1200–3–16–.53 Nonmetallic Mineral Processing Plants
1200–3–16–.54 Onshore Natural Gas Processing: SO2 Emissions
1200–3–16–.55 Secondary Emissions from Basic Oxygen Process Steel making Facilities
1200–3–16–.56 Wool Fiberglass Insulation Manufacturing Plants
1200–3–16–.57 Industrial Surface Coating: Plastic Parts for Business Machines
1200–3–16–.58 Reserved
1200–3–16–.59 Industrial-Commercial-Institutional Steam Generating Units
1200–3–16–.60 Rubber Tire Manufacturing Industry
1200–3–16–.61 Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for which Construction, Reconstruction, or Modification Commenced After June 2, 1990
1200–3–16–.62 through 1200–3–16–.73 Reserved .
1200–3–16–.74 Standards of Performance for Calciners and Dryers in Mineral Industries.
1200–3–16–.75 Reserved.
1200–3–16–.76 Standards of Performance For Municipal Solid Waste Landfills (40 CFR 60, Subpart WWW)
1200–3–16–.77 through 1200-3-16- .99 Reserved.

1200–3–16–.01 GENERAL PROVISIONS.

(1) When a standard for visible emissions, particulate matter, sulfur oxides, or any other pollutant is specified for an affected facility in this chapter, it will supersede the standards in any other rule of the regulations. Otherwise, all the provisions of the other regulations, concerning those pollutants shall remain in full effect for all sources regulated under this chapter.

(2) No person shall cause, suffer, allow, or permit emissions in excess of the standards in this chapter.

(3) Applicability. Unless specifically defined in subsequent rules, the provisions of this chapter shall apply to the owner or operator of any source which contains any new or modified affected facility commenced after the date specified in each rule. Regardless of the specific emission standards contained in this chapter, new and/or modified sources in or significantly impacting upon a nonattainment area must comply with the provisions of paragraph 1200–3–9–.01(5). Regardless of the specific emission standards contained in this chapter, all sources identified in paragraph 1200–3–9–.01(4) of these regulations shall comply with the standards set pursuant to chapter 1200–3–9.

(4) (a) Definitions. As used in this chapter, all terms not defined herein shall have the meaning given them in chapter 1200–3–2.

1. "Affected facility" means, with reference to a stationary source, any apparatus to which a standard is applicable.

2. "Capital expenditure" means an expenditure for a physical or operational change to an existing facility which exceeds the product of the applicable "annual asset guidelines repair allowance percentage" specified in the latest edition of Internal Revenue Service Publication 534 and the existing facility's basis, as defined by section 1012 of the Internal Revenue Code.

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

4. "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 date specified in a given rule; or any apparatus which could be altered in such a way as to be of that type.

5. "One-Hour Period" means any 60 minute period commencing on the hour.

6. "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 pollutant (to which a standard applies) into the atmosphere not previously emitted. The application of this definition is further defined in paragraph (9) of this rule.

7. "Monitoring device" means the total equipment required under the monitoring paragraphs in applicable rules, used to measure and record (if applicable) process parameters.

8. "Nitrogen oxides" means all oxides of nitrogen except nitrous oxide measured by the reference method.

9. "Particulate matter" means any finely divided solid or liquid material, other than uncombined water, as measured by the reference method or an equivalent or alternate method.

(Rule 1200-3-16-.01, continued)

10. "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.

11. "Six-minute period" means any one of ten equal parts of a one-hour period.

12. "Standard conditions" means a temperature of 20 C (68 F) and a pressure of 760mm of Hg (29.92 in. of Hg).

(b) Each rule in this chapter may contain additional definitions that apply just in that rule only unless specifically referred to in other rules of these regulations.

(5) Performance test:

(a) Within sixty (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 and at such other times as may be required by the Technical Secretary, the owner or operator of such facility shall conduct performance test(s) and furnish the Technical Secretary a written report of the results of such performance test(s).

(b) Performance tests shall be conducted and data reduced in accordance with the test methods and procedures specified in subparagraph (g) of this paragraph or in the latter rules of this chapter, unless the Technical Secretary:

1. Specifies or approves the use of a reference method with minor changes in methodology.

2. Approves the use of an equivalent method.

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

(c) Peformance tests shall be conducted under such conditions as the Technical Secretary shall specify to the plant operator based on representative performance of the affected facility. The owner or operator shall make available to the Technical Secretary such records as may be necessary to determine the conditions of the performance tests. Operations during periods of startups, shutdown, and malfunctions shall not constitute representative conditions of performance tests unless otherwise specified in the applicable standard.

(d) The owner or operator of an affected facility shall provide the Technical Secretary ten (10) days prior notice of the performance test to afford the Technical Secretary the opportunity to have an observer present.

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

1. Sampling ports adequate for test methods applicable to such facility.

2. Safe sampling platform(s).

3. Safe access to sampling platform(s).

4. Utilities for sampling and testing equipment.

(f) Each performance test shall consist of three (3) separate runs using the applicable test method. Each run shall be conducted for such time and under such conditions specified in the applicable

standard. For the purpose of determining compliance with an applicable standard, the arithmetic means of results of the three (3) runs shall apply. In the event that a sample is accidentally lost or conditions occur in which one (1) of the three (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 Technical Secretary's approval, be determined using the arithmetic mean of the results of the two (2) other runs.

(g) The reference methods and procedures to be used for any tests required in this chapter, except as provided in subparagraph (b) of this paragraph, are as follows:

(Note: All references to ASTM in this chapter refers to the American Society for Testing Materials. Copies of methods are available for purchase by writing to ASTM, 1916 Race Street, Philadelphia, PA 19103 or by writing to the Tennessee Division of Air Pollution Control, 701 Broadway, 4th Floor Customs House, Nashville, TN 37219. Be sure and specify which method is desired).

1. Sample and Velocity Traverses for Stationary Sources

   Sample and velocity traverses shall be determined by Method 1 outlined in the *Federal Register*, Vol. 42, No. 160, August 18, 1977, beginning on page 41755, as amended in the *Federal Register*, Vol. 43, No. 57, March 23, 1978, on page 11984, and as amended in the *Federal Register*, Vol. 48, No. 191, September 30, 1983, beginning on page 45035, and as amended in the *Federal Register*, Vol. 51, No. 107, June 4, 1986, beginning on page 20288, and as amended in the *Federal Register*, Vol. 51, No. 157, August 14, 1986, on page 29104.

2. Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube)

   Stack gas velocity and volumetric flow rate shall be determined with a type S pitot tube by Method 2 outlined in the *Federal Register*, Vol. 42, No. 160, August 18, 1977, beginning on page 41758, and as amended in the *Federal Register*, Vol. 43, No. 57, March 23, 1978, on page 11984, or by one of the following alternative methods:

   (i) Direct Measurement of Gas Volume Through Pipes and Small Ducts

   Gas volume through pipes and small ducts shall be determined by direct measurement by Method 2A outlined in the Federal Register, Vol. 48, No. 161, August 18, 1983, beginning on page 37592.

   (ii) Determination of Exhaust Gas Volume Flow Rate from Gasoline Vapor Incinerators

   Exhaust gas volume flow rate from gasoline vapor incinerators shall be determined by Method 2B outlined in the Federal Register, Vol. 48, No. 161, August 18, 1983, beginning on page 37594.

   (iii) Reserved

   (iv) Reserved

3. Gas Analysis for Carbon Dioxide, Oxygen, Excess Air, and Dry Molecular Weight
   Carbon dioxide, oxygen, excess air, and dry molecular weight shall be determined by gas analysis by Method 3 outlined in the *Federal Register*, Vol. 42, No. 160, August 18, 1977, beginning on page 41768, as amended in the *Federal Register*, Vol. 43, No. 57, March 23, 1978, on page 11984, and as amended in the *Federal Register*, Vol. 48, No. 207, October 25, 1983, beginning on page 49459, or by the following alternative method:

(i) Determination of Oxygen and Carbon Dioxide Concentrations in Emissions From Stationary Sources (Instrument Analyzer Procedure)

Oxygen and carbon dioxide concentrations in emissions from stationary sources shall be determined by an instrument analyzer procedure by Method 3A outlined in the *Federal Register*, Vol. 49, No. 248, December 24, 1984, beginning on page 49964, as amended in the *Federal Register*, Vol. 51, No. 112, June 11, 1986, beginning on page 21166.

4. Determination of Moisture Content in Stack Gases

Moisture content in stack gases shall be determined by Method 4 outlined in the *Federal Register*, Vol. 42, No. 160, August 18, 1977, beginning on page 41771, as amended in the *Federal Register*, Vol. 43, No. 57, March 23, 1978, beginning on page 11984, and as amended in the *Federal Register*, Vol. 48, No. 241, December 14, 1983, on page 55671.

5. Determination of Particulate Emissions from Stationary Sources

Particulate emissions from stationary sources shall be determined by Method 5 outlined in the *Federal Register*, Vol. 42, No. 160, August 18, 1977, beginning on page 41776, as amended in the *Federal Register*, Vol. 43, No. 57, March 23, 1978, on page 11985, as amended in the *Federal Register*, Vol. 45, No. 196, October 7, 1980, on page 66752, as amended in the *Federal Register*, Vol. 48, No. 167, August 26, 1983, beginning on page 39011, as amended in the *Federal Register*, Vol. 48, No. 241, December 14, 1983, on page 55671, and as amended in the *Federal Register*, Vol. 50, No. 6, January 9, 1985, beginning on page 1165; or by one of the following alternative methods:

(i) Determination of Particulate Emissions from the Asphalt Processing and Asphalt Roofing Industry

Particulate Emissions from the asphalt processing and asphalt roofing industry shall be determined by Method 5A outlined in the *Federal Register*, Vol. 47, No. 153, August 6, 1982, beginning on page 34145, and as amended in the *Federal Register*, Vol. 51, No. 177, September 12, 1986 on page 32455.

(ii) Determination of Nonsulfuric Acid Particulate Matter from Stationary Sources.

Particulate matter emissions from Nonsulfuric Acid from stationary sources shall be determined by Method 5B outlined in the *Federal Register*, Vol. 51, No. 228, November 26, 1986, beginning on page 42842.

(iii) Reserved

(iv) Determination of Particulate Matter Emissions from Positive Pressure Fabric Filters

Particulate matter emissions from positive pressure fabric filters shall be determined by Method 5D outlined in the *Federal Register*, Vol. 49, No. 212, October 31, 1984, beginning on page 43847, and as amended in the *Federal Register*, Vol. 51, No. 177, September 12, 1986, on page 32455.

(v) Determination of Particulate Emission from the Wool Fiberglass Insulation Manufacturing Industry

Particulate emission from the wool fiberglass insulation manufacturing industry shall be determined by Method 5E outlined in the *Federal Register*, Vol. 50, No. 37, February 25, l985, beginning on page 7701.

(vi) Determination of Nonsulfate Paraticulate Matter from Stationary Sources.

Non-sulfate particulate matter from stationary sources shall be determined by Method 5F outlined in the *Federal Register*, Vol. 51, No. 228, November 26, 1986, on page 42842.

6. Determination of Sulfur Dioxide Emissions from Stationary Sources

Sulfur dioxide emissions from stationary sources shall be determined by Method 6 outlined in the *Federal Register*, Vol. 42, No. 160, August 18, 1977, beginning on page 41783, as amended in the *Federal Register*, Vol. 43, No. 57, March 23, 1978, on page 11985, as amended in the *Federal Register*, Vol. 48, No. 167, August 26, 1983, on page 39013, and as amended in the *Federal Register*, Vol. 49, No. 125, June 27, 1984, on page 26524, or by one of the following alternative methods:

(i) Determination of Sulfur Dioxide, Moisture, and Carbon Dioxide Emissions from Fossil Fuel Combustion Sources

Sulfur dioxide, moisture, and carbon dioxide emissions from fossil fuel combustion sources shall be determined by Method 6A outlined in the *Federal Register*, Vol. 47, No. 231, December 1, 1982, beginning on page 54079, and as amended in the *Federal Register*, Vol. 49, No. 51, March 14, 1984, beginning on page 9684, and as amended in the *Federal Register*, Vol. 51, No. 177, September 12, 1986, on page 32455.

(ii) Determination of Sulfur Dioxide and Carbon Dioxide Daily Average Emissions from Fossil Fuel Combustion Sources

Sulfur dioxide and carbon dioxide daily average emissions from fossil fuel combustion sources shall be determined by Method 6B outlined in the *Federal Register*, Vol. 47, No. 231, December 1, 1982, beginning on page 54079, and as amended in the *Federal Register*, Vol. 49, No. 51, March 14, 1984, beginning on page 9685, and as amended in the *Federal Register*, Vol. 51, No. 177, September 12, 1986, beginning on page 32455.

(iii) Determination of Sulfur Dioxide Emissions from Stationary Sources (Instrumental Analyzer Procedure)

Sulfur dioxide emissions from stationary source shall be determined by an instrumental analyzer procedure by Method 6C outlined in the *Federal Register*, Vol. 49, No. 248, December 24, 1984, beginning on page 49965, and as amended in the *Federal Register*, Vol. 51, No. 112, June 11, 1986, beginning on page 21167.

7. Determination of Nitrogen Oxide Emissions from Stationary Sources

Nitrogen oxide emissions from stationary sources shall be determined by Method 7 outline in the *Federal Register*, Vol. 42, No. 160, August 18, 1977, as amended in the *Federal Register*, Vol. 43, No. 57, March 23, 1978, beginning on page 11985, and as amended in the *Federal Register*, Vol. 49, No. 125, June 27, 1984, beginning on page 26524, or by one of the following alternative methods:

(i) Determination of Nitrogen Oxide Emissions from Stationary Sources (Ion Chromatographic Method)

Nitrogen oxide emissions from stationary sources shall be determined by an ion chromatographic method by Method 7A outlined in the *Federal Register*, Vol. 48, No. 237, December 8, 1983, beginning on page 55073.

(ii) Determination of Nitrogen Oxide Emissions from Stationary Sources (Ultraviolet Spectrophotometric Method).

Nitrogen oxide emissions from stationary sources shall be determined by an ultraviolet spectrophotometric method by Method 7B outlined in the *Federal Register*, Vol. 50, No. 78, April 23, 1985, beginning on page 15894.

(iii) Determination of Nitrogen Oxide Emissions from Stationary Sources (Alkaline-Permanganate/Colorimetric Method)

Nitrogen oxide emissions from stationary sources shall be determined by an alkaline-permanganate/colormetric method by Method 7C outlined in the *Federal Register*, Vol. 49, No. 189, September 27, 1984, beginning on page 38234.

(iv) Determination of Nitrogen Oxide Emissions from Stationary Sources (Alkaline-Permanganate/Ion Chromatographic Method)

Nitrogen oxide emissions from stationary sources shall be determined by alkaline-permanganate/ion chromatographic method by Method 7D outlined in the *Federal Register*, Vol. 49, No. 189, September 27, 1984, beginning on page 38237.

(v) Determination of Nitrogen Oxides Emissions from Stationary Sources (Instrumental Analyzer Procedure)

Nitrogen oxides emissions from stationary sources shall be determined by an instrumental analyzer procedure by Method 7E outlined in the *Federal Register*, Vol. 49, No. 248, December 24, 1984, beginning on page 49971, and as amended in the *Federal Register*, Vol. 51, No. 112, June 11, 1986, beginning on page 21171.

8. Determination of Sulfuric Acid Mist and Sulfur Dioxide Emissions from Stationary Sources.

Sulfuric acid mist and sulfur dioxide emissions from stationary sources shall be determined by Method 8 outlined in the *Federal Register*, Vol. 42, No. 160, August 18, 1977, beginning on page 41786, and as amended in the *Federal Register*, Vol. 43, No. 57, March 25, 1978, on page 11986.

9. Visual Determination of the Opacity of Emissions from Stationary Sources

The opacity of emissions from stationary sources shall be determined either visually by Method 9 outlined in the *Federal Register*, Vol. 39, No. 219, November 12, 1974, beginning on page 39874, or by the following alternative methods:

(i) Determination of the Opacity of Emissions from Stationary Sources Remotely by Lidar.

The opacity of emissions from stationary sources shall be determined remotely by a mobile lidar system (laser radar; Light Detection and Ranging) by Alternate Method 1 to Method 9 outlined in the *Federal Register*, Vol. 46, No. 208, October 28, 1981,

beginning on page 53144, and as amended in the *Federal Register*, Vol. 47, No. 127, July 1, 1982, beginning on page 28624.

10. Determination of Carbon Monoxide Emissions from Stationary Sources

    Carbon monoxide emissions from stationary sources shall be determined by Method 10 outlined in the *Federal Register*, Vol. 39, No. 47, March 8, 1974, beginning on page 9319.

11. Determination of Hydrogen Sulfide Content of Fuel Gas Streams in Petroleum Refineries

    Hydrogen sulfide content of fuel gas streams in petroleum refineries shall be determined by Method 11 outlined in the *Federal Register*, Vol. 43, No. 6, January 10, 1978, beginning on page 1494.

12. Determination of Inorganic Lead Emissions from Stationary Sources

    Inorganic lead emissions from stationary sources shall be determined by Method 12 outlined in the *Federal Register*, Vol. 47, No. 74, April 16, 1982, beginning on page 16564, as amended in the *Federal Register*, Vol. 49, No. 166, August 24, 1984, beginning on page 33842, and as amended in the *Federal Register*, Vol. 49, No. 186, September 24, 1984, on page 37384.

13. Determination of Total Fluoride Emissions from Stationary Sources

    Total fluoride emissions from stationary sources shall be determined by either one of the following methods:

    (i) Determination of Total Fluoride Emissions from Stationary Sources, SPADNS Zirconium Lake Method

    Total fluoride emissions from stationary sources shall be determined by the SPADNS Zirconium Lake method by Method 13A outlined in the *Federal Register*, Vol. 45, No. 121, June 20, 1980, beginning on page 41852, and as amended in the *Federal Register*, Vol. 45, No. 249, December 24, 1980, on page 85016, or

    (ii) Determination of Total Fluoride Emissions from Stationary Sources; Specific Ion Electrode Method

    Total Fluoride emissions from stationary sources shall be determined by the specific ion electrode method by Method 13B outlined in the *Federal Register*, Vol. 45, No. 121, June 20, 1980, beginning on page 41852, and as amended in the *Federal Register*, Vol. 45, No. 249, December 24, 1980, on page 85016.

14. Determination of Fluoride Emissions from Potroom Roof Monitors for Primary Aluminum Plants

    Fluoride emissions from potroom roof monitors for primary aluminum plants shall be determined by Method 14 outlined in the *Federal Register*, Vol. 45, No. 127, June 30, 1980, beginning on page 44202.

15. Determination of Hydrogen Sulfide, Carbonyl Sulfide, and Carbon Disulfide Emissions from Stationary Sources
    Hydrogen sulfide, carbonyl sulfide, and carbon disulfide emissions from stationary sources shall be determined by either Method 15 outlined in the *Federal Register*, Vol. 43, No. 51, March 15, 1978, beginning on page 10866, or by the following alternative method:

(i) Determination of Total Reduced Sulfur emissions from sulfur recovery plants in petroleum refineries shall be determined by Method 15A outlined in the *Federal Register*, Vol. 52, No. 104, June 1, 1987, beginning on page 20391.

Nonsulfate particulate matter emissions from stationary sources shall be determined by Method 5F outlined in the *Federal Register*, Vol. 51, No. 228, November 26, 1986, beginning on page 42842.

16. Semicontinuous Determination of Sulfur Emissions from Stationary Sources

Sulfur emissions from stationary sources shall be determined by either a semicontinuous procedure by Method 16 outlined in the *Federal Register*, Vol. 43, No. 37, February 23, 1978 beginning on page 7575, as amended in the *Federal Register*, Vol. 43, No. 152, August 7, 1978, beginning on page 34785, and as amended in the *Federal Register*, Vol. 44, No. 9, January 12, 1979, beginning on page 2579, or by the following alternative method:

(i) Determination of Total Reduced Sulfur Emissions from Stationary Sources (Impinger Technique)

Total reduced sulfur emissions from stationary sources shall be determined by an impinger technique by Method 16A outlined in the *Federal Register*, Vol. 50, No. 46, March 8, 1985, beginning on page 9597.

17. Determination of Particulate Emissions from Stationary Sources (In-Stack Filtration Method)

Particulate emissions from stationary sources shall be determined by an in-stack filtration method by Method 17 outlined in the *Federal Register*, Vol. 43, No. 37, February 23, 1978, beginning on page 7568.

18. Measurement of Gaseous Organic Compound Emissions by Gas Chromatography

Gaseous organic compound emissions shall be determined by gas chromatography by Method 18 outlined in the *Federal Register*, Vol. 48, No. 202, October 18, 1983, beginning on page 48344, and as amended in the *Federal Register*, Vol. 49, No. 105, May 30, 1984, on page 22608, and as amended in the *Federal Register*, Vol. 52, No. 33, February 19, 1987 beginning on page 5105.

19. Determination of Sulfur Dioxide Removal Efficiency and Particulate, Sulfur Dioxide and Nitrogen Oxides Emissions Rates from Electric Utility Steam Generators

Sulfur dioxide removal efficiency and particulate, sulfur dioxide, and nitrogen oxides emission rates from electric utility steam generators shall be determined by Method 19 outlined in the *Federal Register*, Vol. 44, No. 113, June 11, 1979, beginning on page 33580, and as amended in the *Federal Register*, Vol. 48, No. 207, October 25, 1983, on page 49460.

20. Determination of Nitrogen Oxides, Sulfur Dioxide, and Oxygen Emissions From Stationary Gas Turbines

Nitrogen oxides, sulfur dioxide, and oxygen emissions from stationary gas turbines shall be determined by Method 20 outlined in the *Federal Register*, Vol. 44, No. 176, September 10, 1979, beginning on page 52792, and as amended in the *Federal Register*, Vol. 47, No. 135, July 14, 1982, beginning on page 30480, and as amended in the *Federal Register*, Vol. 51, No. 177, September 12, 1986, beginning on page 32456.

(Rule 1200-3-16-.01, continued)

21. Determination of Volatile Organic Compound Leaks

    Volatile organic compound leaks shall be determined by Method 21 outlined in the *Federal Register*, Vol. 48, No. 161, August 18, 1983, beginning on page 37600, and as amended in the *Federal Register*, Vol. 48, No. 247, December 22, 1983, beginning on page 56580.

22. Visual Determination of Fugitive Emissions from Material Sources and Smoke Emissions from Flares

    Fugitive emissions from material sources and smoke emissions from flares shall be determined by Method 22 outlined in the *Federal Register*, vol. 47, No. 152, August 5, 1982, beginning on page 84146, and as amended in the *Federal Register*, Vol. 48, No. 202, October 18, 1983, beginning on page 48360.

23. (Reserved)

24. Determination of Volatile Matter Content, Water Content, Density, Volume Solids, and Weight Solids of Surface Coatings

    Volatile matter content, water content, density, volume solids, and weight solids of surface coatings shall be determined by either Method 24 outlined in the *Federal Register*, Vol. 45, No. 194, October 3, 1980, beginning on page 65958, or by the following alternative method:

    (i) Determination of Volatile Matter Content and Density of Printing Inks and Related Coatings

    Volatile matter content and density of printing inks and related coatings shall be determined by Method 24A outlined in the *Federal Register*, Vol. 47, No. 216, November 8, 1982, on page 50655, and as amended in the *Federal Register*, Vol. 48, No. 6, January 10, 1983, on page 1056.

25. Determination of Total Gaseous Nonmethane Organic Emissions as Carbon

    Total gaseous nonmethane organic emissions shall be determined as carbon by Method 25 outlined in the *Federal Register*, Vol. 45, No. 194, October 3, 1980, beginning on page 65959, or by one of the following alternative methods:

    (i) Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer

    Total gaseous organic concentration shall be determined using a flame ionization analyzer by Method 25A outlined in the *Federal Register*, Vol. 48, No. 161, August 18, 1983, beginning on page 37595.

    (ii) Determination of Total Gaseous Organic Concentration Using a Nondispersive Infrared Analyzer

    Total gaseous organic concentration shall be determined using a nondispersive infrared analyzer by Method 25B outlined in the *Federal Register*, Vol. 48, No. 161, August 18, 1983, on page 37597.

26. (Reserved)

(Rule 1200-3-16-.01, continued)

27. Determination of Vapor Vapor tightness of gasoline delivery tank shall be determined using a pressure-vacuum test by Method 27 as outlined in the *Federal Register*, Vol. 48, No. 161, August 18, 1983, beginning on page 37597.Tightness of Gasoline Delivery Tank Using Pressure-Vacuum Test

(6) Compliance with standards and maintenance requirements:

(a) Compliance with standards in this chapter, other than opacity standards, shall be determined only by performance tests established by paragraph (5) of this rule unless otherwise specified in the applicable standard. Noncompliance may be established by these tests, or by the results of the monitoring (including fuel data) required in accordance with the provisions of these regulations.

(b) Compliance with opacity standards in this chapter shall be determined by conducting observations in accordance with the reference method or by equivalent or alternate methods specified by the Technical Secretary. Noncompliance may be demonstrated by these methods or by monitoring with transmissometers. Opacity readings of portions of plumes which contained condensed, uncombined water vapor shall not be used for purposes of determining compliance with opacity standards. The results of continuous monitoring by transmissometers 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 source shall meet the burden of proving that the instrument used meets (at the time of the alleged violation), performance specification as required by the Technical Secretary, has been properly maintained and (at the time of the alleged violation) calibrated, and that the resulting data have not been tampered with in any way.

(c) 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.

(d) 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 Technical Secretary which may include, but is not limited to, monitoring results, opacity observations, review of operating and maintenance procedures, and inspection of the source.

(e) 1. An owner or operator of an affected facility may request the Technical Secretary to determine opacity of emissions from the affected facility during the initial performance tests required by paragraph 1200–3–16–.01(5).

2. Upon receipt from such owner or operator of the written report of the results of the performance test required by paragraph 1200–3–16–.01(5), the Technical Secretary will make a finding concerning compliance with opacity and other applicable standards. If the Technical Secretary finds that an affected facility is in compliance with all applicable standards for which performance tests are conducted in accordance with paragraph 1200–3–16–.01(5) but during the time such performance tests are being conducted fails to meet any applicable opacity standards, he shall notify the owner or operator and advise him that he may petition the Technical Secretary within 10 days of receipt of notification to make appropriate adjustment to the opacity standard for the affected facility.

3. The Technical Secretary will grant such a petition upon a demonstration by the owner or operator that the affected facility and associated air pollution control equipment was operated and maintained in a manner to minimize the opacity of emissions during the performance tests; that the performance tests were performed under conditions established

by the Technical Secretary; and that the affected facility and associated air pollution control equipment were incapable of being adjusted or operated to meet the applicable opacity standard.

4. The Technical Secretary will establish an opacity standard for the affected facility meeting the above requirements at a level at which the source will be able, as indicated by the performance and opacity tests, to meet the opacity standard at all times during which the source is meeting the mass or concentration emission standard.

(7) Notification and Record Keeping

(a) Any owner or operator subject to the provisions of this chapter shall furnish the Technical Secretary written notification as follows:

1. A notification of the date construction (or reconstruction as defined under subparagraph (9)(b) of this rule) of an affected facility is commenced postmarked no later than 30 days after such date. This requirement shall not apply in the case of mass-produced facilities which are purchased in completed form.

2. 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.

3. A notification of the actual date of initial startup of an affected facility postmarked within 15 days after such date.

4. 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 the change is specifically exempted under an applicable rule or in part (9)(a)6. of this rule and the exemption is not denied under subpart (9)(a)5.(v) of this rule. 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 Technical Secretary may request additional relevant information subsequent to this notice.

5. A notification of the date upon which demonstration of the continuous monitoring system performance commences in accordance with subparagraph (8)(c). Notification shall be postmarked not less than 30 days prior to such date.

(b) Any owner or operator subject to the provisions of 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; or any periods during which a continuous monitoring system or monitoring device is inoperative.

(c) Each owner or operator required to install a continuous monitoring system shall submit a written report of excess emissions (as defined in applicable rules) to the Technical Secretary 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:

1. The magnitude of excess emissions computed in accordance with subparagraph (8)(h), any conversion factor(s) used, and the date and time of commencement and completion of each time period of excess emissions.

(Rule 1200-3-16-.01, continued)

2. 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), the corrective action taken or preventative measures adopted.

3. 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.

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

(d) Any owner or operator subject to the provisions of this chapter shall maintain a file on 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 two years following the date of such measurements, maintenance, reports, and records.

(8) Monitoring Requirements

(a) All in-stack monitoring systems shall meet the performance specifications referenced by the various parts of this subparagraph unless otherwise specified in the specific rule that required the in-stack monitoring system to be installed.

1. Continuous in-stack monitoring systems for the measurement of opacity shall meet the requirements of Performance Specification 1 outlined in the *Federal Register*, Volume 48, Number 62, Wednesday, March 30, 1983, beginning on page 13327.

2. Continuous in-stack monitoring systems for the measurements of either sulfur dioxide or nitrogen oxides shall meet the requirements of Performance Specification 2 outlined in the *Federal Register*, Volume 48, Number 102, Wednesday, May 25, 1983, beginning on page 23611.

3. Continuous in-stack monitoring systems for the measurement of either oxygen or carbon dioxide shall meet the requirements of Performance Specification 3 outlined in the *Federal Register*, Volume 48, Number 102, Wednesday, May 25, 1983, on page 23616.

4. Continuous in-stack monitoring systems for the measurement of carbon monoxide shall meet the requirements of Performance Specification 4 outlined in the *Federal Register*, Volume 50, Number 150, Monday, August 5, 1985, beginning on page 31701.

5. Continuous in-stack monitoring systems for the measurement of total reduced sulfur compounds shall meet the requirements of Performance Specification 5 outlined in the *Federal Register*, Volume 48, Number 140, Wednesday, July 20, 1983, on page 32986.

(b) All continuous monitoring systems and monitoring devices shall be installed and operational prior to conducting performance tests required by paragraph (5) of this rule. Verification of operational status shall, as a minimum, consist of the following:

1. For continuous monitoring systems referenced in part (d)1. of this paragraph, completion of the conditioning period specified by the applicable performance specification referenced in subparagraph (a) above.

(Rule 1200-3-16-.01, continued)

2. For continuous monitoring systems referenced in part (d)2. of this paragraph, completion of seven days of operation.

3. For monitoring devices referenced in applicable rules, completion of the manufacturer's written requirements or recommendations for checking the operation or calibration of the device.

(c) It shall be demonstrated that the continuous in-stack opacity monitoring system meets the specifications in Performance Specification 1 as referenced in subparagraph (a) above, before the performance test required under paragraph (5) of this rule is conducted. Other continuous emission monitoring systems shall be evaluated during any performance tests required under paragraph (5) of this rule or within 30 days thereafter. The owner or operator of an affected facility shall conduct continuous emission monitoring system performance evaluations at such other times as may be required by the Technical Secretary and shall furnish the Technical Secretary within 60 days thereof two or, upon request, more copies of a written report of the results of all tests referenced in this subparagraph. These continuous monitoring system performance evaluations shall be conducted in accordance with the requirements and procedures contained in the applicable performance specification as referenced in subparagraph (a) above.

(d) Owners or operators of all continuous emission monitoring systems installed in accordance with the provisions of this chapter shall check the zero and span calibration drifts at least once daily in accordance with the method prescribed by the manufacturer of such systems unless the manufacturer recommends adjustments at shorter intervals, in which case such recommendations shall be followed. The zero and span shall, as a minimum, be adjusted whenever the 24-hour zero drift or 24-hour span drift limits of the applicable performance specifications as referenced in subparagraph (a) above are exceeded. For continuous monitoring systems measuring opacity of emissions, the optical surfaces exposed to the effluent gases shall be cleaned prior to performing the zero or span drift adjustments except that for systems using automatic zero adjustments, the optical surfaces shall be cleaned when the cumulative automatic zero compensation exceeds four percent opacity. Unless otherwise approved by the Technical Secretary, the following procedures, as applicable, shall be followed.

1. For extractive continuous monitoring systems measuring gases, minimum procedures shall include introducing applicable zero and span gas mixtures into the measurement system as near the probe as is practical. Span and zero gases certified by their manufacturer to be traceable to National Bureau of Standards reference gases shall be used whenever these reference gases are available. The span and zero gas mixtures shall be the same composition as specified in the applicable performance specification as referenced in subparagraph (a) above. Every six months from date of manufacture, span and zero gases shall be reanalyzed by conducting triplicate analyses with Reference Method 6, as referenced by Part 1200–3–16–.01(5)(g)6., for sulfur dioxide; Reference Method 7, as referenced by Part 1200–3–16–.01(5)(g)7., for nitrogen oxides; and Reference Method 3, as referenced by Part 1200–3–16–.01(5)(g)3., for oxygen and carbon dioxide.

   The gases may be analyzed at less frequent intervals if longer shelf lives are guaranteed by the manufacturer.

2. For non-extractive continuous monitoring systems measuring gases, minimum procedures shall include upscale check(s) using a certified calibration gas cell or test cell which is functionally equivalent to a known gas concentration. The zero check may be performed by computing the zero value from upscale measurements or by mechanically producing a zero condition.

3. 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.

(e) Except for zero and span adjustments required under subparagraph (d) of this paragraph and system breakdowns, repairs, and calibration checks, all continuous monitoring systems shall be in continuous operation and shall meet minimum frequency of operation requirements as follows:

1. All continuous monitoring systems referenced by subparagraph (8)(c) 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.

2. All continuous monitoring systems referenced by subparagraph (c) of this paragraph 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.

(f) All continuous monitoring systems or monitoring devices shall be installed in such a manner 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 are referenced in subparagraph (8)(a) of this rule.

(g) When the effluents from a single affected facility or two 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 effluent or on the combined effluent. When the affected facilities are not subject to the same emission standards, separate continuous monitoring systems shall be installed on each effluent. When the effluent from one affected facility is released to the atmosphere through more than one point, the owner or operator shall install applicable continuous monitoring systems on each separate effluent unless the installation of fewer systems is approved by the Technical Secretary.

(h) 1. Owners or operators of all continuous monitoring systems for measurement of opacity shall reduce all data to six- minute averages and for systems other than opacity to one- hour averages for time periods as defined in paragraph (4) of this Rule. Six minute opacity averages shall be calculated from 24 or more data points equally spaced over each six-minute period. For systems other than opacity, one-hour averages shall be computed from four or more data points equally spaced over each one-hour period. Data recorded during periods of system breakdowns, repairs, calibration checks, and zero and span adjustments shall not be included in the data averages computed under this subparagraph. An arithmetic or integrated average of all data may be used. The data output of all continuous monitoring systems may be recorded in reduced or nonreduced form (e.g., ppm pollutant and percent 02 or ng/J (lb/million Btu) of pollutant). All excess emissions shall be converted into units of the standard using the applicable conversion procedures specified in the rules of this chapter. After conversion into units of the standard, the data may be rounded to the same number of significant digits used in the following rules in this chapter to specify the applicable standard (e.g., rounded to the nearest one percent opacity).

2. Upon written application by an owner or operator, the Technical Secretary may approve alternatives to any monitoring procedures or requirements of this chapter including, but not limited to the following:

(i) 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.

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

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

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

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

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

(vii) Alternative to the A.S.T.M. test methods or sampling procedures specified by any rule. (Note: All references to ASTM in this rule refers to the American Society for Testing Materials. Copies of methods are available for purchase by writing to ASTM, 1916 Race Street, Philadelphia, PA 19103 or by writing to the Tennessee Division of Air Pollution Control, 701 Broadway, 4th Floor Customs House, Nashville, TN 37219. Be sure and specify which method is desired).

(viii) Alternative continuous monitoring systems that do not meet the design or performance requirements in Performance Specification 1, as referenced in subparagraph (a) above, but adequately demonstrate a definite and consistent relationship between its measurements and the measurements of opacity by a system complying with the requirements in Performance Specification 1. The Technical Secretary may require that such demonstration be performed for each affected facility.

(ix) Alternative monitoring requirements when the effluent from a single affected facility or the combined effluent from two or more affected facilities are released to the atmosphere through more than one point.

(i) The reference methods for continuous monitoring systems for opacity, sulfur dioxide, nitrogen oxides, oxygen, and carbon dioxide are found in the *Federal Register*, Vol. 40, No. 194, of October 6, l975.

(9) (a) Modification

1. Modification as defined and used in this chapter shall have a less inclusive meaning than in the other chapters of these regulations. Therefore, an action not considered a modification for inclusion under the requirements of this chapter may be a modification as regards the permit requirements in chapter 1200–3–9 and other requirements for new and/or modified sources in other than this chapter 1200– 3–16 of the regulations.

2. Except as provided under parts 5. and 6. of this subparagraph and subparagraph (b) of this paragraph, 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 shall become 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.

(Rule 1200-3-16-.01, continued)

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

   (i) Emission factors are specified in the latest issue of "Compilation of Air Pollution Emission Factors," EPA Publication No. AP-42, or other emission factors determined by the Technical Secretary 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 not increase.

   (ii) Material balances, continuous monitor data, or manual emission tests in cases where utilization of emission factors as referenced in subpart (i) of this part does not demonstrate to the Technical Secretary'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 Technical Secretary's satisfaction that there are reasonable grounds to dispute the results obtained by the Technical Secretary utilizing emission factors as referenced in subpart (i) of this part. When the emission rate is based on results from manual emission tests or continuous monitoring systems, the procedures specified in Appendix C as listed in the *Federal Register* (40 FR 58420, December 16, l975) shall be used to determine whether an increase in emission rate has occurred. Tests shall be conducted under such conditions as the Technical Secretary shall specify to the owner or operator based on representative performance of the facility. At least three valid test runs must be conducted before and at least three after the physical or operational change. All operating parameters which may affect emissions must be held constant to the maximum feasible degree for all test runs.

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

5. (i) A modification shall not be deemed to occur if an existing facility undergoes a physical or operational change where the owner or operator demonstrates to the Technical Secretary's satisfaction (by any of the procedures prescribed under part 3. of this subparagraph) that the total emission rate of any pollutant has not increased from all facilities within the stationary source to which appropriate reference, equivalent, or alternative methods can be applied. An owner or operator may completely and permanently close any facility within a stationary source to prevent an increase in the total emission rate regardless of whether such reference, equivalent or alternative method can be applied, if the decrease in emission rate from such closure can be adequately determined by any of the procedures prescribed under part 3. of this subparagraph. The owner or operator of the source shall have the burden of demonstrating compliance with this paragraph.

   (ii) Such demonstration shall be in writing and shall include:

      (I) The name and address of the owner or operator.

      (II) The location of the stationary source.

      (III) A complete description of the existing facility undergoing the physical or operational change resulting in an increase in emission rate, any applicable control system, and the physical or operational change to such facility.

(IV) The emission rates into the atmosphere from the existing facility of each pollutant to which a standard applies physical or operational change takes place, to the extent such information is known or can be predicted.

(V) A complete description of each facility and the control systems, if any, for those facilities within the stationary source where the emission rate of each pollutant in question will be decreased to compensate for the increase in emission rate from the existing facility undergoing the physical or operational change.

(VI) The emission rates into the atmosphere of the pollutants in question from each facility described under item (V) of this subpart both before and after the improvement or installation of any applicable control system or any physical or operational changes to such facilities to reduce emission rate.

(VII) A complete description of the procedures and methods used to determine the emission rates.

(iii) Compliance with part 5. of this subparagraph may be demonstrated by the methods listed in part 3. of this subparagraph where appropriate. Decreases in emissions resulting from requirements of rules in other chapters of Tennessee Air Pollution Control Regulations will not be acceptable. The required reduction in emission rate may be accomplished through the installation or improvement of a control system or through physical or operational changes to facilities including reducing the production of a facility or closing a facility.

(iv) Emission rates established for the existing facility which is undergoing a physical or operational change resulting in an increase in the emission rate, and established for the facilities described under item 5. (ii)(V) of this subparagraph shall become the baseline for determining whether such facilities undergo a modification or are in compliance with standards.

(v) Any emission rate in excess of that rate established under subpart (iv) of this part shall be a violation of these regulations except as otherwise provided in part 6. of this subparagraph. However, any owner or operator electing to demonstrate compliance under this part 5. must apply to the Technical Secretary to obtain the use of any exemptions under subparts 6.(i), 6.(ii), and 6.(iv) of this subparagraph. The Technical Secretary will grant such under this paragraph will not be circumvented or nullified by the utilization of the exemption.

(vi) The Technical Secretary may require the use of continuous monitoring devices and compliance with necessary reporting procedures for each facility described in items 5.(ii)(III) and 5.(ii)(V) of this subparagraph.

6. The following shall not, by themselves, be considered modifications under this chapter:

(i) Maintenance, repair, and replacement which the Technical Secretary determines to be routine for a source category, subject to the provisions of part 4. of this subparagraph and subparagraph (b) of this paragraph.

(ii) An increase in production rate of an existing facility, if that increase can be accomplished without a capital expenditure on the stationary source containing that facility.

(iii) An increase in the hours of operation.

(iv) Use of an alternative fuel or raw material if, prior to the date any standard under this part becomes applicable to that source type, provided 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, shall not be considered a modification.

(v) 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 Technical Secretary determines to be less environmentally beneficial.

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

7. Special provisions set forth under an applicable rule of this chapter shall supersede any conflicting provisions of this paragraph.

8. Within 180 days of the completion of any physical or operational change subject to the control measures specified in parts 2. or 5. of this subparagraph, compliance with all applicable standards must be achieved.

(b) 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:

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

(ii) 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 percent of the fixed capital cost that would be required to construct a comparable entirely new facility, he shall notify the Technical Secretary of the proposed replacements. The notice must be postmarked 60 days (or as soon as practicable) before construction of the replacements is commenced and must include the following information:

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

(ii) The location of the existing facility.

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

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

(Rule 1200-3-16-.01, continued)

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

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

(vii) 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 Technical Secretary will determine, within a reasonable time after receipt of the notice required by part 4. of this subparagraph and any additional information he may reasonably require, whether the proposed replacement constitutes reconstruction.

6. The Technical Secretary's determination under part 5. of this subparagraph shall be based on:

(i) 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;

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

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

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

7. Individual rules of this chapter may include specific provisions which refine and delimit the concept of reconstruction set forth in this subparagraph.

(10) Upon mutual agreement of the owner or operator of any air contaminant source and the Technical Secretary, an emission limit more restrictive than that otherwise specified in this Chapter may be established. This emission limit shall be stated as a special condition for any permit or order issued concerning the source. Violation of this agreed to, more stringent emission standard is grounds for revocation of the issued permit and/or other enforcement measures provided for in the Tennessee Air Quality Act.

(11) General Control Device Requirements

(a) Introduction

This paragraph contains requirements for control devices used to comply with applicable rules of chapters 11 and 16. The requirements are placed here for administrative convenience and only apply to facilities covered by rules referring to this paragraph.

(b) Flares

Subparagraphs (c) through (f) of this paragraph apply to flares.

(c) 1. Flares shall be designed for and operated with no visible emissions as determined by the methods specified in subparagraph (f) of this paragraph, except for periods not to exceed a total of 5 minutes during any 2 consecutive hours.

2. Flares shall be operated with a flame present at all times, as determined by the methods specified in subparagraph (f) of this paragraph.

(Rule 1200-3-16-.01, continued)

3. 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 subparagraph (f) of this paragraph.

4. (i) Steam-assisted and nonassisted flares shall be designed for and operated with an exit velocity, as determined by the methods specified in part (f)4 of this paragraph less than 18.3 m/sec (60 ft/sec), except as provided in subpart (c)4(ii) and (iii) of this paragraph.

   (ii) Steam-assisted and nonassisted flares designed for and operated with an exit velocity, as determined by the methods specified in part (f)4 of this paragraph 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).

   (iii) Steam-assisted and nonassisted flares designed for and operated with an exit velocity, as determined by the methods specified in part (f)4 of this paragraph less than velocity, Vmax, as determined by the method specified in part (f)5 of this paragraph and less than 122 m/sec (400 ft/sec) are allowed.

5. Air-assisted flares shall be designed and operated with an exit velocity less than the velocity, Vmax, as determined by the method specified in part (f)6 of this paragraph.

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

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

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

(f) 1. Reference Method 22 as specified in 1200–3–16–.01(5)(g)22. shall be used to determine the compliance of flares with the visible emission provisions of this rule. The observation period is 2 hours and shall be used according to Method 22.

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:

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

Where:

H_T = Net heating value of the sample, MJ/scm; where the net enthalpy per mole of offgas is based on combustion at 250C and 760 mm Hg, but the standard temperature for determining the volume corresponding to one mole is 200C;

(Rule 1200-3-16-.01, continued)

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

where the standard temperature for $\frac{(\text{g mole})}{\text{scm}}$ is 20°C;

n = Number of components in the sample;

Ci = Concentration of sample component i in ppm on a wet basis, as measured for organics by Reference Method 18 (as specified in rule 1200–3–16–.01(5)(g)18.) and measured for hydrogen and carbon monoxide by ASTM D1946-77; and

Hi = Net heat of combustion of sample component i, kcal/g mole at 250C and 760 mm Hg. The heat of combustion may be determined using ASTM D2382-76 if published values are not available or cannot be calculated.

(Note: All references to ASTM in this rule refers to the American Society for Testing Materials. Copies of methods are available for purchase by writing to ASTM, 1916 Race Street, Philadelphia, PA 19103 or by writing to the Tennessee Division of Air Pollution Control, 701 Broadway, 4th Floor Customs House, Nashville, TN 37219. Be sure and specify which method is desired).

4. The actual exit velocity of a flare shall be determined by dividing the volumetric flowrate (in units of standard temperature and pressure) as determined either by Reference Method 2 or 2(A) as appropriate (as specified in 1200–3–16–.01(5)(g)2.); by the unobstructed (free) cross sectional area of the flare tip.

5. The maximum permitted velocity, Vmax, for flares complying with subpart (c)4.(iii) of this paragraph shall be determined by the following equation.

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

Vmax = Maximum permitted velocity, M/sec

28.8 = Constant

31.7 = Constant

H_T = The net heating value as determined in part (f)3.

6. The maximum permitted velocity, Vmax, for air-assisted flares shall be determined by the following equation.

$$\text{Vmax} = 8.706 + 0.7084\,(\text{HT})$$

Vmax = Maximum permitted velocity, m/sec

8.706 = Constant

0.7084 = Constant

H_T = The net heating value as determined in part (f)3 of his paragraph.

Authority: *T.C.A. §§68–25–105 and 4–5–202.* ***Administrative History****: Original rule filed January 10, 1977; effective February 9, 1977. Amendment filed February 5, 1979; effective March 21, 1979. Amendment filed effective*

(Rule 1200-3-16-.01, continued)

May 7, 1979; effective June 21, 1979. Amendment filed November 19, 1981; effective January 4, 1982. Amendment filed December 2, 1981; effective January 18, 1982. Amendment filed January 31, 1983; effective March 2, 1983. Amendment filed July 3, 1984; effective August 1, 1984. Amendment filed September 26, 1986; effective November 10, 1986. Amendment filed September 21, 1988; effective November 6, 1988.

1200–3–16–.02 FUEL FIRED STEAM GENERATORS FOR WHICH CONSTRUCTION IS COMMENCED AFTER APRIL 3, 1972.

(1) Applicability.

(a) The affected facilities to which the provisions of this rule apply are:

1. Each fossil-fuel-fired steam generating unit of more than 73 mega watts heat input rate (250 million Btu per hour) commenced on or after April 3, 1972, and before November 6, 1988.

2. Each fossil-fuel and 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) that commenced construction or modification after November 6, 1988.

(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 rule, shall not bring that unit under the applicability of this rule.

(c) The requirements of subparts (5)(a)2.(iv) and (v), subparagraphs (b), and (5)(d), and subpart (6)(f)4.(vi) of this rule are applicable to lignite-fired steam generating units that commenced construction or modification after November 6, 1988.

(d) Any facility covered under 1200–3–16–.03 is not covered under this rule.

(2) Definitions.

(a) “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.

(b) “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.

(c) “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.

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

(f) “Coal” means all solid fuels classified as anthracite, bituminous, subbituminous, or lignite by the American Society for Testing Material. Designation D 388-77.

(Note: All references to ASTM in this rule refers to the American Society for Testing Materials. Copies of methods are available for purchase by writing to ASTM, 1916 Race Street, Philadelphia, PA 19103 or by writing to the Tennessee Division of Air Pollution Control, 701

(Rules 1200-3-16-.02, continued)

Broadway, 4th Floor Customs House, Nashville, TN 37219. Be sure and specify which method is desired).

(3) Standard for particulate matter and visible emissions.

(a) On and after the date on which the performance test required to be conducted by 1200–3–16–.01(5)(g) is completed, no owner or operator subject to the provisions of this rule shall 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. For units described in part (1)(a)1. of this rule, exhibit greater than 20 percent opacity except that a maximum of 40 percent opacity shall be permissible for not more than 2 minutes in any hour.

3. For units described in part (1)(a)2. of this rule, exhibit greater than 20 percent opacity except for one six-minute period per hour of not more than 27 percent opacity.

(4) Standard for sulfur dioxide.

(a) On and after the date on which the performance test required to be conducted by 1200–3–16–.01(5) is completed, no owner or operator subject to the provisions of this rule shall 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:

$$PS_{SO_2} = \frac{y(340) + z(520)}{y + z}$$

where:

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, and

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 1200–3–16–.01(5) is completed, no owner or operator subject to the provisions of this rule shall cause to be

(Rules 1200-3-16-.02, continued)

discharged into the atmosphere from any affected facility any gases which contain nitrogen oxides, expressed as NO2 in excess of:

1. For units described in part (1)(a)1. of this rule:

   (i) 86 nanograms per joule heat input (0.20 lb per million Btu) derived from gaseous fossil fuel.

   (ii) 130 nanograms per joule heat input (0.30 lb per million Btu) derived from liquid fossil fuel.

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

2. For units described in part (1)(a)2. of this rule:

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

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

   (iii) 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 fossil fuel containing 25 percent, by weight, or more of coal refuse).

   (iv) 260 nanograms per joule heat input (0.60 lb per million Btu) derived from lignite or lignite and wood residue (except as provided by part 2(v) of this subparagraph).

   (v) 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 subparagraphs (c) and (d) of this paragraph when different fossil fuels are burned simultaneously in any combination, the applicable standard (in ng/J) is determined by proration using the following formula:

1. For units described in part (1)(a)1. of this rule:

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

where:

PS_{NOx}	=	is the prorated standard for nitrogen oxides when burning different fuels simultaneously, in nanograms per joule heat input derived from all fossil fuels fired;
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; and
z	=	is the percentage of total heat input derived from solid fossil fuel (except lignite or a solid fossil fuel containing 25% by weight or more coal refuse).

(Rules 1200-3-16-.02, continued)

2. For units described in part (1)(a)2. of this rule:

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

where:

PS_{NOx}	=	is the prorated standard for nitrogen oxides when burning different fuels simultaneously, in nanograms per joule heat input derived from all fossil fuels fired or from all fossil fuels and wood residue fired;
w	=	is the percentage of total heat input derived from lignite;
x	=	is the percentage of total heat input derived from gaseous fossil fuel;
y	=	is the percentage of total heat input derived from liquid fossil fuel; and
z	=	is the percentage of total heat input derived from solid fossil fuel (except lignite).

(c) When a fossil fuel containing at least 25 percent, 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 percent of lignite that is mined in North Dakota, South Dakota, or Montana remain subject to subpart (a)2.(v) of this paragraph 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 subparagraph (b) of this paragraph.

(b) Certain of the continuous monitoring system requirements under subparagraph (a) of this paragraph 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 subparagraph (d) of this paragraph.

3. Notwithstanding 1200–3–16–.01(8)(b), installation of a continuous monitoring system for nitrogen oxides may be delayed until after the initial performance tests under 1200–3–16–.01(5) have been conducted. If the owner or operator demonstrates during the performance test that emissions of nitrogen oxides are less than 70 percent of the applicable standards in paragraph (5) of this rule, 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 percent 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 1200–3–16–.01(5) and comply with all other applicable monitoring requirements under this rule.

(Rules 1200-3-16-.02, continued)

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

(c) For performance evaluations under 1200–3–16–.01(8)(c) and calibration checks under 1200–3–16–.01(8)(d) the following procedures shall be used:

1. Reference Methods 6 or 7, as applicable, shall be used for conducting performance evaluations of sulfur dioxide and nitrogen oxides continuous monitoring systems.

2. Sulfur dioxide or nitric oxide, as applicable, shall be used for preparing calibration gas mixtures under Performance Specification 2 as stated in the *Federal Register*, Vol. 48, No. 102, Wednesday, May 25, 1983, beginning on page 23608.

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

(In parts per million)

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

where:

x = the fraction of total heat input derived from gaseous fossil fuel, and
y = the fraction of total heat input derived from liquid fossil fuel, and
z = the fraction of total heat input derived from solid fossil fuel.

4. All span values computed under part 3. of this subparagraph 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 Technical Secretary's approval.

(d) Fuel analysis shall be conducted according to specifications provided by the Technical Secretary.

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

(Rules 1200-3-16-.02, continued)

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 Technical Secretary shall be used when measurements are on a wet basis. When measurements are on a dry basis, the following conversion procedure shall be used:

$$E = CF \frac{20.9}{20.9 - \text{percent } O_2}$$

where:

E, C, F, and $\%0_2$ are determined under subparagraph (f) of this paragraph.

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:

$$E = \frac{CFc\ 100}{\text{Percent } CO_2}$$

where:

E, C, F_c, and $\%C0_2$ are determined under subparagraph (f) of this paragraph.

(f) The values used in the equations under parts (e)1. and 2. of this paragraph are derived as follows:

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 X 104 M ng/dscm per ppm (2.59 X 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).

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 given as follows:

(i) For anthracite coal as classified according to A.S.T.M. D 388-77, F = 2.723 x 10^{-7} dscm/J (10,140 dscf/million Btu) and F_c = 0.532 x 10^{-7} scm CO_2/J (1,980 scf CO_2/million Btu).

(ii) For subbituminous and bituminous coal as classified according to A.S.T.M. D 388-77, F = 2.637 x 10^{-7} dscm/J (9,820 dscf/million Btu) and Fc = 0.486 x 10^{-7}scm CO_2/J (1,810 scf CO_2 million Btu).

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

(Rules 1200-3-16-.02, continued)

(iv) For gaseous fossil fuels, F = 2.347 x 10^{-7} dscm/J (8,740 dscf/million Btu). For natural gas, propane, and butane fuels, Fc = 0.279 x 10-7 scm CO_2/J (1,040 scf CO_2/million Btu) for natural gas, 0.322 x 10^{-7} scm CO_2/J (1,200 scf $C0_2$/million Btu) for propane and 0.338 X 10^{-7} scm CO_2/J (1,260 scf CO_2/million Btu)for butane.

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

(vi) For lignite coal as classified according to A.S.T.M. D 388-77, F = 2.659 x 10^{-7} dscm/J (9,900 dscf/million Btu) and F_c = 0.516 x 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 Technical Secretary) or Fc factor (scm CO_2/J, or scf CO_2/million Btu) on either basis in lieu of the F or Fc factors specified in part 4. of this subparagraph:

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

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

(SI units)

$$F = \frac{106\,(\,3.64\,(\%H) + 1.53\,(\%C) \times 0.57\,(\%S) + 0.14\,(\%N) - 0.46\,(\%O))}{GCV}$$

(English units)

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

(SI units)

$$Fc = \frac{321 \times 103(\%C)}{GCV}$$

(English Units)

(i) 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 A.S.T.M. method D3178-74 or D3176 (solid fuels), or computed from results using A.S.T.M. methods D1137-53(75), D1945-64(76), or D1946-77 (gaseous fuels) as applicable.

(Rules 1200-3-16-.02, continued)

(ii) GCV is the gross calorific value (kJ/kg, Btu/lb) of the fuel combusted, determined by th A.S.T.M. test methods D 2015-77 for solid fuels and D 1826-77 for gaseous fuels as applicable.

(iii) For affected facilities which fire both fossil fuels and nonfossil fuels, the F or Fc value shall be subject to the Technical Secretary's approval.

6. For affected facilities firing combinations of fossil fuels or fossil fuels and wood residue, the F or Fc factors determined by part (f)4. or (f)5. of this paragraph shall be prorated in accordance with the applicable formula as follows:

$$F = \overset{n}{\underset{i=1}{\text{sum}}} X_i F_i \quad \text{or} \quad F_c = \overset{n}{\underset{i=1}{\text{sum}}} X_i (F_c)_i$$

where:

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

F_i or$(F_c)i$ = the applicable F or Fc factor for each fuel type determined in accordance with parts (f)4. and (f)5. of this paragraph.

n = the number of fuels being burned in combination

(g) For the purpose of reports required under 1200–3–16–.01(7)(c), periods of excess emissions that shall be reported are defined as follows:

1. Opacity.

(i) For units defined in part (1)(a)1. of this rule, the Technical Secretary may specify any level he wishes so long as the level constitutes a violation under part (3)(a)2. of this rule.

(ii) For units defined in part (1)(a)2. of this rule, excess emissions are defined as any six-minute period during which the average opacity of emissions exceeds 20 percent opacity, except that one six-minute average per hour of up to 27 percent opacity need not be reported.

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

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

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

(Rules 1200-3-16-.02, continued)

(7) Test methods and procedures.

(a) The Reference Methods in 1200–3–16–.01(5)(g) except as provided in 1200–3–16–.01(5)(b) shall be used to determine compliance with the standards as prescribed in Paragraphs (3), (4), and (5) of this rule as follows:

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

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

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

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

5. Method 7 for concentration of NO_x.

(b) For Method 5, 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 Technical Secretary. The probe and filter holder heating systems in the sampling train shall be set to provide a gas temperature of 160+ 14°C (320 + 25°F).

(c) For Methods 6 and 7, the sampling site shall be the same as that selected for Method 5. The sampling point in the duct shall be at the centroid of the cross section or at a point no closer to the walls than 1 m (3.28 ft.). For Method 6, the sample shall be extracted at a rate proportional to the gas velocity at the sampling point.

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

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

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

$$E = CF \frac{20.9}{20.9\text{-percent } O_2}$$

where:

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

2. C = pollutant concentration, ng/dscm (lb/dscf), determined by Method 5, 6, or 7.

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 as applicable.

The sample shall be obtained as follows:

(Rules 1200-3-16-.02, continued)

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

(ii) For determination of particulate emissions, the oxygen sample shall be obtained simultaneously by traversing the duct at the same sampling location used for each run of Method 5 under subparagraph (b) of this paragraph. Method 1 shall be used for selection of the number of traverse points except that no more than 12 sample points are required.

4. F = a factor as determined in parts (f) 4., 5., or 6. of paragraph (6) of this rule.

(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 A.S.T.M. methods D2015-77 (solid fuels), D240-76 (liquid fuels), or D1826-77 (gaseous fuels) as applicable. The method used to determine calorific value of wood residue must be approved by the Technical Secretary. 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.

Authority*: T.C.A. §§68–25–105 and 4–5–202.* ***Administrative History****: Original rule filed January 10, 1977; effective February 9, 1977. Amendment filed March 13, 1978; effective April 12, 1978. Amendment filed July 21, 1980; effective September 8, 1980. Amendment filed September 21, 1988; effective November 6, 1988.*

1200–3–16–.03 ELECTRIC UTILITY STEAM GENERATING UNITS FOR WHICH CONSTRUCTION COMMENCED AFTER SEPTEMBER 18, 1978.

(1) Applicability.

(a) The affected facility to which this rule 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 rule 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 rule. (The gas turbine emissions are subject to rule 1200–3–16–.31.)

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

(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) shall not bring that unit under the applicability of this rule.

(2) Definitions.

(Rules 1200-3-16-.03, continued)

(a) "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; nuclear steam generators are not included).

(b) "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.

(c) "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.

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

(e) "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.

(f) "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:

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

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

2. For sulfur dioxide is determined under 1200–3–16–.03–(9)(b).

3. For nitrogen oxides is:

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

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

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

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

(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) "Principal company" means the electric utility company or companies which own the affected facility.

(k) "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.

(l) "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 contractural 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 contractural arrangement.

(m) "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 contractural sales to other electric utility companies. Sales to other electric utility companies (e.g., emergency power) not on a firm contractural 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.

(n) "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 is prorated based on ownership unless the proportional entitlement to electric output is otherwise established by contractural arrangement.

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

(p) "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 is prorated based on ownership unless the proportional entitlement to electric output is otherwise established by contractural arrangement.

(q) "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(s) in the neighboring company supplying replacement electrical power) less the electric power load on these transmission lines.

(r) "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.

(s) "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:

   (i) All available system capacity in the principal company interconnected with the affected facility is being operated, and

   (ii) 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 part 1. of this definition apply.

(t) "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.

(u) "Potential electrical output capacity" is defined as 33 percent of the maximum design heat input capacity of the steam 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 fossil fuel firing capacity of the steam generator exclusive of the heat input and electrical power contribution by the gas turbine.

(v) "Anthracite" means coal that is classified as anthracite according to the American Society of Testing and Materials' (ASTM) Standard Specification for Classification of Coals by Rank D388-77.

(w) "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.

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

(y) "Resource recovery unit" means a facility that combusts more than 75 percent non-fossil fuel on a quarterly (calendar) heat input basis.

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

(Rules 1200-3-16-.03, continued)

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

(3) Standard for Particulate Matter.

(a) On and after the date on which the performance test required to be conducted under paragraph 1200–3–16–.01(5) is completed, no owner or operator subject to the provisions of this rule shall 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. 1 percent of the potential combustion concentration (99 percent reduction) when combusting solid fuel; and

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

(b) On and after the date the particulate matter performance test required to be conducted under 1200–3–16–.01(5) is completed, no owner or operator subject to the provisions of this rule shall cause to be discharged into the atmosphere from any affected facility any gases which exhibit greater than 20 percent opacity (6-minute average), except for one 6-minute period per hour of not more than 27 percent opacity.

(4) Standard for Sulfur Dioxide.

(a) On and after the date on which the initial performance test required to be conducted under 1200–3–16–.01(5) is completed, no owner or operator subject to the provisions of this rule shall cause to be discharged into the atmosphere from any affected facility which combusts solid fuel or solid-derived fuel, except as provided under subparagraphs (c), (d), (f), or (h) of this paragraph, any gases which contain sulfur dioxide in excess of:

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

2. 30 percent of the potential combustion concentration (70 percent 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 1200–3–16–.01(5) is completed, no owner or operator subject to the provisions of this rule shall cause to be from any affected facility which combusts liquid or gaseous fuels (except for liquid or gaseous fuels derived from solid fuels and as provided under subparagraphs (e) or (h) of this paragraph), any gases which contain sulfur dioxide in excess of:

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

2. 100 percent 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 1200–3–16–.01(5) is complete, no owner or operator subject to the provisions of this rule shall cause to be discharged into the atmosphere from any affected facility which combusts solid solvent refined coal (SRC-I) any gases which contain sulfur dioxide in excess of 520 ng/J (1.20

(Rules 1200-3-16-.03, continued)

lb/million Btu) heat input and 15 percent of the potential combustion concentration (85 percent reduction) except as provided under subparagraph (f) of this paragraph; 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 are limited to 520 ng/J (1.20 lb/million Btu) heat input from any affected facility which:

1. Combusts 100 percent anthracite, or

2. Is classified as a resource recovery facility, or

3. Is located in a noncontinental area and combusts solid fuel or solid-derived fuel.

(e) Sulfur dioxide emissions are limited to 340 ng/J (0.80 lb/million Btu) heat input from any affected facility which is located in a noncontinental area and combusts liquid or gaseous fuels (excluding solid-derived fuels).

(f) The emission reduction requirements under this paragraph do not apply to any affected facility that is operated under an SO_2 commercial demonstration permit issued in accordance with the provisions of 1200–3–16–.03(6).

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

(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 percent

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 - PSO2).

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

(Rules 1200-3-16-.03, continued)

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 1200–3–16–.01(5) is completed, no owner or operator subject to the provisions of this rule shall cause to be discharged into the atmosphere from any affected facility, except as provided under subparagraph (b) of this paragraph, 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 ng/J	Heat input (lb/M 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 requirements	Exempt from NOx standards and NOx monitoring	
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 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)

(Rules 1200-3-16-.03, continued)

2. NOx reduction requirements –

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

(b) The emission limitations under subparagraph (a) of this paragraph do not apply to any affected facility which is combusting coal-derived liquid fuel and is operating under a commercial demonstration permit issued in accordance with the provisions of 1200–3–16–.03(6).

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

$$E_{NO_X} = (86\ w + 130\ x + 210\ y + 260\ z)/100$$

where:

E_{NO_x} 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; and

z is the percentage of total heat input derived from the combustion of fuels subject to the 260 ng/J heat input standard.

(6) Commercial demonstration permit.

(a) An owner or operator of an affected facility proposing to demonstrate an emerging technology may apply to the EPA Administrator for a commercial demonstration permit in accordance with section 60.45a, “Commerical demonstration permit,” as specified in the *Federal Register*, Vol. 44, No. 113, June 11, 1979.

(b) An owner or operator of an affected facility that combusts solid solvent refined coal (SRC-I) and who is issued a commercial demonstration permit is not subject to the SO2 emission reduction requirements under 1200–3–16–.03(4)(c) but must, as a minimum, reduce SO2 emissions to 20 percent of the potential combustion concentration (80 percent reduction) for each 24-hour period of steam generator operation and to less than 520 ng/J (1.20 lb/million Btu) heat input on a 30-day rolling average basis.

(c) An owner or operator of a fluidized bed combustion electric utility steam generator (atmospheric or pressurized) who is issued a commercial demonstration permit is not subject to the SO2 emissions reduction requirements under 1200–3–16–.03(4)(a) but must, as a minimum, reduce SO2 emissions to 15 percent of the potential combustion concentration (85 percent

reduction) on a 30-day rolling average basis and to less than 520 ng/J (1.20 lb/million Btu) heat input on a 30-day rolling average basis.

(d) The owner or operator of an affected facility that combusts coal-derived liquid fuel and who is issued a commercial demonstration permit is not subject to the applicable NOx emission limitation and percent reduction under 1200–3–16–.03(5)(a) but must, as a minimum, reduce emissions to less than 300 ng/J (0.70 lb/million Btu) heat input on a 30-day rolling average basis.

(e) Commerical demonstration permits may not exceed the following equivalent MW electrical generation capacity for any one technology category, and the total equivalent MW electrical generation capacity for all commercial demonstration plants may not exceed 15,000 MW.

Technology	Pollutant	Equivalent electrical capacity (MW electrical output)
Solid solvent refined coal (SRC-I)	SO2	6,000 10,000
Fluidized bed combustion (atmospheric)	SO2	400-3,000
Fluidized bed combustion (pressurized)	SO2	400-1,200
Coal liquification	NOx	750-10,000
Total allowable for all technologies		15,000

(7) Compliance provisions.

(a) Compliance with the particulate matter emission limitation under 1200–3–16–.03(3)(a)1. constitutes compliance with the percent reduction requirements for particulate matter under 1200–3–16–.03(2) and (3).

(b) Compliance with the nitrogen oxides emission limitation under 1200–3–16–.03–(5)(a) constitutes compliance with the percent reduction requirements under 1200–3–16–.03(5)(a)2.

(c) The particulate matter emission standards under 1200–3–16–.03(3) and the nitrogen oxides emission standards under 1200–3–16–.03(5) apply at all times except during periods of startup, shutdown, or malfunction. The sulfur dioxide emission standards under 1200–3–16–.03(4) apply at all times except during periods of start-up, shutdown, or when both emergency conditions exist and the procedures under subparagraph (d) of this paragraph 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,

(Rules 1200-3-16-.03, continued)

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 Technical Secretary may at his discretion require the owner or operator within 60 days of notification to demonstrate spare module capability. To demonstrate this capability, the owner or operator must demonstrate compliance with the appropriate requirements under subparagraphs (a), (b), (d), (e), and (i) under 1200–3–16–.03– (4) for any period of operation lasting from 24 hours to 30 days when:

   (i) Any one flue gas desulfurization module is not operated,

   (ii) The affected facility is operating at the maximum heat input rate,

   (iii) 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

   (iv) The owner or operator has given the Technical Secretary 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 1200–3–16–.01(5) compliance with the sulfur dioxide emission limitations and percentage reduction requirements under 1200–3–16–.03(4) and the nitrogen oxides emission limitations under 1200–3–16–.03(5) is 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 for sulfur dioxide are calculated to show compliance with the standards.

(f) For the initial performance test required under 1200–3–16–.01(5), compliance with the sulfur dioxide emission limitations and percent reduction requirements under 1200–3–16–.03(4) and the nitrogen oxides emission limitation under 1200–3–16–.03(5) is 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 Technical Secretary. The initial performance test is to 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 is 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 (NOx only), or emergency conditions (SO_2 only). Compliance with the percentage reduction requirement for SO2 is 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 1200–3–16–.03(8) of this rule, compliance of the affected facility with the emission requirements under 1200–3–16–.03(4) and (5) of this rule for the day on which the 30-day period ends may be determined by the Technical Secretary by following the applicable procedures in sections 6.0 and 7.0 of Reference Method 19 as specified in 1200–3–16–.01(5)(g)19.

(8) Emission monitoring.

(a) The owner or operator of an affected facility shall install, calibrate, maintain, and operate a continuous montoring 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 an FGD system), the opacity is 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 are monitored (subject to the approval of the Technical Secretary).

(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 are monitored at both the inlet and outlet of the sulfur dioxide control device.

2. For a facility which qualifies under the provisions of 1200–3–16–.03(4)(d), sulfur dioxide emissions are only monitored as discharged to the atmosphere.

3. An "as fired" fuel monitoring system (upstream of coal pulverizers) meeting the requirements of Method 19 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 part (b)1. of this paragraph.

(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 subparagraphs (b), (c), and (d) of this paragraph are operated and data recorded during all periods of operation of the affected facility including periods 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 will be obtained by using other monitoring systems as approved by the Technical Secretary or the reference methods as described in subparagraph (h) of this paragraph to provide emission data for a minimum of 18 hours in at least 22 out of 30 successive boiler operating days.

(g) The 1–hour averages required under 1200–3–16–.01(8)(h) are expressed in ng/J (lbs/million Btu) heat input and used to calculate the average emission rates under 1200–3–16–.03(7). The 1-hour averages are calculated using the data points required under 1200–3–16–.01(8)(b). At least two data points must be used to calculate the 1-hour averages.

(h) Reference methods used to supplement continuous monitoring system data to meet the minimum data requirements in 1200–3–16–.03(8)(f) will be used as specified below or otherwise approved by the Technical Secretary.

(Rules 1200-3-16-.03, continued)

1. Reference Methods 3, 6, and 7, as specified in 1200–3–16–.01(5)(g)3., 6., and 7., as applicable are used. The sampling location(s) are the same as those used for the continuous monitoring system.

2. For Method 6, the minimum sampling time is 20 minutes and the minimum sampling volume is 0.02 dscm (0.71 dscf) for each sample. Samples are taken at approximately 60-minute intervals. Each sample represents a 1-hour average.

3. For Method 7, samples are taken at approximately 30-minute intervals. The arithmetic average of these two consecutive samples represents a 1-hour average.

4. For Method 3, the oxygen or carbon dioxide sample is to be taken for each hour when continuous SO2 and NOx data are taken or when Methods 6 and 7 are required. Each sample shall be taken for a minimum of 30 minutes in each hour using the integrated bag method specified in Method 3. Each sample represents a 1-hour average.

5. For each 1-hour average, the emissions expressed in ng/J (lb/million Btu) heat input are determined and used as needed to achieve the minimum data requirements of subparagraph (f) of this paragraph.

(i) The following procedures are used to conduct monitoring system performance evaluations under 1200–3–16–.01(8)(c) and calibration checks under 1200–3–16–.01(8)(d).

1. Reference Method 6 or 7, as applicable, is used for conducting performance evaluations of sulfur dioxide and nitrogen oxides continuous monitoring systems.

2. (Reserved)

3. For affected facilities burning only fossil fuel, the span value for a continuous monitoring system for measuring opacity is between 60 and 80 percent and for a continuous monitoring system measuring nitrogen oxides is 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, and

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

4. All span values computed under subparagraph (b)3. of this paragraph for burning combinations of fossil fuels are rounded to the nearest 500 ppm.

(Rules 1200-3-16-.03, continued)

5. For affected facilities burning fossil fuel, alone or in combination with non-fossil fuel, the span value of the sulfur monitoring system at the inlet to the sulfur dioxide control device is 125 percent of the maximum estimated hourly potential emissions of the fuel fired, and the outlet of the sulfur dioxide control device is 50 percent of maximum estimated hourly potential emissions of the fuel fired.

(9) Compliance determination procedures and methods.

(a) The following procedures and reference methods are used to determine compliance with the standards for particulate matter under 1200–3– 16–.03(3).

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

2. Method 5, 5B, or 17 is used for determining particulate matter emissions and associated moisture content as follows: Method 5 is to be used at affected facilities without wet 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 a temperature of 1600C (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. Do not use Method 17 after wet FGD systems if the effluent is saturated or laden with water droplets.

3. For Method 5, 5B, or 17, Method 1 is used to select the sampling site and the number of traverse sampling points. The sampling time for each run is at least 120 minutes and the minimum sampling volume is 1.7 dscm (60 dscf) except that small sampling times or volumes, when necessitated by process variables or other factors, may be approved by the Technical Secretary.

4. For Method 5 or 5B the probe and filter holder heating system in the sampling train is set to provide an average gas temperature of 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, 5B, or 17 by traversing the duct at the same sampling location. Method 1 is 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 is determined using the oxygen or carbon-dioxide measurement and particulate matter measurements obtained under this section, the dry basis Fc-factor and the dry basis emission rate calculation procedure contained in Method 19 (1200–3–16–.01(5)(g)19).

7. Prior to the Technical Secretary's issuance of a particulate matter reference method that does not experience sulfuric acid mist interference problems, particulate matter emissions may be sampled prior to a wet flue gas desulfurization system.

(b) The following procedures and methods are used to determine compliance with the sulfur dioxide standards under 1200–3–16–.03(4).

1. Determine the percent of potential combustion concentration (percent PCC) emitted to the atmosphere as follows:

(i) Fuel Pretreatment (%Rf): 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 Rf 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 1200–3–16–.03(4), any reduction in potential SO_2 emissions resulting from the following processes may be credited:

(I) Fuel pretreatment (physical coal cleaning), hydrodesulfurization of fuel oil, etc.).

(II) Coal pulverizers, and

(III) Bottom and flyash interactions.

(ii) Sulfur Dioxide Control System (%Rg): 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 is calculated using the average emission rate from the sulfur dioxide control device and the average SO2 input rate from the "as fired" fuel analysis for 30 successive boiler operating days.

(iii) Overall percent reduction (% Ro): Determine the overall percent reduction using the results obtained in subparts (b)1. (i) and (ii) of this paragraph following the procedures in Method 19. Results are 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 reduction achieved by a sulfur dioxide control system for each 30-day period in the current quarter.

(iv) Percent emitted (% PCC): Calculate the percent of potential combustion concentration emitted to the atmosphere using the following equation: Percent PCC = 100-Percent Ro.

2. Determine the sulfur dioxide emission rates following the procedures in Method 19.

(c) The procedures and methods outlined in Method 19 are used in conjunction with the 30-day nitrogen-oxides emission data collected under 1200–3–16–.03(8) to determine compliance with the applicable nitrogen oxides standard under 1200–3–16–.03(5).

(d) Electric utility combined cycle gas turbines are performance tested for particulate matter, sulfur dioxide, and nitrogen oxides using Method 19. The sulfur dioxide and nitrogen oxides emission rates from the gas turbine used in Method 19 calculations are determined when the gas turbine is performance tested under 1200–3–16–.31. The potential uncontrolled particulate matter emission rate from a gas turbine is defined as 17 ng/J (0.04 lb/million Btu) heat input.

(10) 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) are submitted to the Technical Secretary.

(b) For sulfur dioxide and nitrogen oxides the following information is reported to the Technical Secretary for each 24-hour period.

1. Calendar date.

(Rules 1200-3-16-.03, continued)

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 non-compliance 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 non-compliance with the standard; and description of corrective actions taken.

4. Identification of the boiler operating days for which pollutant or dilutent data have not been obtained by an approved method for at least 18 hours of operation of the facility; justification for not obtaining sufficient data; and description of corrective actions taken.

5. Identification of the times when emissions data have been excluded from the calculation of average emission rates because of startup, shutdown, malfunction (NO_x only), emergency conditions (SO_2 only), or other reasons, and justification for excluding data for reasons other than startup, shutdown, malfunction, or emergency conditions.

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

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

8. Identification of the times when the pollutant concentration exceeded full span of the continuous monitoring system.

9. Description of any modifications to the continuous monitoring system which could affect the ability of the continuous monitoring system to comply with Performance Specifications 2 or 3.

(c) If the minimum quantity of emission data as required by 1200–3–16–.03(8) is not obtained for any 30 successive boiler operating days, the following information obtained under the requirements of 1200–3–16–.03(7)(h) is reported to the Technical Secretary for that 30-day period:

1. The number of hourly averages available for outlet emission rates (no) and inlet emission rates (ni) as applicable.

2. The standard deviation of hourly averages for outlet emission rates (so) and inlet emission rates (si) as applicable.

3. The lower confidence limit for the mean outlet emission rate (Eo*) and the upper confidence limit for the mean inlet emission rate (Ei*) as applicable.

4. The applicable potential combustion concentration.

5. The ratio of the upper confidence limit for the mean outlet emission rate (Eo*) and the allowable emission rate (Estd) as applicable.

(d) If any standards under 1200–3–16–.03(4) are exceeded during emergency conditions because of control system malfunction, the owner or operator of the affected facility shall submit a signed statement:

(Rules 1200-3-16-.03, continued)

1. Indicating if emergency conditions existed and requirements under 1200–3–16–.03(7)(d) were met during each period and

2. Listing the following information:

   (i) Time periods the emergency condition existed;

   (ii) Electrical output and demand on the owner or operator's electric utility system and the affected facility;

   (iii) Amount of power purchased from interconnected neighboring utility companies during the emergency period;

   (iv) Percent reduction in emissions achieved;

   (v) Atmospheric emission rate (ng/J) of the pollutant discharged; and

   (vi) Actions taken to correct control system malfunction.

(e) If fuel pretreatment credit toward the sulfur dioxide emission standard under 1200–3–16–.03(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 1200–3–16–.03(9) and Method 19; 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 part 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 1200–3–16–.01(7), periods of excess emissions are defined as all 6-minute periods during which the average opacity exceeds the applicable opacity standards under 1200–3–16–.03(3)(b). Opacity levels in excess of the applicable opacity

(Rules 1200-3-16-.03, continued)

standard and the date of such excesses are to be submitted to the Technical Secretary each calendar quarter.

(i) The owner or operator of an affected facility shall submit the written reports required under this paragraph and rule 1200–3–16–.01 to the Technical Secretary for every calendar quarter. All quarterly reports shall be postmarked by the 30th day following the end of each calendar quarter.

***Authority**: T.C.A. §§68–25–105 and 4–5–202.* ***Administrative History**: Original rule filed July 21, 1980; effective September 8, 1980. Amendment filed September 21, 1988; effective November 6, 1988.*

1200–3–16–.04 INCINERATORS.

(1) Applicability and designation of affected facility. The provisions of this rule are applicable to each incinerator of more than 50 tons per day charging rate, commenced on or after April 3, 1972, which is the affected facility.

(2) Definitions.

(a) "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.

(b) "Solid waste" means refuse, more than 50 percent of which is municipal type waste consisting of a mixture of paper, wood, yard wastes, food wastes, plastic, leather, rubber, and other combustibles, and noncombustible materials such as glass and rock.

(c) "Day" means 24 hours.

(d) "Particulate matter" means any finely divided liquid or solid material, other than uncombined water, as measured by methods specified by the Technical Secretary.

(3) Standard for particulate matter.

On and after the date on which the performance test required to be conducted by paragraph .01(5) of this chapter is completed, no owner or operator subject to the provisions of this rule shall discharge or cause the discharge into the atmosphere of particulate matter which is in excess of 0.18 g./dscm (0.08 gr./dscf) corrected to 12 percent CO2.

(4) Monitoring of operations. The owner or operator of any incinerator of more than forty-five (45) metric tons per day charging rate (50 tons per day) subject to the provisions of this rule shall record the daily charging rates and hours of operation.

(5) Test methods and procedures:

(a) The sampling time for each particulate run shall be at least sixty (60) minutes and the minimum sample volume shall be 0.85 dscm (30 dscf) except that smaller sampling times or sample volumes, when necessitated by process variables or other factors, may be approved by the Technical Secretary.

(b) 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 parts 1. through 5. of this subparagraph or the procedure under parts 1., 2., and 6. of this subparagraph as follows:

(Rules 1200-3-16-.04, continued)

1. The outlet sampling site shall be the same as for the particulate matter measurement. The inlet site shall be selected according to a method specified by the Technical Secretary.

2. Randomly select nine (9) sampling points within the cross-section at both the inlet and outlet sampling sites. Use of the first set of three 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 CO2 an integrated gas sample, traversing the three (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 using the full number of traverse points. For the inlet make two (2) full velocity traverses approximately one (1) hour apart during each run and average the results. The outlet volumetric flow rate may be determined from the particulate matter run.

5. Calculate the adjusted CO2 percentage using the following equation:

$$(\%CO_2)\ adj = (\%CO2)\ di\ (Qdi/Qdo)$$

where:

($\%CO_2$) adj is the adjusted CO2 percentage which removes the effect of CO2 absorption and dilution air.

($\%CO_2$) di is the percentage of CO2 measured before the scrubber, dry basis.

Qdi is the volumetric flow rate before the scrubber, average of two (2) runs, dscf/min, and

Qdo is the volumetric flow rate after the scrubber, dscf/min.

6. Alternatively, the following procedures may be substituted for the procedures under parts 3., 4., and 5. of this subparagraph.

   (i) Simultaneously with each particulate matter run, extract and analyze for CO2, O2, and N2 an integrated gas sample, traversing the three (3) sample points and sampling for equal increments of time at each point. Conduct the runs at both the inlet and outlet sampling sites.

   (ii) After completing the analysis of the gas sample, calculate the percentage of excess air (%EA) for both the inlet and outlet sampling stations.

$$\%EA = \left[\frac{\%\ O_2 - 0.5\%\ CO}{0.264\%\ N_2 - (\%02 - 0.5\%\ CO)} \right] x\ 100$$

Where:

%EA = Percent excess air

%O2 = Percent oxygen by volume, dry basis

%CO = Percent carbon monoxide by volume, dry basis

(Rules 1200-3-16-.04, continued)

%N = Percent nitrogen by volume, dry basis

0.264 = Ratio of oxygen to nitrogen in air by volume.

(iii) Calculate the adjusted CO2 percentage using the following equation:

$$(\%CO_2)adj=(\%CO_2)di \quad \frac{100 + (\%EA)i}{100 + (\%EA)o}$$

Where:

$(\%CO_2)adj$ is the adjusted outlet CO_2 percentage,

$(\%CO_2)di$ is the percentage of CO_2 measured before the scrubber, dry basis,

(%EA)i is the percentage of excess air at the inlet, and

(%EA)o is the percentage of excess air at the outlet.

(c) Particulate matter emissions, expressed in g/dscm, shall be corrected to twelve (12) percent CO2 by using the following formula:

$$c12 = \frac{12c}{\%CO_2}$$

where:

c12 is the concentration of particulate matter corrected to twelve (12) percent CO2,

c is the concentration of particulate matter, and

$\%CO_2$ is the percentage of measured CO2 or when applicable, the adjusted outlet CO2 percentage as determined by Method 3. in subparagraph .01(5)(g) of this chapter or by subparagraph (b) of this paragraph.

***Authority**: T.C.A. §§68–25–105 and 4–5–202.* ***Administrative History**: Original rule filed June 7, 1974; effective February 9, 1977. Amendment filed September 4, 1981; effective October 19, 1981.*

1200–3–16–.05 PORTLAND CEMENT PLANTS.

(1) Applicability. The provisions of this rule shall apply to the affected facilities commenced on or after April 3, 1972, in Portland cement plants as follows: 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.

(2) "Portland Cement Plant" means any facility manufacturing portland cement by either the wet or dry process.

(3) Standards for particulate matter and opacity.

(a) On and after the date on which the performance test required to be conducted by paragraph .01(5) of this chapter is completed, no owner or operator subject to the provisions of this rule shall cause to be discharged into the atmosphere from any kiln any gases which:

(Rules 1200-3-16-.05, continued)

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 twenty (20) percent opacity.

(b) On and after the date on which the performance test required to be conducted by paragraph .01(5) of this chapter is completed, no owner or operator subject to the provisions of this rule shall 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 twenty (20) percent opacity, or greater.

(c) On and after the date on which the performance test required to be conducted by paragraph .01(5) of this chapter is completed, no owner or operator subject to the provisions of this part shall cause to be discharged into the atmosphere from any affected facility other than the kiln any gases which exhibit ten (10) percent opacity, or greater.

(4) Monitoring of operations. The owner or operator of any portland cement plant subject to the provisions of this rule shall record the daily production rates and kiln feed rates.

(5) Test methods and procedures:

(a) For determination of particulates, 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 Technical Secretary shall be as follows:

1. Sixty (60) minutes and 0.85 dscm (30.0 dscf) for the kiln.

2. Sixty (60) minutes and 1.15 dscm (40.6 dscf) for the clinker cooler.

(b) 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.

(c) 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 = Qs x c, where Qs = volumetric flow rate of the total effluent in dscm/hr, and c=particulate concentration in g/dscm.

Authority*: T.C.A. §§68–25–105 and 4–5–202.* ***Administrative History****: Original rule filed January 10, 1977; effective February 9, 1977.*

1200–3–16–.06 SULFURIC ACID PLANTS.

(1) Applicability. The provisions of this rule shall apply to each sulfuric acid production unit commenced on or after April 3, 1972, which is the affected facility.

(2) Definitions.

(a) “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.

(b) "Acid mist" means sulfuric acid mist, as measured by test methods specified in subparagraph .01(5)(g) of this chapter.

(3) Standard for sulfur dioxide. On and after the date on which the performance test required to be conducted by paragraph .01(5) of this chapter is completed, no owner or operator subject to the provisions of this rule shall cause to be discharged into the atmosphere from any affected facility any gases which contain sulfur dioxide in excess of 2 kg per metric ton of acid produced (4 lbs/ton), the production being expressed as 100 percent H2SO4.

(4) Standard for acid mist and opacity. On and after the date on which the performance test required to be conducted by paragraph .01(5) of this chapter is completed, no owner or operator subject to the provisions of this rule shall cause to be discharged into the atmosphere from any affected facility any gases which:

(a) Contain acid mist, expressed as H2SO4 in excess of 0.075 kg per metric ton of acid produced (0.15 lb per ton), the production being expressed as 100 percent H2SO4.

(b) Exhibit ten (10) percent 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 paragraph 2.1, Performance Specification 2, Appendix B, *Federal Register*, Vol. 40, No. 194, and for calibration checks under subparagraph .01(8)(d) of this chapter, shall be sulfur dioxide (SO2). The method for sulfuric acid mist and sulfur dioxide specified by paragraph .01(5) of this chapter shall be used for conducting monitoring system performance evaluations under subparagraph .01(8)(c) of this chapter, except that only the sulfur dioxide portion of the specified method 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 standard (kg/metric ton, lb/short ton). The conversion factor shall be determined, as a minimum, three 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 eight-hour period as follows:

$$CF = k \frac{(1.000 - 0.015r)}{r - s}$$

where:

CF = conversion factor (kg/metric ton per ppm, lb/short ton per ppm).

k = constant derived from material balance. For determining CF in metric units, k = 0.0653. For determining CF in English units, k = 0.1306.

r = percentage of sulfur dioxide by volume entering the gas converter. Appropriate corrections must be made for air injection plants subject to the Technical Secretary's approval.

(Rules 1200-3-16-.06, continued)

s = percentage of sulfur dioxide by volume in the emissions to the atmosphere determined by the continuous monitoring system required under subparagraph (a) of this paragraph.

(c) The owner or operator shall record all conversion factors and values under subparagraph (b) of this paragraph from which they were computed (i.e., CF, r, and s).

(d) For the purpose of reports under subparagraph .01(7)(c) of this chapter, periods of excess emissions shall be all three-hour periods (or the arithmetic average of three consecutive one-hour periods) during which the integrated average sulfur dioxide emissions exceed the applicable standards under paragraph (3).

(6) Test methods and procedures:

(a) The moisture content can be considered to be zero. For determination of sulfur dioxide and acid mist the sampling time for each run shall be at least sixty (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 Technical Secretary.

(b) Acid production rate, expressed in metric tons per hour of 100 percent H2SO4, shall be determined during each testing period by suitable methods and shall be confirmed by a material balance over the production system.

(c) Acid mist and sulfur dioxide emissions, expressed in g/metric ton of 100 percent H2SO4, 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 = Qs x c, where Qs = volumetric flow rate of the effluent in dscm/hr as determined in accordance with paragraph .01(5) of this chapter and c = acid mist and SO2 concentrations in g/dscm as determined in accordance with paragraph .01(5) of this chapter.

***Authority**: T.C.A. §§68–25–105 and 4–5–202.* ***Administrative History**: Original rule filed January 10, 1977; effective February 9, 1977.*

1200–3–16–.07 NITRIC ACID PLANTS.

(1) Applicability. The provisions of this rule shall apply to each nitric acid production unit commenced on or after April 3, 1972, which is the affected facility.

(2) Definitions.

(a) "Nitric acid production unit" means any facility producing weak nitric acid by either the pressure or atmospheric pressure process.

(b) "Weak acid production unit" means acid which is thirty (30) to seventy (70) percent in strength.

(3) Standards for nitrogen oxides and opacity. On and after the date on which the performance test required to be conducted by paragraph .01(5) of this chapter is completed, no owner or operator subject to the provisions of this rule shall cause to be discharged into the atmosphere from any affected facility any gases which:

(a) Contain nitrogen oxides, expressed as NO2, in excess of 1.5 kg per metric ton of acid produced (3.0 lb. per ton), the production being expressed as 100 percent nitric acid.

(b) Exhibit ten (10) percent 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 paragraph 2.1, Performance Specification 2, Appendix B, *Federal Register*, Vol. 40, No. 194, and for calibration checks under subparagraph .01(8)(d) of this chapter, shall be nitrogen dioxide (NO2). The span shall be set at 500 ppm of nitrogen dioxide. The method for nitrogen oxides specified in accordance with the provisions of paragraph .01(5) of this chapter shall be used for conducting monitoring system performance evaluations under subparagraph .01(8)(c) of this chapter.

(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 re-established during any performance test under paragraph .01(5) of this chapter or any other continuous monitoring system performance evaluation under subparagraph .01(8)(c) of this chapter.

(c) The owner or operator shall record the daily production rate and hours of operation.

(d) For the purpose of reports required under subparagraph .01(7)(c) of this chapter, periods of excess emissions that shall be reported are defined as any three-hour period during which the average nitrogen oxides emissions (arithmetic average of three contiguous one-hour periods) as measured by a continuous monitoring system exceed the standard under paragraph (3) of this rule.

(5) Test methods and procedures:

(a) The sampling point for nitrogen oxides shall be the centroid of the stack or duct if the cross-section area is less than 50 ft2 or at a point no closer to the walls than 1 m (3.28 ft), if the area is 50 ft2 or greater. Each run shall consist of at least four (4) grab samples taken at approximately fifteen (15) minute intervals. The arithmetic mean of the samples shall constitute the run value. A velocity traverse shall be performed once per run.

(b) Acid production rate, expressed in metric tons per hour of 100 percent nitric acid, shall be determined during each testing period by suitable methods and shall be confirmed by a material balance over the production system.

(c) For each run, nitrogen oxides, expressed in g/metric ton of 100 percent 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:

$$g/hr = Qs \times c$$

Where:

Qs = volumetric flow rate of the effluent in dscm/hr, and

c = NOx concentration in g/dscm.

(Rules 1200-3-16-.07, continued)

***Authority**: T.C.A. §§68–25–105 and 4–5–202. **Administrative History**: Original rule filed January 10, 1977; effective February 9, 1977. Amendment filed September 10, 1981; effective October 19, 1981.*

1200–3–16–.08 HOT MIX ASPHALT FACILITIES.

(1) Applicability. The provisions of this rule shall apply to each Hot Mix Asphalt facility commenced on or after April 21, 1976, which is the affected facility. For the purpose of this rule, 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.

(2) Definitions

"Hot Mix Asphalt Facility" means any facility, as described in paragraph (1) of this rule, used to manufacture hot mix asphalt by heating and drying aggregate and mixing with asphalt cements.

(3) Standards for particulate matter and opacity. On and after the date on which the performance test required to be conducted by paragraph .01(5) of this chapter is completed, no owner or operator subject to the provisions of this rule shall discharge or cause the discharge into the atmosphere from any affected facility any gases which:

(a) Contain particulate matter in excess of 90 mg/dscm (0.04 gr/dscf).

(b) Exhibit twenty (20) percent opacity, or greater.

(4) Test methods and procedures.

For determination of concentration of particulate matter, the sampling time for each run shall be at least sixty (60) minutes and the sampling rate shall be at least 0.9 dscm/hr (0.53 dscf/min) except that shorter sampling time, when necessitated by process variables or other factors, may be approved by the Technical Secretary.

***Authority**: T.C.A. §§68–25–105 and 4–5–202. **Administrative History**: Original rule filed January 10, 1977; effective February 9, 1977. Amendment filed September 21, 1988; effective November 6, 1988.*

1200–3–16–.09 PETROLEUM REFINERIES.

(1) Applicability.

(a) The provisions of this rule 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 subparagraph (a) of this paragraph which commences construction or modification after April 21, 1976 or any Claus sulfur recovery plant under subparagraph (a) of this paragraph which commences construction or modification after November 6, l988 is subject to the requirements of this rule.

(2) Definitions.

(Rules 1200-3-16-.09, continued

(a) "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.

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

(c) "Process gas" means any gas generated by a petroleum refinery process unit, except fuel gas and process upset gas as defined in this paragraph.

(d) "Fuel gas" means any gas which is generated by a petroleum refinery process unit and which is combusted, including any gaseous mixture of natural gas and fuel gas which is combusted.

(e) "Process upset gas" means any gas generated by a petroleum refinery process unit as a result of start-up, shut-down, upset or malfunction.

(f) "Refinery process unit" means any segment of the petroleum refinery in which a specific processing operation is conducted.

(g) "Fuel gas combustion device" means any equipment, such as process heaters, boilers and flares used to combust fuel gas, but does not include fluid coking unit and fluid catalytic cracking unit incinerator-waste heat boilers or facilities in which gases are combusted to produce sulfur or sulfuric acid.

(h) "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 a formula specified in 1200–3–16–.09(7)(a)(4).

(i) "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.

(j) "Oxidation control system" means an emission control system which reduces emissions from sulfur recovery plants by converting these emissions to sulfur dioxide.

(k) "Reduction control system" means an emission control system which reduces emissions from sulfur recovery plants by converting these emissions to hydrogen sulfide.

(l) "Reduced sulfur compounds" means hydrogen sulfide (H2S), carbonyl sulfide (COS) and carbon disulfide (CS2).

(m) (Reserved)

(3) Standards for particulate matter and opacity:

(a) On and after the date on which the performance test required to be conducted by 1200–3–16–.01(5) is completed, no owner or operator subject to the provisions of this rule shall 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 thirty (30) percent opacity or greater, except for six (6) minutes in any one (1) hour.

(Rules 1200-3-16-.09, continued

(b) Where gases discharged by the fluid catalytic cracking unit catalyst regenerator pass through an incinerator or waste heat boiler in which auxiliary liquid or solid fossil fuel is burned, particulate matter in excess of that permitted by part (a)1. of this paragraph may be emitted to the atmosphere, except that the incremental rate of particulate emissions shall not exceed 0.043 g/MJ (0.10 lb/million Btu) of heat input attributable to such liquid or solid fossil fuel.

(4) Standard for carbon monoxide. On and after the date on which the performance test required to be conducted by paragraph .01(5) of this chapter is completed, no owner or operator subject to the provisions of this rule shall 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 per cent by volume.

(5) Standard for sulfur dioxide.

(a) On and after the date on which the performance test required to be conducted by 1200–3–16–.01(5) is completed, no owner or operator subject to the provisions of this paragraph shall:

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 Technical Secretary that this is as effective in preventing sulfur dioxide emissions to the atmosphere as restricting the H2S 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 subparagraph.

2. Discharge or cause the discharge of any gases into the atmosphere from any Claus sulfur recovery plant containing in excess of:

(i) 0.025 percent by volume of sulfur dioxide at zero percent oxygen on a dry basis if emissions are controlled by a oxidation control system, or a reduction control system followed by incineration, or

(ii) 0.030 percent by volume of reduced sulfur compounds and 0.0010 percent by volume of hydrogen sulfide calculated as sulfur dioxide at zero percent oxygen on a dry basis if emissions are controlled by a reduction control system not followed by incineration.

(b) (Reserved)

(6) Emission monitoring:

(a) Continuous monitoring systems shall be installed, calibrated, maintained, and operated by the owner or operator as follows:

1. A continuous monitoring system for the measurement of the opacity of emissions discharged into the atmosphere from the fluid catalytic cracking unit catalyst regenerator. The continuous monitoring system shall be spanned at 60, 70, or 80 percent opacity.

2. An instrument for continuously monitoring and recording the concentration of carbon monoxide in gases discharged into the atmosphere from fluid catalytic cracking unit catalyst regenerators. The span value of this continuous monitoring system shall be 1,000 ppm. Installation of carbon monoxide (CO) continuous monitoring systems is not required if the owner or operator files a written request for exemption to the Technical Secretary and demonstrates, by the exemption performance test described below, that the average CO

emissions are less than 10 percent of the applicable standard listed in paragraph (4) of this rule. 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 as specified in the *Federal Register*, Vol. 50, No. 150, August 5, 1985, pp. 31701-31702, except the span value shall be 100 ppm instead of 1,000 ppm, and if required, the relative accuracy limit shall be 10 percent 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 as specified under part (a)4. of this paragraph). The pollutant gas used to prepare calibration gas mixtures under paragraph 2.1, Performance Specifications 2 and Appendix B, *Federal Register*, Vol. 40, No. 194, and for calibration checks under subparagraph .01(8)(d) of this chapter, shall be sulfur dioxide (SO2). The span shall be set at 100 ppm. For conducting monitoring system performance evaluations under subparagraph .01(8)(c) of this chapter, the method for sulfur dioxide specified in accordance with paragraph .01(5) of this chapter 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 part 1200–3–16–.09(5)(a)1. is achieved by removing H2S from the fuel gas before it is burned; fuel gas combustion devices having a common source of fuel may be monitored at one location, if monitoring at this location accurately represents the concentration of H2S 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 SO2 in the gases discharged into the atmosphere from any Claus sulfur recovery plant if compliance with part 1200–3–16–.09(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. An instrument(s) for continuously monitoring and recording the concentration of H2S and reduced sulfur compounds in the gases discharged into the atmosphere from any Claus sulfur recovery plant if compliance with part 1200–3–16–.09(5)(a)2. is achieved through the use of a reduction control system not followed by incineration. The span(s) of this continuous monitoring system(s) shall be set at 20 ppm for monitoring and recording the concentration of H2S and 600 ppm for monitoring and recording the concentration of reduced sulfur compounds.

(b) (Reserved)

(c) The average coke burn-off rate (thousands of kilogram/hr) and hours of operation for any fluid catalytic cracking unit catalyst regenerator subject to paragraphs (3) and (4) of this rule shall be recorded daily.

(d) For any fluid catalytic cracking unit catalyst regenerator which is subject to paragraph (3) of this rule 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 subparagraph .01(7)(c) of this chapter periods of excess emissions that shall be reported are defined as follows:

(Rules 1200-3-16-.09, continued

1. Opacity. All one-hour periods which contain two or more six-minute periods during which the average opacity as measured by the continuous monitoring system exceeds 30 percent.

2. Carbon monoxide. All hourly periods during which the average carbon monoxide concentration in the gases discharged into the atmosphere from any fluid catalyltic cracking unit catalyst regenerator subject to paragraph 1200–3–16–.09(4) exceeds 0.050 percent by volume.

3. Sulfur dioxide.

   (i) Any three-hour period during which the average concentration of H2S in any fuel gas combusted in any fuel gas combustion device subject to part 1200–3–16–.09(5)(a)1. exceeds 230 mg/dscm (0.10 gr/dscf), if compliance is achieved by removing H2S from the fuel gas before it is burned; or any three-hour period during which the average concentration of SO2 in the gases discharged into the atmosphere from any fuel gas combustion device subject to part 1200–3–16–.09(5)(a)1. exceeds the level specified in part 1200–3–16–.09(5)(a) 1., if compliance is achieved by removing SO2 from the combusted fuel gases.

   (ii) Any twelve-hour period during which the average concentration of SO2 in the gases discharged into the atmosphere from any Claus sulfur recovery plant subject to part 1200–3–16–.09(5)(a)2. exceeds 250 ppm at zero percent oxygen on a dry basis if compliance with subparagraph 1200–3–16–.09(5)(a)2 is achieved through the use of an oxidation control system or a reduction control system followed by incineration; or any twelve-hour period during which the average concentration of H2S, or reduced sulfur compounds in the gases discharged into the atmosphere of any Claus sulfur plant subject to part 1200–3–16– .09(5)(a)2. 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 six-hour period during which the average emissions (arithmetic average of six contiguous one-hour periods) of sulfur dioxide as measured by a continuous monitoring system exceed the standard under 1200–3–16–.09(5).

(7) Test Methods and Procedures:

(a) For the purpose of determining compliance with 1200–3–16–.09(3)(a)1, the following reference methods and calculation procedures shall be used:

1. For gases released to the atmosphere from the fluid catalytic cracking unit catalyst regenerator:

   (i) Method 5B or 5F as specified in rule 1200–3–16.01(5)(g) is to be used to determine particulate matter emissions and associated moisture content from affected facilities without wet FGD systems; only Method 5B is to be used after wet FGD systems.

   (ii) Method 1 for sample and velocity traverses, and

   (iii) 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 Technical Secretary when process variables or other factors preclude sampling for at least 60 minutes.

(Rules 1200-3-16-.09, continued

3. For exhaust gases from the fluid catalytic cracking unit catalyst regenerator prior to the emission control system: the integrated sample techniques of Methods 3. and 4. of subparagraph .01(5)(g) of this chapter for gas analysis and moisture content determination respectively; Method 1 for velocity traverses; and Method 2 for velocity and volumetric flow rate shall be used.

4. Coke burn-off rate shall be determined by the following formula:

$$Rc = 0.2982\ Qre\ (\%CO_2+\%CO) + 2.088\ Qra - 0.0994\ Qre\ \left(\frac{\%CO}{2} + \%CO_2+\%O_2\right) \text{ (Metric Units)}$$

or

$$Rc = 0.0186\ Qre\ (\%CO_2 + \%CO) + 0.1303\ Qra - 0.0062\ Qre\ \left(\frac{\%CO}{2} + \%CO_2 + \%O2\right) \text{(English Units)}$$

where:

Rc	=	coke burn-off rate, kg/hr (English units: lb/hr).
0.2982	=	metric units material balance factor divided by 100, kg-min/hr-m3.
.0.0186	=	English units material balance factor divided by 100, lb-min/hr-ft3.
Qre	=	fluid catalytic cracking unit catalyst regenerator exhaust gas flow rate before entering the emission control system, as determined by Method 2., subparagraph .01(5)(g) of this chapter, dscm/min (English units: dscf/min).
$\%CO_2$	=	percent carbon dioxide by volume, dry basis, as determinedby Method 3., subparagraph .01(5)(g) of this chapter.
$\%O_2$	=	percent oxygen by volume dry basis, as determined byMethod 3., subparagraph .01(5)(g) of this chapter.
2.088	=	metric units material balance factor divided by 100, kg-min/hr-m3.
0.1303	=	English units material balance factor divided by 100, lb-min/hr-ft3.
Qra	=	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).
0.0094	=	metric units material balance factor divided by 100, kg-min/hr-m3.
0.0062	=	English units material balance factor divided by 100, lb-min/hr-ft3.
%CO	=	Percent carbon monoxide by volume, dry basis, as determined by Method 3., subparagraph .01(5)(g) of thischapter.

5. Particulate emissions shall be determined by the following equation:

Re = (60 x 10-6) QrvCs (Metric Units)

or

Re = (8.57 x 10-3) QrvCs (English Units)

where:

Re	=	particulate emission rate, kg/hr (English units: lb/hr)
60 x 10-6	=	Metric units conversion factor, min-kg/hr-mg
8.57 x 10-3	=	English units conversion factor, min-lb/hr-gr
Qrv	=	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).

(Rules 1200-3-16-.09, continued

Cs = 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:

Rs = 1000 Re/Rc (Metric or English Units)

where:

Rs = Particulate emission rate, kg/1000 kg, (English units: lb/1000 lb) of coke burn-off in the fluid catalytic cracking unit catalyst regenerator.

1000 = conversion factor, kg to 1000 kg (English units: lb to 1000 lb).

Re = particulate emission rate, kg/hr. (English units: lb/hr).

Rc = 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 emission permitted under subparagraph (3)(b) of this rule must 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 fossil auxiliary fuels. For each run, the rate of particulate emissions permitted under subparagraph (3)(b) of this rule shall be calculated from the following equation:

$$Rs = 1.0 + \frac{0.18\ H}{Rc} \text{ (Metric Units)}$$

or

$$Rs = 1.0 + \frac{0.10\ H}{Rc} \text{ (English Units)}$$

where:

Rs = allowable particulate emission rate, kg/1000 kg (Englishunits: lb/1000 lb) of coke burn-off in the fluid catalytic cracking unit catalyst regenerator.

1.0 = 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 = metric units maximum allowable incremental rate of particulate emissions, g/million cal.

0.10 = English units maximum allowable incremental rate of particulate emissions, lb/million Btu.

H = heat input from solid or liquid fossil fuel, million cal/hr (English units: million Btu/hr).

Rc = coke burn-off rate, kg/hr (English units: lb/hr).

(b) For the purpose of determining compliance with paragraph (4) of this rule, the integrated sample technique of Method 10 as specified in 1200–3–16–.01(5)(g)10. 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 shall not be less than sixty (60) minutes.

(c) For the purpose of determining compliance with part 1200–3–16–.09(5)(a)1., Method 11 as specified in 1200–3–16–.01(5)(g)11. shall be used to determine the concentration of H^2S and Method 6 as specified in 1200–3–16–.01(5)(g)6. shall be used to determine the concentration of SO_2.

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 two samples of equal sampling time shall constitute one run. Samples shall be taken at approximately 1- hour intervals. For most fuel gases, sample times 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 as specified in 1200–3–16–.01(5)(g)1. shall be used for velocity traverses and Method 2 as specified in 1200–3–16–.01(5)(g)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 m2 (54 ft2) or at a point no closer to the walls than 1 m (39 inches) if the cross sectional area is 5 m2 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 two samples of equal sampling time shall constitute one run. Samples shall be taken at approximately 1- hour intervals.

(d) For the purpose of determining compliance with part 1200–3–16–.09(5)(a)2, Method 6 shall be used to determine the concentration of SO2 and Method 15 as specified by 1200–3–16–.01(5)(g)15 shall be used to determine the concentration of H2S and reduced sulfur compounds.

As an alternative, Method 15A as specified by 1200–3–16–.01(5)(g)15 may be used for determining reduced sulfur compounds.

1. If Method 6 is used, the procedure outlined in subparagraph (c)(2) of this paragraph shall be followed except that each run shall span a minimum of four 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 four consecutive hours. Where more than one sample is used, the average SO2 concentration for the run shall be calculated as the time weighted average of the SO2 concentration for each sample according to the formula:

$$C_R = \underset{i=1}{\overset{N}{\text{SUM}}} C_{si} \frac{t_{si}}{T}$$

Where:

C_R = SO_2 concentration for the run.
N = Number of samples.

(Rules 1200-3-16-.09, continued

C_{si} = SO_2 concentration for sample i.
t_{si} = Continuous time of sample i.
T = 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 three 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 m2 (54 ft2) or at a point no closer to the walls than 1 m (39 in.) if the cross-sectional area is 5 m2 or more and the centroid is more than 1 m 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 ft3/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. Method 4 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:

$$Bwo = \sum_{i=l}^{N} B_{si} \frac{t_{si}}{T}$$

Where:

Bwo = Proportion by volume of water vapor in the gas stream for the run.
N = Number of samples.
B_{si} = Proportion by volume of water vapor in the gas stream for the sample i.
t_{si} = Continuous sampling time for sample i.
T = Total continuous sampling time of all N samples.

***Authority**: T.C.A. §§68–25–105 and 4–5–202. **Administrative History**: Original rule filed January 10, 1977; effective February 9, 1977. Amendment filed May 17, 1978; effective June 16, 1978. Amendment filed June 3, 1981; effective July 20, 1981. Amendment filed September 4, 1981; effective October 19, 1981. Amendment filed September 21, 1988; effective November 6, 1988.*

1200–3–16–.10 STANDARDS OF PERFORMANCE FOR STORAGE VESSELS FOR PETROLEUM LIQUIDS FOR WHICH CONSTRUCTION, RECONSTRUCTION, OR MODIFICATION COMMENCED AFTER APRIL 21, 1976 AND PRIOR TO MAY 19, 1978.

(1) Applicability:

(a) The provisions of this rule shall apply to each storage vessel for petroleum liquids commenced on or after April 21, 1976, which has a storage capacity greater than 151,416 liters (40,000 gallons), except as provided in subparagraph (1)(b), below.

(b) This rule does not apply to storage vessels for crude petroleum or condensate stored, processed, and/or treated at a drilling and production facility prior to custody transfer.

(c) 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.

(a) "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.

1. Pressure vessels which are designed to operate in excess of fifteen (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.

(b) "Petroleum liquids" means crude petroleum, condensate, and any finished or intermediate products manufactured in a petroleum refinery but does not mean Number 2 through Number 6 fuel oils as specified in ASTM-D-396-78, gas turbine fuel oils Number 2- GT through 4-GT as specified in ASTM-D-2880-78, or diesel fuel oils Number 2-D and 4-D as specified in ASTM-D-975-78.

(c) "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.

(d) "Crude petroleum" means a naturally occurring mixture which consists of hydrocarbons and/or sulfur, nitrogen and/or oxygen derivatives of hydrocarbons and which is a liquid at standard conditions.

(e) "Hydrocarbon" means any organic compound consisting predominantly of carbon and hydrogen.

(f) "Condensate" means hydrocarbon liquid separated from natural gas which condenses due to changes in the temperature and/or pressure and remains liquid at standard conditions.

(Rule 1200-3-16-.10, continued)

(g) "Custody transfer" means the transfer of produced crude petroleum and/or condensate, after processing and/or treating in the producing operations, from storage tanks or automatic transfer facilities to pipelines or any other forms of transportation.

(h) "Drilling and production facility" means all drilling and servicing equipment, wells, flow lines, separators, equipment, gathering lines, and auxiliary non-transportation related equipment used in the production of crude petroleum but does not include natural gasoline plants.

(i) "True vapor pressure" means the equilibrium partial pressure exerted by a petroleum liquid as determined in accordance with methods specified by the Technical Secretary.

(j) "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.

(k) "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.

(l) "Reid vapor pressure" is the absolute vapor pressure of volatile crude oil and volatile non-viscous petroleum liquids, except liquified petroleum gases, as determined by method specified by the Technical Secretary.

(3) Standards for volatile organic compounds (VOC). The owner or operator of any storage vessel to which this rule applies shall store petroleum liquids as follows:

(a) 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.

(b) 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 subparagraph (d) of this paragraph, the owner or operator subject to this rule 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, unless the Technical Secretary specifically requests that the liquid be sampled, the actual storage temperature determined, and the Reid vapor pressure determined from the samples(s).

(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 paragraph:

(Rule 1200-3-16-.10, continued)

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 paragraph (3) of this rule.

Authority*: T.C.A. §§68–25–105 and 4–5–202.* ***Administrative History****: Original rule filed January 10, 1977; effective February 9, 1977. Amendment filed June 2, 1981; effective July 17, 1981. Amendment filed April 18, 1990; effective June 2, 1990.*

1200–3–16–.11 STANDARDS OF PERFORMANCE FOR STORAGE VESSELS FOR PETROLEUM LIQUIDS FOR WHICH CONSTRUCTION, RECONSTRUCTION, OR MODIFICATION COMMENCED AFTER MAY 18, 1978 AND PRIOR TO JULY 23, 1984.

(1) Applicability:

(a) Execept as provided in subparagraph (b) of this paragraph, the affected facility to which this rule 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 rule.

(2) Definitions:

(a) “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 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 a tank annually does not exceed twice the volume of the tank.

(b) “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 D-396-78, gas turbine fuel oils Nos. 2-GT through 4-GT as specified in ASTM D-2880-78, or diesel fuel oils Nos. 2-D and 4-D as specified in ASTM D-975-78.

(c) “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.

(d) “Petroleum” means the crude oil removed from the earth and the oils derived from tar sands, shale, and coal.

(e) “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.

(Rules 1200-3-16-.11, continued)

(f) "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, 1962.

(g) "Reid vapor pressure" is the absolute vapor pressure of volatile crude oil and volatile non-viscous petroleum liquids, except liquified petroleum gases, as determined by ASTM D323-82.

(h) "Liquid-mounted seal" means a foam or liquid-filled primary seal between the tank wall and the floating circumference of the tank.

(i) "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.

(j) "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.

(k) "Custody transfer" means the transfer of produced petroleum and/or condensate, after processing and/or treating in the producing operations, from storage tanks or automatic transfer facilities to pipelines or any other forms of transportation.

(3) Standard for volatile organic compounds (VOC).

(a) The owner or operator of each storage vessel to which this rule 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 item (a)1.(ii)(IV) of this paragraph, the closure device is to consist of two seals, one above the other. The lower seal is referred to as the secondary seal. The roof is to 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 this roof is resting on the leg supports shall be continuous and shall be accomplished as rapidly as possible.

(i) The primary seal is to be either a metallic shoe seal, a liquid- mounted seal, or a vapor-mounted seal. Each seal is to meet the following requirements:

(I) The accumulated area of gaps between the tank wall and the metallic shoe seal or the liquid- mounted seal shall not exceed 212 cm2 per meter of tank diameter (10.0 in2 per ft of tank diameter) and the width of any portion of any gap shall not exceed 3.81 cm (1 1/2 in).

(II) The accumulated area of gaps between the tank wall and the vapor-mounted seal shall not exceed 21.2 cm2 per meter of tank diameter (1.0 in2 per ft of tank diameter) and the width of any portion of any gap shall not exceed 1.27 cm (1/2 in).

(III) One end of the metallic shoe is to extend into the stored liquid and the other end is to extend to a minimum vertical distance of 61 cm (24 in.) above the stored liquid surface.

(IV) There are to to no holes, tears, or other openings in the shoe, seal fabric, or seal envelope.

(ii) The secondary seal is meet the following requirements:

(I) The secondary seal is to 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 item (a)1.(ii)(II) of this paragraph.

(II) The accumulated area of gaps between the tank wall and the secondary seal shall not exceed 21.2 cm2 per meter of tank diameter (1.0 in2 per ft of tank diameter) and the width of any portion of any gap shall not exceed 1.27 cm (1/2 in).

(III) There are to be no holes, tears, or other openings in the seal or seal fabric.

(IV) 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.

(iii) Each opening in the roof except for automatic bleeder vents and rim space vents is to provide a projection below the liquid surface. Each opening in the roof except for automatic bleeder vents, rim space vents and leg sleeves is to be equipped with a cover, seal 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 or as described in subpart (a) 1. (iv) of this paragraph. Automaticbleeder 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 legs supports or at the manufacturer's recommended setting.

(iv) Each emergency roof drain is to be provided with a slotted membrane fabric cover that covers at least 90 percent 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 is to 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 is to 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 is to be equipped with a cover, seal, 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. Automatic bleeder vents are to 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 are to be set 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 percent by weight.

4. A system equivalent to those described in parts (a) 1., (a) 2. and (a) 3. of this rule as provided in paragraph (5).

(b) The owner or operator of each storage vessel to which this rule 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 percent by weight.

(4) Testing and Procedures

(a) Except as provided in 1200–3–16–.01(5), compliance with the standard prescribed in paragraph 1200–3–16–.11(3) shall be determined as follows:

1. The owner or operator of each storage vessel to which this rule applies which has an external floating roof shall meet the following requirements:

(i) Determine the gap areas and maximum gap widths between the primary seal and the tank wall, and the secondary seal and the tank wall according to the following frequency:

(I) For primary seals, gap measurements shall be performed within 60 days of the initial fill with petroleum liquid and at least once every five 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.

(II) For secondary seals, gap measurements shall be performed within 60 days of the initial fill with petroleum liquid and atleast once every year thereafter.

(III) 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 items (a)1.(i)(I) and (a)1.(i)(III) of this paragraph.

(ii) Determine gap widths in the primary and secondary seals individually by the following procedures:

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

(II) Measure seal gaps around the entire circumference of the tank in each place where a 1/8” diameter uniform probe passes freely (without forcing or binding against seal) between the seal and the tank wall and measure the circumferential distance of each such location.

(III) The total surface area of each gap described in item (a)1.(ii)(II) of this paragraph 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.

(IV) Keep records of each gap measurement at the plant for a period of at least two years following the date of measurement. Each record shall identify 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 subpart (a)1(iii) of this paragraph and the calculation required by subpart (a)1(iii) of this paragraph.

(V) If either the seal gap calculated in accord with subpart (a)1(iii) of this paragraph or the measured maximum seal gap exceeds the limitations specified by paragraph (3) of this rule, a report shall be furnished to the Technical Secretary within 60 days of the date of measurements. The report shall identify the vessel and list each reason why the vessel did not meet the specifications of paragraph (3). The report shall also describe the actions necessary to bring the storage vessel into compliance with the specifications of paragraph (3).

(iii) 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 1200–3–16-.11(3)(a)1.(i) and (ii).

(iv) Provide the Technical Secretary prior notice of the gap measurement to afford the Technical Secretary opportunity to have an observer present.

2. The owner or operator of each storage vessel to which this rule applies which has a vapor recovery and return or disposal system shall provide the following information to the Technical Secretary on or before the date on which construction of the storage vessel commences:

(i) 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 must be included.

(ii) The manufacturer's design specifications and estimated emission reduction capability of the system.

(iii) The operation and maintenance plan for the system.

(iv) Any other information which will be useful to the Technical Secretary in evaluating the effectiveness of the system in reducing VOC emissions.

(5) (Reserved).

(6) Monitoring of Operations.

(a) Except as provided in subparagraph (d) of this paragraph, the owner or operator subject to this rule 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, unless the Technical Secretary specifically requests that the liquid be sampled, the actual storage temperatures determined, and the Reid vapor pressure determined from the sample(s).

(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).

(Rules 1200-3-16-.11, continued)

(d) The following are exempt from the requirements of this paragraph:

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 equipment with a vapor recovery and return or disposal system in accordance with the requirements of 1200–3–16–.11-(3)(a)3. and (3)(b).

***Authority**: T.C.A. §§68–25–105 and 4–5–202.* ***Administrative History**: Original rule filed March 12, 1982; effective April 26, 1982. Amendment filed April 18, 1990; effective June 2, 1990. Amendment filed April 23, 1998; effective July 7, 1998.*

1200–3–16–.12 SECONDARY LEAD SMELTERS.

(1) Applicability. The provisions of this rule shall apply to the following affected facilities commenced on or after April 21, 1976 in secondary lead smelters: pot furnaces of more than 250 kg (550 lb) charging capacity, blast (cupola) furnaces, and reverberatory furnaces.

(2) Definitions.

(a) "Reverberatory furnace" includes the following types of reverberatory furnaces: stationary, rotating, rocking and tilting.

(b) "Secondary lead smelter" means any facility producing lead from a lead-bearing scrap material by smelting to the metallic form.

(c) "Lead" means elemental lead or alloys in which the predominant component is lead.

(3) Standards for particulate matter and opacity:

(a) On and after the date on which the performance test required to be conducted by paragraph .01(5) of this chapter is completed, no owner or operator subject to the provisions of this rule shall 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 twenty (20) percent opacity or greater.

(b) On and after the date on which the performance test required to be conducted by paragraph .01(5) of this chapter is completed, no owner or operator subject to the provisions of this rule shall discharge or cause the discharge into the atmosphere from any pot furnace any gases which exhibit ten (10) percent opacity or greater.

(4) Test methods and procedures:

For determining of the concentration of particulate matter and associated moisture content, the sampling time for each run shall be at least sixty (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 Technical Secretary. Particulate sampling shall be conducted during representative periods of furnace operation, including charging and tapping.

(Rules 1200-3-16-.12, continued)

***Authority**: T.C.A. §§68–25–105 and 4–5–202. **Administrative History**: Original rule filed January 10, 1977; effective February 9, 1977.*

1200–3–16–.13 SECONDARY BRASS AND BRONZE INGOT PRODUCTION.

(1) Applicability. The provisions of this rule shall apply to the following affected facilities commenced on or after April 21, 1976, in secondary brass or bronze ingot production plants: reverberatory and electric furnaces of 1,000 kg (2,205 lb) or greater production capacity and blast (cupola) furnaces of 250 kg/hr (550 lb/hr) or greater production capacity.

(2) Definitions.

(a) "Brass or bronze" means any metal alloy containing copper as its predominant constituent and lesser amounts of zinc, tin, lead, or other metals.

(b) "Reverberatory furnace" includes the following types of reverberatory furnaces: stationary, rotating, rocking, and tilting.

(c) "Electric furnace" means any furnace which uses electricity to produce over fifty (50) percent of the heat required in the production of refined brass or bronze.

(d) "Blast furnace" means any furnace used to recover metal from slag.

(3) Standard for particulate matter:

(a) On and after the date on which the performance test required to be conducted by paragraph .01(5) of this chapter is completed, no owner or operator subject to the provisions of this rule shall 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 twenty (20) percent opacity or greater.

(b) On and after the date on which the performance test required to be conducted by paragraph .01(5) of this chapter is completed, no owner or operator subject to the provisions of this rule shall discharge or cause the discharge into the atmosphere from any blast (cupola) or electric furnace any gases which exhibit ten (10) percent opacity or greater.

(4) Test methods and procedures;

For determining the concentration of particulate matter and the associated moisture content, 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 Technical Secretary. Particulate matter sampling shall be conducted during representative periods of charging and refining, but not during pouring of the heat.

***Authority**: T.C.A. §§68–25–105 and 4–5–202. **Administrative History**: Original rule filed January 10, 1977; effective February 9, 1977.*

1200–3–16–.14 IRON AND STEEL PLANTS.

(1) Applicability. The provisions of this rule shall apply to each basic oxygen process furnace commenced on or after April 21, 1976.

(Rules 1200-3-16-.14, continued)

(2) Definitions

(a) "Basic oxygen process furnace" (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 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 November 6, 1988. For an affected facility constructed, modified, or reconstructed after April 21, 1976, but on or before November 6, l988, "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 subparagraph (b) of this paragraph, on and after the date on which the performance test required to be conducted by paragraph 1200–3–16–.01(5) is completed, no owner or operator subject to the provisions of this rule shall 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 percent opacity or greater, except that an opacity of greater than 10 percent but less than 20 percent many occur once per steel production cycle.

(b) For affected facilities constructed, modified, or reconstructed after November 6, 1988, the following limits shall apply:

1. On or after the date on which the performance test under paragraph 1200–3–16–.01(5) is required to be completed, no owner or operator of an affected facility for which open hooding is the method for controlling primary emissions shall cause to be discharged to the atmosphere any gases that:

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

(ii) Exit from a control device not used solely for the collection of secondary emissions, as defined in paragraph (2) of rule 1200–3–16–.55, and exhibit 10 percent opacity or

greater, except that an opacity greater than 10 percent but less than 20 percent may occur once per steel production cycle.

2. On or after the date on which the performance test required by 1200–3–16–.01(5) is completed, no owner or operator of an affected facility for which closed hooding is the method for controlling primary emissions shall cause to be discharged into the atmosphere any gases that:

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

(ii) Exit from a control device not used solely for the collection of secondary emissions, as defined in paragraph (2) of rule 1200–3–16–.55, and exhibit 10 percent opacity or greater, except that an opacity greater than 10 percent but less than 20 percent may occur once per steel production cycle.

(c) On and after the date on which the performance test required by 1200–3–16–.01(5) is completed, each owner or operator of an affected facility subject to subparagraph (b) of this paragraph 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 is to be certified by the manufacturer to be accurate within $ 250 Pa (+ 1 inch water).

2. A monitoring device for the continual measurement of the water supply pressure to the control equipment. The monitoring device is to be certified by the manufacturer to be accurate within + 5 percent of the design water supply pressure. The monitoring device's pressure sensor or pressure tap must be located close to the water discharge point. The Technical Secretary must 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 subparagraph (a) of this paragraph. The chart recorder error directly after synchronization shall 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 are to be recalibrated annually, and at other times as the Technical Secretary may require, in accordance with the procedures under part .01 (8) (b) 3. of this chapter.

(c) Any owner or operator subject to the requirements of subparagraph (b) of this paragraph shall report to the Technical Secretary, on a semiannual basis, all measurements over any 3-hour

period that average more than 10 percent below the average levels maintained during the most recent performance test conducted under paragraph 1200–3–16–.01(5) in which the affected facility demonstrated compliance with the mass standards under 1200–3–16–.14(3)(a)1, (b)1.(i) or (b)2.(i). The accuracy of the respective measurements, not to exceed the values specified in parts (b)1. and (b)2. of this paragraph, may be taken into consideration when determining the measurement results that must be reported.

(5) Test Methods and Procedures

(a) For determining the concentration of particulate matter and associated moisture content, the sampling for each run shall continue for an integral number of cycles with total duration of at least sixty (60) minutes. The sampling rate shall be at least 0.9 dscm/hr (0.53 dscf/min) except that shorter sampling times, when necessitated by process variables or other factors, may be approved by the Technical Secretary. A cycle shall start at the beginning of either the scrap preheat or the oxygen blow and shall terminate immediately prior to tapping.

(b) For Method 5, the sampling time shall be as follows:

1. For affected facilities that commenced construction, modification, or reconstruction on or before November 6, l988, 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 sample volumes, when necessitated by process variables or other factors, may be approved by the Technical Secretary.

2. For affected facilities that commence construction, modification, or reconstruction after November 6, l988, 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 factors, may be approved by the Technical Secretary.

(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.

***Authority**: T.C.A. §§68–25–105 and 4–5–202.* ***Administrative History**: Original rule filed January 10, 1977; effective February 9, 1977. Amendment filed May 17, 1978; effective June 16, 1978. Amendment filed January 31, 1983; effective March 2, 1983. Amendment filed September 21, 1988; effective November 6, 1988.*

1200–3–16–.15 SEWAGE TREATMENT PLANT INCINERATORS.

(1) Applicability. The provisions of this rule shall apply to each incinerator commenced on or after April 21, 1976, which burns the sludge produced by municipal sewage treatment facilities.

(2) Standards for particulate matter and opacity. On and after the date on which the performance test required to be conducted by paragraph .01(5) of this chapter is completed, no owner or operator of any sewage sludge incinerator subject to the provisions of this rule shall discharge or cause the discharge into the atmosphere of:

(a) Particulate matter at a rate in excess of 0.65 g/kg dry sludge input (1.30 lb/ton dry sludge input).

(b) Any gases which exhibit twenty (20) percent opacity or greater.

(3) Monitoring of operations. The owner or operator of any sludge incinerator subject to the provisions of this rule shall:

(a) 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 +5 percent over its operating range.

(b) Provide access to the sludge charged so that a well-mixed representative grab sample of the sludge can be obtained.

(4) Test methods and procedures:

(a) For determining the concentration of particulate matter and associated moisture content, the sampling time for each run shall be at least sixty (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 Technical Secretary.

(b) Dry sludge charging rate shall be determined as follows:

1. Determine the mass (Sm) or volume (Sv) of sludge charged to the incinerator during each run using a flow measuring device meeting the requirements of subparagraph (3)(a) of this rule. 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 five (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 for each interval. Then add the quantity for each interval to determine the total quantity charged during the entire run, (Sm) or (Sv).

2. Collect samples of the sludge charged to the incinerator in non-porous collecting jars at the beginning of each run and at approximately one (1) hour intervals thereafter until the test ends, and determine for each sample the dry sludge content (total solids residue) in accordance with the method specified in "244 G. Method for Solid and Semisolid Samples," 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:

(i) Evaporating dishes shall be ignited to at least 103 C rather than the 550 C specified in step 3(a)(1).

(ii) Determination of volatile residue, step 3(b) may be deleted.

(Rules 1200-3-16-.15, continued)

(iii) The quantity of dry sludge per unit sludge charged shall be determined in terms of either Rdv (metric units; mg dry sludge/liter sludge charged or English units: lb/ft3) or Rdm (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 Rdv or Rdm.

(i) If the volume of sludge charged is used:

$$Sd = (60x10^{-3}) \quad \frac{RdvSv}{T} \quad \text{(Metric Units)}$$

or

$$Sd = (8.021) \quad \frac{RdvSv}{T} \quad \text{(English Units)}$$

where:

Sd = average dry sludge charging rate during the run, kg/hr (English units: lb/hr).

Rdv = average quantity of dry sludge per unit volume of sludge charged to the incinerator, mg/l (English units: lb/ft3).

Sv = sludge charged to the incinerator during the run, m3 (English units: gal).

T = duration of run, min (English units: min).

60*x*10–3 = metric units conversion factor, 1-kg-min/m3-mg-hr.

8.021 = English units conversion factor, ft3-min/gal/hr.

(ii) If the mass of sludge charged is used:

$$Sd = (60 \frac{Rdm\ Sm}{T} \quad \text{(Metric or English Units)}$$

where:

Sd = average dry sludge charging rate during the run, kg/hr (English units; lb/hr).
Rdm= average ratio of quantity of dry sludge to quantity of sludge charged to the incinerator, mg/mg (English units: lb/lb).
Sm = sludge charged during the run, kg (English units: lb).
T = duration of run, min (Metric or English units).
60 = conversion factor, min/hr (Metric or English units).

(c) Particulate emission rate shall be determined by:

Caw = CsQs (Metric or English Units)

where:

(Rules 1200-3-16-.15, continued)

Caw = particulate matter mass emissions, mg/3hr (English units: lb/hr).
Cs = particulate matter concentration, mg/m3 (English units: lb/dscf).
Qs = volumetric stack gas flow rate, dscm/hr (English units; dscf/hr). Qs and Cs shall be determined using Method 2 and 5, respectively.

(d) To check compliance, particulate emissions shall be determined as follows:

$$Cds = \frac{(10\text{-}3)\ Caw}{Sd} \text{ (Metric Units)}$$

or

$$Cds = \frac{(2000)\ Caw}{Sd} \text{ (English Units)}$$

where:
Cds = particulate emission discharge, g/kg dry sludge (English units: lb/ton dry sludge).
10-3 = Metric conversion factor, g/mg.
2000 = English conversion factor, lb/ton.

***Authority**: T.C.A. §§68–25–105 and 4–5–202. **Administrative History**: Original rule effective February 9, 1977. Amended June 16, 1978.*

1200–3–16–.16 PHOSPHATE FERTILIZER INDUSTRY: WET-PROCESS PHOSPHORIC ACID PLANTS.

(1) Applicability

The provisions of this rule shall apply to each wet process phosphoric acid plant having a design capacity of more than 15 tons of equivalent P2O5 feed per calendar day. For the purpose of this rule, the affected facility includes any combination of reactors, filters, evaporators, and hotwells commenced on or after February 9, 1977.

(2) Definitions.

(a) “Wet-process phosphoric acid plant” means any facility manufacturing phosphoric acid by reacting phosphate rock and acid.

(b) “Total fluorides” means elemental fluorine and all fluoride compounds as measured by reference methods specified in subparagraph .01(5)(g) or equivalent or alternative methods.

(c) “Equivalent P2O5 feed” means the quantity of phosphorous, expressed as phosphorous pentoxide, fed to the process.

(3) Standard for Fluorides. On and after the date on which the performance test required to be conducted by paragraph .01(5) of this chapter is completed, no owner or operator subject to the provisions of this rule shall 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 equivalent P2O5 feed (0.020 lb/ton).

(4) Monitoring of Operations. The owner or operator of any wet-process phosphoric acid plant, subject to the provisions of this rule shall:

(a) 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 $5 percent over its operating range.

(b) Maintain a daily record of equivalent P2O5 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 subparagraph (a) of this paragraph and then by proceeding according to part (5)(c)2. of this rule.

(c) 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 +5 percent over its operating range.

(5) Test Methods and Procedures

(a) For determining the concentration of total fluorides and the associated moisture content, the sampling for each run shall be at least 60 minutes and the minimum sampling 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 Technical Secretary.

(b) 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.

(c) Equivalent P2O5 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 subparagraph (4)(a) of this rule.

2. Calculate the equivalent P2O5 feed by multiplying the percentage P2O5 content, as measured by the spectrophotometric molybdovanadophosphate method (AOAC Method 9), times the total mass rate of phosphorus-bearing feed. AOAC Method 9 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 Technical Secretary.

(d) For each run, emissions expressed in g/metric ton of equivalent P2O5 feed shall be determined using the following equation:

$$E = \frac{(CsQs)\ 10\text{-}3}{MP2O5}$$

where:

E	=	Emissions of total fluorides in g/metric ton of equivalent P2O5 feed.
Cs	=	Concentration of total fluorides in mg/dscm.
Qs	=	Volumetric flow rate of the effluent gas stream in dscm/hr.
10-3	=	Conversion factor for mg to g.

(Rules 1200-3-16-.16, continued)

MP2O5 = Equivalent P2O5 feed in metric ton/hr.

***Authority**: T.C.A. §§68–25–105 and 4–5–202. **Administrative History**: Original rule effective February 9, 1977. Amended effective November 6, 1988*

1200–3–16–.17 PHOSPHATE FERTILIZER INDUSTRY: SUPERPHOSPHORIC ACID PLANTS.

(1) Applicability

The provisions of this rule shall apply to each superphosphoric acid phosphate plant having a design capacity of more than 15 tons of equivalent P2O5 feed per calendar day. For the purpose of this rule, the affected facility includes any combination of evaporators, hotwells, acid sumps and cooling tanks commenced on or after February 9, 1977.

(2) Definitions.

(a) "Superphosphoric acid plant" means any facility which concentrates wet-process phosphoric acid to 66 percent or greater P2O5 content by weight for eventual consumption as a fertilizer.

(b) "Total fluorides" means elemental fluorine and all fluoride compounds as measured by reference methods specified in subparagraph .01(5)(g) of this chapter, or equivalent or alternative methods.

(c) "Equivalent P2O5 feed" means the quantity of phosphorus, expressed as phosphorous pentoxide, fed to the process.

(3) Standard for Fluorides. On and after the date on which the performance test required to be conducted by paragraph .01(5) of this chapter is completed, no owner or operator subject to the provisions of this rule shall 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 P2O5 feed (0.010 lb/ton).

(4) Monitoring of Operations. The owner or operator of any granular diammonium phosphate plant subject to the provisions of this rule shall:

(a) 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 +5 percent over its operating range.

(b) Maintain a daily record of equivalent P2O5 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 subparagraph (a) of this paragraph and then by proceeding according to part (5)(c)2. of this rule.

(c) 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 +5 percent over its operating range.

(5) Test Methods and Procedures.

(a) For determining the concentration of total fluorides and the associated moisture content, 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 at shorter necessitated by process variables or other factors, may be approved by the Technical Secretary.

(Rules 1200-3-16-.17, continued)

(b) 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.

(c) Equivalent P2O5 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 subparagraph (4)(a) of this rule.

2. Calculate the equivalent P2O5 feed by multiplying the percentage P2O5 content, as measured by the spectrophotometric molybdovanadophosphate method (AOAC Method 9), times the total mass rate of phosphorus-bearing feed. AOAC Method 9 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 Technical Secretary.

(d) For each run, emissions expressed in g/metric ton of equivalent P2O5 feed shall be determined using the following equation:

$$E = \frac{(CsQx)\ 10\text{-}3}{MP2O5}$$

where:

E	=	Emissions of total fluorides in g/metric ton of equivalent P2O5 feed.
Cs	=	Concentration of total fluorides in mg/dscm.
Qs	=	Volumetric flow rate of the effluent gas stream in dscm/hr.
10-3	=	Conversion factor for mg to g.
MP205	=	Equivalent P2O5 feed in metric ton/hr.

***Authority**: T.C.A. §§68–25–105 and 4–5–202. **Administrative History**: Original rule effective February 9, 1977. Amended effective November 6, 1988.*

1200–3–16–.18 PHOSPHATE FERTILIZER INDUSTRY: DIAMMONIUM PHOSPHATE PLANTS.

(1) Applicability

The provisions of this rule shall apply to each granular diammonium phosphate plant having a design capacity of more than 15 tons of equivalent P2O5 feed per calendar day. For the purpose of this rule, the affected facility includes any combination of reactors, granulators, dryers, coolers, screens and mills commenced on or after February 9, 1977.

(2) Definitions.

(a) “Granular diammonium phosphate plant” means any plant manufacturing granular diammonium phosphate by reacting phosphoric acid with ammonia.

(Rules 1200-3-16-.18, continued)

(b) "Total fluorides" means elemental fluorine and all fluoride compounds as measured by reference methods specified in subparagraph .01(5)(g) of this chapter or equivalent or alternative methods.

(c) "Equivalent P2O5 feed" means the quantity of phosphorous, expressed as phosphorous pentoxide, fed to the process.

(3) Standard for Fluorides. On and after the date on which the performance test required to be conducted by paragraph .01(5) of this chapter is completed, no owner or operator subject to the provisions of this rule shall 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 P2O5 feed (0.060 lb/ton).

(4) Monitoring of operations. The owner or operator of any granular diammonium phosphate plant subject to the provisions of this rule shall:

(a) 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 +5 percent over its operating range.

(b) Maintain a daily record of equivalent P2O5 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 subparagraph (a) of this paragraph and then by proceeding according to part (5)(c) 2. of this rule.

(c) 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 +5 percent over its operating range.

(5) Test Methods and Procedures.

(a) For determining the concentration of total fluorides and the associated moisture content, 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 Technical Secretary.

(b) 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.

(c) Equivalent P2O5 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 subparagraph (4)(a) of this rule.

2. Calculate the equivalent P2O5 feed by multiplying the percentage P2O5 content, as measured by the spectrophotometric molybdovanadophosphate method (AOAC Method 9), times the total mass rate of phosphorus-bearing feed. AOAC Method 9 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 Technical Secretary.

(d) For each run, emissions expressed in g/metric ton of equivalent P2O5 feed shall be determined using the following equation:

(CsQs) 10-3

(Rules 1200-3-16-.18, continued)

E =

MP2O5

where:

E	=	Emissions of total fluorides in g/metric ton of equivalent P2O5 feed.
Cs	=	Concentration of total fluorides in mg/dscm.
Qs	=	Volumetric flow rate of the effluent gas stream in dscm/hr.
10-3	=	Conversion factor for mg to g.
MP2O5	=	Equivalent P2O5 feed in metric ton/hr.

Authority: *T.C.A. §§68–25–105 and 4–5–202.* ***Administrative History:*** *Original rule filed January 10, 1977; effective February 9, 1977. Amendment filed May 17, 1978; effective June 16, 1978. Amendment filed September 21, 1988; effective November 6, 1988.*

1200–3–16–.19 PHOSPHATE FERTILIZER INDUSTRY: TRIPLE SUPERPHOSPHATE PLANTS.

(1) Applicability

The provisions of this rule shall apply to each triple superphosphate plant having a design capacity of more than 15 tons of equivalent P2O5 feed per calendar day. For the purpose of this rule, the affected facility includes any combination of mixers, curing belts (dens), reactors, granulators, dryers, cookers, screens, mills and facilities which store run-of-pile triple superphosphate commenced on or after February 9, 1977.

(2) Definitions

(a) "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.

(b) "Run-of-pile triple superphosphate" means any triple phosphate that has not been processed in a granulator and is composed on particles at least 25 percent 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 subparagraph .01(5)(g) of this chapter or equivalent or alternative methods.

(d) "Equivalent P2O5 feed" means the quantity of phosphorus, expressed as phosphorous pentoxide, fed to the process.

(3) Standard for Fluorides. On and after the date on which the performance test required to be conducted by paragraph .01(5) of this chapter is completed, no owner or operator subject to the provisions of this rule shall 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 P2O5 feed (0.20 lb/ton).

(4) Monitoring of Operations. The owner or operator of any triple superphosphate plant subject to the provisions of this rule shall:

(Rules 1200-3-16-.19, continued)

(a) 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 +5 percent over its operating range.

(b) Maintain a daily record of equivalent P2O5 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 subparagraph (a) of this paragraph and then by proceeding according to part (5)(c)2 of this rule.

(c) 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 +5 percent over its operating range.

(5) Test Methods and Procedures.

(a) For determining the concentration of total fluorides and the associated moisture content, 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 Technical Secretary.

(b) 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.

(c) Equivalent P2O5 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 subparagraph (4)(a) of this rule.

2. Calculate the equivalent P2O5 feed by multiplying the percentage P2O5 content, as measured by the spectrophotometric molybdovanadophosphate method (AOAC Method 9), times the total mass rate of phosphorus-bearing feed. AOAC Method 9 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 Technical Secretary.

(d) For each run, emissions expressed in g/metric ton of equivalent P2O5 feed shall be determined when using the following equation:

$$E = \frac{(CsQs)\ 10\text{-}3}{MP2O5}$$

where:

E = Emissions of total fluorides in g/metric ton of equivalent feed.

Cs = Concentration of total fluorides in mg/dscm.

Qs = Volumetric flow rate of the effluent gas stream in dscm/hr.

10-3 = Conversion factor for mg to g.

MP2O5 = Equivalent P2O5 feed in metric ton/hr.

(Rules 1200-3-16-.19, continued)

Authority: *T.C.A. §§68–25–105 and 4–5–202.* ***Administrative History:*** *Original rule filed January 10, 1977; effective February 9, 1977. Amendment filed September 21, 1988; effective November 6, 1988.*

1200–3–16–.20 PHOSPHATE FERTILIZER INDUSTRY: GRANULAR TRIPLE SUPERPHOSPHATE STORAGE FACILITIES.

(1) Applicability. The provisions of this rule shall apply to each granular triple superphosphate storage facility. For the purpose of this rule, the affected facility includes any combination of storage or curing piles, conveyors, elevators, screens and mills commenced on or after February 9, 1977.

(2) Definitions.

(a) "Granular triple superphosphate storage facility" means any facility curing or storing granular triple superphosphate.

(b) "Total fluorides" means elemental fluorine and all fluoride compounds as measured by reference methods specified in subparagraph .01(5)(g) of this chapter.

(c) "Equivalent P2O5 stored" means the quantity of phosphorus, expressed as phosphorus pentoxide, being cured or stored in the affected facility.

(d) "Fresh granular triple superphosphate" means granular triple superphosphate produced no more than 10 days prior to the date of the performance test.

(3) Standard for Fluorides. On and after the date on which the performance test required to be conducted by paragraph .01(5) of this chapter is completed, no owner or operator subject to the provisions of this rule shall 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 P2O5 stored (5.0 *x* 10-4 lb/hr/ton of equivalent P2O5 stored).

(4) Monitoring of Operations. The owner or operator of any granular triple superphosphate storage facility subject to the provisions of this rule shall:

(a) Maintain an accurate account of triple superphosphate in storage to permit the determination of the amount of equivalent P2O5 stored.

(b) Maintain a daily record of total equivalent P2O5 stored by multiplying the percentage P2O5 content, as determined by part (5)(e)(2) of this rule times the total mass of granular triple superphosphate stored.

(c) 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 +5 percent over its operating range.

(5) Test Methods and Procedures.

(a) For determining the concentration of total fluorides and the associated moisture content, 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 Technical Secretary.

(b) 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.

(Rules 1200-3-16-.20, continued)

(c) Except as provided under subparagraph (e) of this paragraph, 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 percent of the building capacity.

2. Fresh granular triple superphosphate - at least 20 percent of the amount of triple superphosphate in the building.

(d) If the provisions set forth in part (c)2 of this paragraph exceed production capabilities for fresh granular triple superphosphate, the owner or operator shall have at least five days maximum production of fresh granular triple superphosphate in the building during a performance test.

(e) Equivalent P2O5 stored shall be determined as follows:

1. Determine the total mass stored during each run using an accountability system meeting the requirements of subparagraph (4)(a) of this rule.

2. Calculate the equivalent P2O5 stored by multiplying the percentage P2O5 content, as measured by the spectrophotometric molybdovanadophosphate method (AOAC Method 9), times the total mass stored. AOAC Method 9 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 Technical Secretary.

(f) For each run, emissions expressed in g/hr/metric ton of equivalent P2O5 stored shall be determined using the following equation:

$$E = \frac{(CsQs)\ 10\text{-}3}{MP2O5}$$

where:

E	=	Emissions of total fluorides in g/hr/metric ton of equivalent P2O5 stored.
Cs	=	Concentration of total fluorides in mg/dscm.
Qs	=	Volumetric flow rate of the effluent gas stream in dscm/hr.
10-3	=	Conversion factor for mg to g.
MP2O5	=	Equivalent P2O5 stored in metric tons.

Authority*: T.C.A. §§68–25–105 and 4–5–202.* ***Administrative History****: Original rule filed January 10, 1977; effective February 9, 1977. Amendment filed May 17, 1978; effective June 16, 1978.*

1200–3–16–.21 PRIMARY ALUMINUM REDUCTION PLANTS.

(1) Applicability:

(a) The affected facilities in primary aluminum reduction plants to which this rule applies are potroom groups and anode baking plants.

(b) Any facility under subparagraph (a) of this paragraph that commences construction or modification after November 6, l988 is subject to the requirements of this rule.

(Rules 1200-3-16-.21, continued)

(2) Definitions:

(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 subparagraph (6)(g) of this rule.

(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 paragraph (6) of this rule 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 1200–3–16–.01 (5) is completed, no owner or operator subject to the provisions of this rule shall cause to be discharged into the atmosphere from any affected facility any gases containing total fluorides as measured according to 1200–3–16–.01 (5) above, in excess of:

1. (i) 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 (2.0 lb/ton) and 1.3 kg/Mg (2.6 lb/ton) will 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;

(ii) 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) will 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;

(iii) For the purpose of compliance with the alternative standards in subparts (i) and (ii), exemplary operation and maintenance procedures include the following:

(I) Hood covers should fit properly and be in good repair;

(II) If the exhaust system is equipped with an adjustable air damper system, the hood exhaust rate for individual pots should be increased whenever hood

covers are removed from a pot (the exhaust system should not, however, be overloaded by placing too many pots on high exhaust);

(III) Hood covers should be replaced as soon as possible after each potroom operation;

(IV) Dust entrainment should be minimized during materials handling operations and sweeping of the working aisles;

(V) Only tapping crucibles with functional aspirator air return systems (for returning gases under the collection hooding) should be used;

(VI) The primary control system should be regularly inspected and properly maintained;

2. 0.05 kg/Mg (0.1 lb/ton) of aluminum equivalent for anode bake plants.

(b) Within 30 days of any performance test which reveals emissions which fall between the 1.0 kg/Mg and 1.3 kg/Mg levels in part (a)1.(i) of this paragraph or between the 0.95 kg/Mg and 1.25 kg/Mg levels in part (a)1.(ii) of this paragraph, the owner or operator shall submit a report 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 to the Technical Secretary.

(4) Standard for visible emissions.

(a) On and after the date on which the performance test required to be conducted by 1200–3–16–.01(5) is completed, no owner or operator subject to the provisions of this rule shall cause to be discharged into the atmosphere:

1. From any potroom group any gases which exhibit 10 percent opacity or greater, or

2. From any anode bake plant any gases which exhibit 20 percent opacity or greater.

(5) Monitoring of Operations.

(a) The owner or operator of any affected facility subject to the provisions of this rule 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 + 5 percent 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 1200–3–16–.01 (5)(a) 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 1200–3–16–.01(5)(c). The owner or operator shall give the Technical Secretary at least 15 days notice of each test. The Technical Secretary may require additional testing.

(b) An owner or operator may petition the Technical Secretary to establish an alternative testing requirement that requires testing less frequently than once each month for a primary control system or an anode bake plant. If the owner or operator shows that emissions from the primary

control system or the anode bake plant have low variablity during day-to-day operations, the Technical Secretary may establish such an alternative testing requirement. The alternative testing requirement shall include a testing schedule and, in the case of a primary control system, the method to be used to determine primary control system emissions for the purpose of performance tests. The Technical Secretary shall establish alternative testing requirements on the applicable operating permit as a condition.

(c) Except as provided in 1200–3–16–.01(5)(b), reference methods in 1200–3–16–.01 (5)(g) shall be used to determine compliance with the standards prescribed in paragraph (3) of this rule as follows:

1. For sampling emissions from stacks:

(i) Method 1 as specified in 1200–3–16–.01(5)(g)1. for sample and velocity traverses.

(ii) Method 2 as specified in 1200–3–16–.01(5)(g)2. for velocity and volumetric flow rate.

(iii) Method 3 as specified in 1200–3–16–.01(5)(g)3. for gas analysis.

(iv) Method 13A and 13B as specified in 1200–3–16–.01(5)(g)13. 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:

(i) Method 1 as specified in 1200–3–16–.01(5)(g)1. for sample and velocity traverses,

(ii) Method 2 as specified in 1200–3–16–.01(5)(g)2. and Method 14 as specified in 1200–3–16–.01(5)(g)14. for velocity and volumetric flow rate,

(iii) Method 3 as specified in 1200–3–16–.01(5)(g)3. for gas analysis, and

(iv) Method 14 as specified in 1200–3–16–.01(5)(g)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 collec–tion systems, the procedures under 1200–3–16–.01(5)(b) shall be followed.

(d) For Method 13A or 13B as specified in 1200–3–16–.01(5)(g)13., 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 necessiated by process variables or other factors, may be approved by the Technical Secretary.

(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 subparagraph (c) of this paragraph.

(f) The rate of aluminum production is 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.

(Rules 1200-3-16-.21, continued)

(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 subparagraph (5)(a) of this rule.

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 two. (Note: An owner or operator may establish a different multiplication factor by submitting production records of the Mg of aluminum produced and the concurrent Mg of anode consumed by potrooms).

(h) For each run, potroom group emissions expressed in kg/Mg of aluminum produced shall be determined using the following equation:

$$Epg = \frac{(CsQs)1\ 10\text{-}6 + (CsQs)2\ 10\text{-}6}{M}$$

Where:

Epg = potroom group emissions of total fluorides in kg/Mg of aluminum produced.

Cs = concentration of total fluorides in mg/dscm as determined by Method 13A or 13B, as specified in 1200–3–16–.01(5)(g)13., or by Method 14 as specified in 1200–3–16–.01(5)(g)14., as applicable.

Qs = volumetric flow rate of the effluent gas stream in dscm/hr as determined by Method 2 as specified in 1200–3–16–.01(5)(g)2. and/or Method 14 as specified in 1200–3–16–.01(5)(g)14., as applicable.

10-6 = conversion factor from mg to kg.

M = rate of aluminum production in Mg/hr as determined by subparagraph (6)(f) of this rule.

(CsQs)1 = product of Cs and Qs for measurements of primary control system effluent gas streams.

(CsQs)2 = product of Cs and Qs for measurements of secondary control system of roof monitor effluent gas streams.

Where an alternative testing requirement has been established for the primary control system, the calculated value (CsQs)1 from the most recent performance test will be used.

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

$$Ebp = \frac{CsQs\ 10\text{-}6}{Me}$$

(Rules 1200-3-16-.21, continued)

Where:

Ebp = anode bake plant emissions of total fluorides in kg/Mg of aluminum equivalent.

Cs = concentration of total fluorides in mg/dscm as determined by Method 13A or 13B, as specified in 1200–3–16–.01(5)(g)13.

Qs = volumetric flow rate of the effluent gas stream in dscm/hr as determined by Method 2, as specified in 1200–3–16–.01(5)(g)2.

10-6 = conversion factor from mg to kg.

Me = aluminum equivalent for anodes produced by anode bake plants in Mg/hr as determined by subparagraph (6)(g) of this rule.

***Authority**: T.C.A. §§68–25–105 and 4–5–202.* ***Administrative History**: Original rule filed January 10, 1977; effective February 9, 1977. Amendment filed September 4, 1981; effective October 19, 1981. Amendment filed March 24, 1986; effective April 23, 1986.*

1200–3–16–.22 COAL PREPARATION PLANTS.

(1) Applicability. The provisions of this rule shall apply to any of the affected facilities in coal preparation plants which process more than 200 tons per day. For the purpose of this rule, the affected facilities include: 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 commenced on or after February 9, 1977.

(2) Definitions.

(a) “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.

(b) “Bituminous coal” means solid fossil fuel classified as bituminous coal by A.S.T.M. Designation D-388-66.

(c) “Coal” means all solid fossil fuels classified as anthracite, bituminous, sub-bituminous, or lignite by A.S.T.M. Designation D- 388-66.

(d) “Cyclonic flow” means a spiraling movement of exhaust gases within a duct or stack.

(e) “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.

(f) “Pneumatic coal-cleaning equipment” means any facility which classifies bituminous coal by size or separates bituminous coal from refuse by application of air stream(s).

(g) “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.

(h) “Coal storage system” means any facility used to store coal except for open storage piles.

(Rules 1200-3-16-.22, continued)

(i) "Transfer and loading system" means any facility used to transfer and load coal for shipment.

(3) Standards for Particulate Matter and Opacity.

(a) On and after the date on which the performance test required to be conducted by paragraph .01(5) of this chapter is completed, an owner or operator subject to the provisions of this rule shall 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 percent opacity or greater.

(b) On and after the date on which the performance test required to be conducted by paragraph .01(5) of this chapter is completed, an owner or operator subject to the provisions of this rule shall 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 percent opacity or greater.

(c) On and after the date on which the performance test required to be conducted by paragraph .01(5) of this chapter is completed, an owner or operator subject to the provisions of this subpart shall 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 percent 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 is to be certified by the manufacturer to be accurate within +3 Fahrenheit.

2. For affected facilities that use venturi scrubber emissions control equipment:

(i) A monitoring device for the continuous measurement of the pressure loss through the venturi constriction of the control equipment. The monitoring device is to be certified by the manufacturer to be accurate within + 1 inch water gauge.

(ii) A monitoring device for the continuous measurement of the water supply pressure to the control equipment. The monitoring device is to be certified by the manufacturer to be accurate within + 5 percent of design water supply pressure. The pressure sensor or tap must be located close to the water discharge point. The Technical Secretary may be consulted for approval of alternative locations.

(b) All monitoring devices under subparagraph (a) of this paragraph are to be recalibrated annually in accordance with procedures under subparagraph .01(8)(b) of this chapter.

(5) Test Methods and Procedures.

(a) For determining the concentration of particulate matter and associated moisture content, the sampling time for each run is at least 60 minutes and the minimum sample volume is 0.85 dscm

(Rules 1200-3-16-.22, continued)

(30 dscf) except that shorter sampling times or smaller volumes, when necessitated by process variables or other factors, may be approved by the Technical Secretary. Sampling is not to be started until 30 minutes after start-up and is to 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 Technical Secretary.

(b) 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.

***Authority**: T.C.A. §§68–25–105 and 4–5–202.* ***Administrative History**: Original rule filed January 10, 1977; effective February 9, 1977.*

1200–3–16–.23 PRIMARY COPPER SMELTERS.

(1) Applicability. The provisions of this rule shall apply to the following affected facilities commenced on or after February 9, 1977 in primary copper smelters: dryer roaster, smelting furnace, and copper converter.

(2) Definitions.

(a) "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.

(b) "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 percent of the sulfur contained in the charge is eliminated in the facility.

(c) "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 percent or more) of the sulfur contained in the charge.

(d) "Calcine" means the solid materials produced by a roaster.

(e) "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, and/or copper matte.

(f) "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 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.

(g) "Copper converter" means any vessel to which copper matte is charged and oxidized to copper.

(h) "Sulfuric acid plant" means any facility producing sulfuric acid by the contact process.

(i) "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.

(j) "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 a fossil fuel.

(Rules 1200-3-16-.23, continued)

(k) "Total smelter charge" means the weight (dry basis) of all copper sulfides 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.

(l) "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.

(3) Standard for particulate matter.

On and after the date on which the performance test required to be conducted by paragraph .01(5) of this chapter is completed, no owner or operator subject to the provisions of this rule shall discharge or cause the discharge 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 paragraph .01(5) of this chapter is completed, no owner or operator subject to the provisions of this rule shall discharge or cause the discharge into the atmosphere from any roaster, smelting furnace, or copper converter any gases which contain sulfur dioxide in excess of 0.065 percent by volume, except as provided in subparagraphs (b) and (c) of this paragraph.

(b) Reverberatory smelting furnaces shall be exempted from subparagraph (a) of this paragraph 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 shall 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 paragraph .01(5) of this chapter is completed, no owner or operator subject to the provisions of this rule shall discharge or cause the discharge into the atmosphere from any dryer any visible emissions which exhibit greater than twenty (20%) percent opacity.

(b) On and after the date on which the performance test required to be conducted by paragraph .01(5) of this chapter is completed, no owner or operator subject to the provisions of this rule shall discharge or cause the discharge into the atmosphere from any affected facility that uses a sulfuric acid plant to comply with the standard set forth in paragraph (4) of this rule, any visible emissions which exhibit greater than twenty percent (20%) opacity.

(6) Monitoring of Operations.

(a) The owner or operator of any primary copper smelter subject to subparagraph (4)(b) of this rule, 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 Technical Secretary and shall be accurate to within plus or minus ten percent.

(b) The owner or operator of any primary copper smelter subject to the provisions of this rule shall install and operate:

1. A continuous monitoring system to monitor and record the opacity of gases discharged into the atmosphere from any dryer. The span of this system shall be set at 80 to 100 percent opacity.

2. A continuous monitoring system to monitor and record sulfur dioxide emissions discharged into the atmosphere from any roaster, smelting furnace or copper converter subject to subparagraph (4)(a) of this rule. The span of this system shall be set at a sulfur dioxide concentration of 0.20 percent by volume.

(i) The continuous monitoring system performance evaluation required under paragraph .01(8) of this chapter shall be completed prior to the initial performance evaluation. During the performance evaluation the span of the continuous monitoring system may be set at a sulfur dioxide concentration of 0.15 percent by volume if necessary to maintain the system output between 20 percent and 90 percent 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 percent by volume.

(ii) For the purpose of the continuous monitoring system performance evaluation required under paragraph .01(8) of this chapter, the reference method referred to under the Field Test for Accuracy (Relative) in Performance Specification 2 of Appendix B (Federal Register, Vol. 40, No. 194) to this part shall be as specified by the Technical Secretary. 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 paragraph 2.1, Performance Specification 2 of Appendix B (Federal Register, Vol. 40, No. 194), and for calibration checks under paragraph .01(8) of this chapter, shall be sulfur dioxide.

(c) Six-hour average sulfur dioxide concentrations shall be calculated and recorded daily for the four consecutive 6-hour periods of each operating day. Each six-hour average shall be determined as the arithmetic mean of the appropriate six contiguous one-hour average sulfur dioxide concentrations provided by the continuous monitoring system installed under subparagraph (b) of this paragraph.

(d) For the purpose of reports required under subparagraph .01(7)(c) of this chapter periods of excess emissions that shall be reported are defined as follows:

1. Opacity. Any six-minute period during which the average opacity, as measured by the continuous monitoring system installed under subparagraph (b) of this paragraph, exceeds the standard under subparagraph (5)(a).

2. Sulfur dioxide. Any six-hour period, as described in subparagraph (c) of this paragraph, during which the average emissions of sulfur dioxide, as measured by the continuous monitoring system installed under subparagraph (b) of this paragraph, exceeds the standard under paragraph (4).

(7) Test Methods and Procedures:

(a) Sulfur dioxide concentrations shall be determined using the continuous monitoring system installed in accordance with subparagraph (6)(b). One 6-hour average period shall constitute one run. The monitoring system drift during any run shall not exceed 2 percent of span.

(b) For determining the concentration of particulate matter and associated moisture content, the sampling time for each run shall be at least 60 minutes and the minimum sampling volume shall

(Rules 1200-3-16-.23, continued)

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 Technical Secretary.

***Authority**: T.C.A. §§68–25–105 and 4–5–202.* ***Administrative History**: Original rule filed January 10, 1977; effective February 9, 1977.*

1200–3–16–.24 PRIMARY ZINC SMELTERS.

(1) Applicability. The provisions of this rule shall apply to the following affected facilities in primary zinc smelters: roaster and sintering machine commenced on or after February 9, 1977.

(2) Definitions.

(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 percent) 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 Emissions.

(a) On and after the date on which the performance test required to be conducted by paragraph .01(5) of this chapter is completed, no owner or operator subject to the provisions of this rule shall discharge or cause the discharge 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 paragraph .01(5) of this chapter is completed, no owner or operator subject to the provisions of this rule shall discharge or cause the discharge into the atmosphere from any roaster any gases which contain sulfur dioxide in excess of 0.065 percent by volume.

(b) Any sintering machine which eliminates more than 10 percent of the sulfur initially contained in the zinc sulfide ore concentrates will be considered as a roaster under subparagraph (a) of this paragraph.

(5) Standard for Visible Emissions.

(a) On and after the date on which the performance test required to be conducted by paragraph .01(5) of this chapter is completed, no owner or operator subject to the provisions of this rule shall discharge or cause the discharge into the atmosphere from any sintering machine any visible emissions which exhibit greater than 20 percent opacity.

(b) On and after the date on which the performance test required to be conducted by paragraph .01(5) of this chapter is completed, operator subject to the provisions of this rule shall discharge or cause the discharge into the atmosphere from any affected facility that uses a sulfuric acid

plant to comply with the standard set forth in paragraph (4), any visible emissions which exhibit greater than 20 percent opacity.

(6) Monitoring of Operations.

(a) The owner or operator of any primary zinc smelter subject to the provisions of this rule shall install and operate:

1. A continuous monitoring system to monitor and record the opacity of gases discharged into the atmosphere from any sintering machine. The span of this system shall be set at 80 to 100 percent opacity.

2. A continuous monitoring system to monitor and record sulfur dioxide emissions discharged into the atmosphere from any roaster subject to paragraph (4). The span of this system shall be set at a sulfur dioxide concentration of 0.20 percent by volume.

(i) The continuous monitoring system performance evaluation required under paragraph .01(8) of this chapter shall be completed prior to the initial performance test required under paragraph .01(5) of this chapter. During the performance evaluation, the span of the continuous monitoring system may be set at a sulfur dioxide concentration of 0.15 percent by volume if necessary to maintain the system output between 20 percent and 90 percent 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 percent by volume.

(ii) For the purpose of the continuous monitoring system performance evaluation required under paragraph .01(8) of this chapter the reference method referred to under the Field Test for Accuracy (Relative) in Performance Specification 2 of Appendix B (Federal Register, Vol. 40, No. 194) shall be as specified by the Technical Secretary.

(iii) 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 paragraph 2.1, Performance Specifications 2 of Appendix B (Federal Register, Vol. 40, No. 194) and for calibration checks under paragraph .01(8) of this chapter shall be sulfur dioxide.

(b) Two-hour average sulfur dioxide concentrations shall be calculated and recorded daily for the twelve consecutive 2-hour periods of each operating day. Each two-hour average shall be determined as the arithmetic mean of the appropriate two contiguous one-hour average sulfur dioxide concentrations provided by the continuous monitoring system installed under subparagraph (a) of this paragraph.

(c) For the purpose of reports required under subparagraph .01(7)(c) of this chapter, periods of excess emissions that shall be reported are defined as follows:

1. Opacity. Any six-minute period during which the average opacity, as measured by the continuous monitoring system installed under subparagraph (a) of this paragraph, exceeds the standard in subparagraph (5)(a) of this rule.

2. Sulfur dioxide. Any two-hour period, as described in subparagraph (b) of this paragraph, during which the average emissions of sulfur dioxide, as measured by the continuous monitoring system installed under subparagraph (a) of this paragraph, exceeds the standard under paragraph (4).

(Rules 1200-3-16-.24, continued)

(7) Test Methods and Procedures.

(a) Sulfur dioxide concentrations shall be determined using the continuous monitoring system installed in accordance with subparagraph (6)(a). One 2-hour average period shall constitute one run.

(b) 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 Technical Secretary.

***Authority**: T.C.A. §§68–25–105 and 4–5–202.* ***Administrative History**: Original rule filed January 10, 1977; effective February 9, 1977. Amendment filed September 4, 1981; effective October 19, 1981.*

1200–3–16–.25 PRIMARY LEAD SMELTERS.

(1) Applicability. The provisions of this rule shall apply 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 commenced on or after February 9, 1977.

(2) Definitions.

(a) "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.

(b) "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".

(c) "Sinter bed" means the lead sulfide ore concentrate charge within a sintering machine.

(d) "Sintering machine discharge end" means any apparatus which receives sinter as it is discharged from the conveying grate of a sintering machine.

(e) "Blast furnace" means any reduction furnace to which sinter is charged and which forms separate layers of molten slag and lead bullion.

(f) "Dross reverbatory furnace" means any furnace used for the removal or refining of impurities from lead bullion.

(g) "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.

(h) "Converter" means any vessel to which lead concentrate or bullion is charged and refined.

(i) "Sulfuric acid plant" means any facility producing sulfuric acid by the contact process.

(3) Standard for Particulate Matter.

On and after the date on which the performance test required to be conducted by paragraph .01(5) of this chapter is completed, no owner or operator subject to the provisions of this rule shall discharge or cause the discharge 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.

On and after the date on which the performance test required to be conducted by paragraph .01(5) of this chapter is completed, no owner or operator subject to the provisions of this rule shall discharge of cause the discharge into the atmosphere from any sintering machine, electric smelting furnace, or converter gases which contain sulfur dioxide in excess of 0.065 percent by volume.

(5) Standard for Visible Emissions.

(a) On and after the date on which the performance test required to be conducted by paragraph .01(5) of this chapter is completed, no owner or operator subject to the provisions of this rule

shall discharge or cause the discharge into the atmosphere from any blast furnace, dross reverberatory furnace, or sintering machine discharge end any visible emissions which exhibit greater than 20 percent opacity.

(b) On and after the date on which the performance test required to be conducted by paragraph .01(5) of this chapter is completed, no owner or operator subject to the provisions of this rule shall discharge or cause the discharge into the atmosphere from any affected facility that uses a sulfuric acid plant to comply with the standard set forth in paragraph (4), any visible emissions which exhibit greater than 20 percent opacity.

(6) Monitoring of Operations.

(a) The owner or operator of any primary lead smelter subject to the provisions of this rule shall install and operate:

1. A continuous monitoring system to monitor and record the opacity of gases discharged into the atmosphere from any blast furnace, dross reverberatory furnace, or sintering machine discharge end. The span of this system shall be set at 80 to 100 percent opacity.

2. A continuous monitoring system to monitor and record sulfur dioxide emissions discharged into the atmosphere from any sintering machine, electric furnace or converter subject to paragraph (4). The span of this system shall be set at a sulfur dioxide concentration of 0.20 percent by volume.

(i) The continuous monitoring system performance evaluation required under paragraph .01(8) of this chapter shall be completed prior to the initial performance test required under paragraph .01(5) of this chapter. During the performance evaluation, the span of the continuous monitoring system may be set at a sulfur dioxide concentration of 0.15 percent by volume if necessary to maintain the system output between 20 percent and 90 percent 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 percent by volume.

(ii) For the purpose of the continuous monitoring system performance evaluation required under paragraph .01(8) of this chapter, the reference method referred to under the Field Test for Accuracy (Relative) in Performance Specification 2 of Appendix B (Federal Register, Vol. 40, No. 194) shall be as specified by the Technical Secretary.

(iii) 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 paragraph 2.1, Performance Specification 2 of Appendix B (Federal Register, Vol. 40, No. 194) and for calibration checks under paragraph .01-(8) of this chapter shall be sulfur dioxide.

(b) Two-hour average sulfur dioxide concentrations shall be calculated and recorded daily for the twelve consecutive two- hour periods of each operating day. Each two-hour average shall be determined as the arithmetic mean of the appropriate two continuous one-hour average sulfur dioxide concentrations provided by the continuous monitoring system installed under subparagraph (a) of this paragraph.

(c) For the purpose of reports required under subparagraph .01(7)(c) of this chapter, periods of excess emissions that shall be reported are defined as follows:

(Rules 1200-3-16-.25, continued)

1. Opacity. Any six-minute period during which the average opacity, as measured by the continuous monitoring system installed under subparagraph (a) of this paragraph, exceeds the standard under subparagraph (5)(a).

2. Sulfur dioxide. Any two-hour period, as described in subparagraph (b) of this paragraph, during which the average emissions of sulfur dioxide, as measured by the continuous monitoring system installed under subparagraph (a) of this paragraph, exceeds the standard under subparagraph (4)(a).

(7) Test Methods and Procedures.

(a) Sulfur dioxide concentrations shall be determined using the continuous monitoring system installed in accordance with subparagraph (6)(a) of this rule. One 2-hour average period shall constitute one run.

(b) 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 Technical Secretary.

Authority*: T.C.A. §§68–25–105 and 4–5–202.* ***Administrative History****: Original rule filed January 10, 1977; effective February 9, 1977. Amendment filed September 4, 1981; effective October 18, 1981.*

1200–3–16–.26 STEEL PLANTS: ELECTRIC ARC FURNACES CONSTRUCTED AFTER FEBRUARY 9, 1977, AND ON OR BEFORE AUGUST 17, 1983.

(1) Applicability and designation of affected facility.

(a) The provisions of this rule 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 rule apply to each affected facility identified in subparagraph (a) of this paragraph that commenced construction, modification, or reconstruction after February 9, 1977 and on or before August 17, 1983.

(2) Definitions.

(a) “Electric Arc Furnace” (EAF) means a 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.

(b) “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 rule.

(c) “Control device” means the air pollution control equipment used to remove particulate matter generated by an EAF(s) from the effluent gas stream.

(d) “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.

(e) “Charge” means the addition of iron and steel scrap or other materials into the top of an electric arc furnace.

(f) “Charging period” means the time period commencing at the moment an EAF starts to open and ending either three minutes after the EAF roof is returned to its closed position or six minutes after commencement of opening of the roof, whichever is longer.

(g) "Tap" means the pouring of molten steel from an EAF.

(h) "Tapping period" means the time period commencing at the moment an EAF begins to tilt to pour and ending either three minutes after an EAF returns to an upright position or six minutes after commencing to tilt, whichever is longer.

(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 opacity" means the arithmetic average of 24 or more opacity observations of emissions from the shop taken in accordance with Method 9 (as specified in 1200–3–16–.01(5)(g)9) for the applicable time periods.

(l) "Heat time" means the period commencing when scrap is charged to an empty EAF and terminating when the EAF tap is completed.

(m) "Shop" means the building which houses one or more EAF's.

(n) "Direct shell evacuation system (DEC 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.

(3) Standards for Particulate Matter and Opacity:

(a) On and after the date on which the performance test required to be conducted by paragraph .01(5) of this chapter is completed, no owner or operator subject to the provisions of this rule shall discharge or cause the discharge 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 three percent opacity or greater.

3. Exit from a shop and, due solely to operations of any EAF(s), exhibit six percent opacity or greater except:

(i) Shop opacity less than 20 percent may occur during charging periods.

(ii) Shop opacity less than 40 percent may occur during tapping periods.

(iii) Opacity standards under part (a)3. of this paragraph shall apply only during periods when pressures and either control system fan motor amperes and damper positions or flow rates are being established under subparagraphs (5)(c) and (5)(g) of this rule.

(iv) 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 under part (a)3. of this paragraph shall apply when the roof is opened and shall continue to apply for the length of time defined by the charging and/or tapping periods.

(Rules 1200-3-16-.26, continued)

(b) On and after the date on which the performance test required to be conducted by paragraph .01(5) of this chapter is completed, no owner or operator subject to the provisions of this rule shall discharge or cause the discharge into the atmosphere from dust-handling equipment any gases which exhibit 10 percent opacity or greater.

(4) Emission Monitoring.

(a) 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 rule.

(b) For the purpose of reports under 1200–3–16–.01(7)(c), periods of excess emissions that shall be reported are defined as all six- minutes periods during which the average opacity is three percent or greater.

(c) No continuous monitoring system shall be 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 subpart (6)(c)6.(i) of this rule.

(5) Monitoring of Operations.

(a) The owner or operator subject to the provisions of this rule 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 subparagraph (b) of this paragraph, or equivalent obtained under subparagraph (d) of this paragraph; and

4. All pressure data obtained under subparagraph (e) of this paragraph.

(b) Except as provided under subparagraph (d) of this paragraph, the owner or operator subject to the provisions of this rule shall check and record on a once-per-shift basis the furnace static pressure (if a Direct Shell Evacuation system is in use) and either:

1. check and record the control system fan motor amperes and damper positions on a once-per-shift basis; or

2. install, calibrate, and maintain a monitoring device that continuously records the volumetric flow rate through each separately ducted hood. The monitoring device(s) may be installed in any appropriate location in the exhaust duct such that reproducible flow rate monitoring will result. The flow rate monitoring device(s) shall have an accuracy +10 percent over its normal operating range and shall be calibrated according to the manufacturer's instructions. The Technical Secretary may require the owner or operator to demonstrate the accuracy of the monitoring device(s) relative to Methods 1 and 2 (as specified in 1200–3–16–.01(5)(g)).

(c) When the owner or operator of an EAF is required to demonstrate compliance with the standards under 1200–3–16–.26(3)(a)3. and at any other time the Technical Secretary 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 EAF subject to parts (b)1. or (b)2. of this paragraph. The owner or operator may petition the Technical

Secretary for reestablishment of these parameters whenever the owner or operator can demonstrate to the Technical Secretary'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 1200–3–16–.26(7)(a).

(d) The owner or operator may petition the Technical Secretary 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 + 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 1200–3–16–.26(3)(a)3. and at any other time the Technical Secretary may require, the pressure in the free space inside the furnace shall be determined during the meltdown and refining period(s) using the monitoring device described in subparagraph (f) of this paragraph. The owner or operator may petition the Technical Secretary for reestablishment of the 15-minute integrated average pressure whenever the owner or operator can demonstrate to the Technical Secretary'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 Technical Secretary 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 shall not be subject to the requirements of this paragraph.

(i) During any performance test required under 1200–3–16–.01(5), and for any report thereof required by subparagraph (6)(c) of this rule or to determine compliance with 1200–3–16–.26(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 furnace where direct-shell evacuation systems are used;

3. Control device operation log; and

4. Continuous monitor or Method 9 (as specified in 1200–3–16–.01(5)(g)9.) data.

(6) Test methods and procedures

(a) Reference methods (as referenced in 1200–3–16–.01(5)(g)) except as provided under 1200–3–16–.01(5)(b), shall be used to determine compliance with standards prescribed under 1200–3–16–.26(3) as follows:

1. Either Method 5 for negative-pressure fabric filters and other types of control devices or Method 5D for positive-pressure fabric filters 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 5D, 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 Technical Secretary. For Method 5 or 5D, the minimum sample volume shall be 4.5 dscm (160 dscf).

(c) For the purpose of this rule, the owner or operator shall conduct the demonstration of compliance with subparagraph (3)(a) of this rule and furnish the Technical Secretary 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 subparagraph (5)(i) of this rule;

(i) List of charge and tap weights and materials;

(ii) Heat times and process log;

(iii) Control device operation log; and

(iv) Continuous monitor or Reference Method 9 data.

7. Test dates and 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 corretions; and

22. Sample emission calculations.

(d) During any performance test required under 1200–3–16–.01(5)(g), 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(s) being tested, the concentration of particulate matter shall be determined using the following equation:

$$Cs = \frac{\sum_{n=1}^{N} (Cs\ Qs)n}{\sum_{n=1}^{N} (Qs)n}$$

Where:

Cs = concentration of particulate matter in mg/dscm (gr/dscf) as determined by Method 5.

N = total number of control devices tested.

Qs = volumetric flow rate of the effluent gas stream in dscm/hr (dscf/hr) as detemined by Method 2.

(Rules 1200-3-16-.26, continued)

(CsQs)n or (Qs)n = value of the applicable parameter for each control device tested.

(f) Any control device subject to the provisions of this rule shall be designed and constructed to allow measurement of emissions using applicable test methods and procedures.

(g) Where emissions from any EAF(s) are combined with emissions from facilities not subject to the provisions of this rule 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 Technical Secretary which compensates for the emissions from the facilities not subject to this rule.

3. Any combination of the criteria of parts (g)1. and (g)2. of this paragraph.

(h) Where emissions from any EAF(s) are combined with emissions from facilities not subject to the provisions of this rule, the owner or operator may use any of the following procedures for demonstrating compliance with 1200–3–16–.26(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 rule.

3. Any combination of the criteria of parts (h)1. and (h)2. of this paragraph.

(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 subparagraph (3)(a) of this rule.

(j) Unless the presence of inclement weather makes concurrent testing infeasible, the owner or operator shall conduct concurrently the performance tests required under 1200–3–16–.01(5)(g) to demonstrate compliance with parts 1, 2 and 3, of subparagraph 1200–3–16–.26(3)(a).

(7) Recordkeeping and reporting requirements.

(a) Operation at a furnace static pressure that exceeds the value established under subparagraph (5)(f) of this rule and either operation of control system fan motor amperes at values exceeding + 15 percent of the value established under subparagraph (5)(c) of this rule or operation at flow rates lower than those established by subparagraph (5)(c) of this rule may be considered by the Technical Secretary to be unacceptable operation and maintenance of the affected facility. Operation at such values shall be reported to the Technical Secretary semiannually.

(b) When the owner or operator of an EAF is required to demonstrate compliance with the standard under parts (6)(g)2. and (6)(g)3. of this rule, the owner or operator shall obtain approval from the Technical Secretary of the procedure(s) that will be used to determine compliance.

(Rules 1200-3-16-.26, continued)

Notification of the procedure(s) to be used must be postmarked 30 days prior to the performance test.

***Authority**: T.C.A. §§68–25–105 and 4–5–202.* ***Administrative History**: Original rule filed January 10, 1977; effective February 9, 1977. Amendment filed September 4, 1981; effective October 19, 1981. Amendment filed September 21, 1988; effective November 6, 1988.*

1200–3–16–.27 FERROALLOY PRODUCTION FACILITIES.

(1) Applicability. The provisions of this rule are applicable to the following affected facilties commenced on or after February 9, 1977: 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.

(2) Definitions.

(a) "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.

(b) "Furnace charge" means any material introduced into the electric material arc furnace and may consist of, but is not limited to, ores, slag, carbonaceous material, and limestone.

(c) "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 rule.

(d) "Slag" means the more or less completely fused and vitrified matter separated during the reduction of a metal from its ore.

(e) "Tapping" means the removal of slag or product from the electrical 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.

(f) "Tapping period" means the time duration from initiation of the process of opening tap until plugging of the tap hole is completed.

(g) "Furnace cycle" means the time period from completion of a furnace product tap to the completion of the next consecutive product tap.

(h) "Tapping station" means that general area where molten product or slag is removed from the electric submerged arc furnace.

(i) "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.

(j) "Furnace power input" means the resistive electrical power consumption of an electric submerged arc furnace as measured in kilowatts.

(k) "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 rule.

(Rules 1200-3-16-.27, continued)

(l) "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.

(m) "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.

(n) "Standard ferromanganese" means that alloy as defined by A.S.T.M. designation A99-66.

(o) "Silicomanganese" means that alloy as defined by A.S.T.M. designation A483-66.

(p) "Calcium carbide" means material containing 70 to 85 percent calcium carbide by weight.

(q) "High-carbon ferrochrome" means that alloy as defined by A.S.T.M. designation A101-66 grades HC1 through HC6.

(r) "Charge chrome" means that alloy containing 52 to 70 percent by weight chromium, 5 to 8 percent by weight carbon, and 3 to 6 percent by weight silicon.

(s) "Silvery iron" means any ferrosilicon, as defined by A.S.T.M. designation A100-69, which contains less than 30 percent silicon.

(t) "Ferrochrome silicon" means that alloy as defined by A.S.T.M. designation A482-66.

(u) "Silicomanganese zirconium" means that alloy containing 60 to 65 percent by weight silicon, 1.5 to 2.5 percent by weight calcium, 5 to 7 percent by weight zirconium, 0.75 to 1.25 percent by weight aluminum, 5 to 7 percent by weight manganese, and 2 to 3 percent by weight barium.

(v) "Calcium silicon" means that alloy as defined by A.S.T.M. designation A495-64.

(w) "Ferrosilicon" means that alloy as defined by A.S.T.M. designation A100-69 grades A, B, C, D, and E which contains 50 or more percent silicon by weight.

(x) "Silicon metal" means any silicon alloy containing more than 96 percent silicon by weight.

(y) "Ferromanganese silicon" means that alloy containing 63 to 66 percent by weight manganese, 28 to 32 percent by weight silicon, and a maximum of 0.08 percent by weight carbon.

(3) Standards for Particulate Matter and Opacity.

(a) On and after the date on which the performance test required to be conducted by paragraph .01(5) of this chapter is completed, no owner or operator subject to the provisions of this subpart shall 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 percent 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 under this part apply only during periods when flow rates are being established under subparagraph (6) (d) of this rule.

5. Escape the capture system at the tapping station and are visible without the aid of instruments for more than 40 percent of each tapping period. There are no limitations on visible emissions under this part when a blowing tap occurs. The requirements under this subparagraph apply only during periods when flow rates are being established under subparagraph (6)(d) of this rule.

(b) On and after the date on which the performance test required to be conducted by paragraph .01(5) of this chapter is completed, no owner or operator subject to the provisions of this subpart shall cause to be discharged into the atmosphere from any dust-handling equipment any gases which exhibit 10 percent opacity or greater.

(4) Standard for Carbon Monoxide.

(a) On and after the date on which the performance test required to be conducted by paragaph .01(5) of this chapter is completed, no owner or operator subject to the provisions of this subpart shall cause to be discharged into the atmosphere from any electric submerged arc furnace any gases which contain, on a dry basis, 20 or greater volume percent of carbon monoxide. Combustion of such gases under conditions acceptable to the Technical Secretary constitutes compliance with this section. 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 rule shall install, calibrate, maintain and operate a continuous monitoring system for measurement of the opacity of emissions discharged into the atmosphere from the control device(s).

(b) For the purpose of reports required under subparagraph .01(7)(c) of this chapter, the owner or operator shall report as excess emissions all six-minute periods in which the average opacity is 15 percent or greater.

(c) The owner or operator subject to the provisions of this subpart shall submit a written report of any product change to the Technical Secretary. Reports of product changes must 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 rule 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 subparagraph (b) of this paragraph.

5. All flow rate data obtained under subparagraph (e) of this paragraph or all fan motor power consumption and pressure drop data obtained under subparagraph (e) of this paragraph.

(b) The owner or operator subject to the provisions of this rule 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 +5 percent over its operating range.

(c) The owner or operator subject to the provisions of this rule 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 subparagraph (e) of this paragraph. 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 the monitoring device(s) in any appropriate location in the exhaust duct such that reproductible flow rate monitoring will result. The flow rate monitoring device must have an accuracy of ±10 percent over its normal operating range and must be calibrated according to the manufacturer's instructions. The Technical Secretary may require the owner or operator to demonstrate the accuracy of the monitoring device relative to Methods 1. and 2. in subparagraph .01(5)(g) of this chapter.

(d) When performance tests are conducted under the provisions of paragraph .01(5) of this chapter to demonstrate compliance with the standards under parts (3)(a)4. and (3)(a)5. of this rule, the volumetric flow rate through each separately ducted hood of the capture system must be determined using the monitoring device required under subparagraph (c) of this paragraph. The volumetric flow rates must be determined for furnace power input levels at 50 and 100 percent of the nominal rated capacity of the electric submerged arc furnace. At all times the electric submerged arc furnace is operated, the owner or operator shall maintain the volumetric flow rate at or above the appropriate levels for that furnace power input level determined during the most recent performance test. If emissions due to tapping are captured and ducted separately from emissions of the electric submerged arc furnace, during each tapping period the owner or operator shall maintain the exhaust flow rates through the capture system over the tapping station at or above the levels established during the most recent performance test. Operation at lower flow rates may be considered by the Technical Secretary 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 paragraph .01(5) of this rule.

(e) The owner or operator may as an alternative to subparagraph (c) of this paragraph 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 are acceptable for demonstration of compliance with the requirements of this subparagraph. The owner or operator shall maintain 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 must be synchronized to allow real time comparisons of the data. The monitoring devices must have an accuracy of ±5 percent over their normal operating ranges.

(f) The volumetric flow rate through each fan of the capture system must be determined from the fan power consumption, fan pressure drop, and fan performance curve specified under

subparagraph (e) of this paragraph, during any performance test required under paragraph .01(5)(g) of this chapter to demonstrate compliance with the standards under parts (3)(a)4. and 5. of this rule. The owner or operator shall determine the volumetric flow rate at a representative temperature for furnace power input levels of 50 and 100 percent of the nominal rated capacity of the electric submerged arc furnace. At all times the electric submerged arc furnace is operated, the owner or operator shall maintain the fan power consumption and fan pressure drop at levels such that the volumetric flow rate is at or above the levels established during the most recent performance test for the 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 Technical Secretary 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 paragraph .01(5) of this chapter. The Technical Secretary 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 subparagraph .01(5)(g) of this chapter.

(g) All monitoring devices required under subparagraphs (c) and (e) of this paragraph are to be checked for calibration annually in accordance with the procedures under paragraph .01(8) of this chapter.

(7) Test Methods and Procedures.

(a) When determining the concentration of particulate matter and the associated moisture content, the use of the heating system specified by the method outlined in part .01(5)(g) of this chapter are not to be used when the carbon monoxide content of the gas stream exceeds ten (10) percent by volume, dry basis.

(b) The sampling time for each particulate run is to include an integral number of furnace cycles. The sampling time for each run must be at least 60 minutes and the minimum sample volume must 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 must be at least 200 minutes and the minimum sample volume must 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 Technical Secretary.

(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 devices 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 paragraph .01(5) of this chapter, the owner or operator shall 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.

(Rules 1200-3-16-.27, continued)

(f) When compliance with paragraph (4) of this rule is to be attained by combusting the gas stream in a flare, the location of the sampling site for particulate matter is to be upstream of the flare.

(g) For each run, particulate matter emissions, expressed in kg/hr (lb/hr), must be determined for each exhaust stream at which emissions are quantified using the following equation:

$$En = CsQs$$

where:

En	=	Emissions of particulate matter in kg/hr (lb/hr).
Cs	=	Concentration of particulate matter in kg/dscm (lb/dscf) as determined by Method 5 of subparagraph .01(5)(g) of this chapter.
Qs	=	Volumetric flow rate of the effluent gas stream in dscm/hr (dscf/hr) as determined by Method 2 of subparagraph .01(5)(g) of this chapter.

(h) For Method 5, particulate matter emissions from the affected facility, expressed in kg/MW-hr (lb/MW-hr) must be determined for each run using the following equation:

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

where:

E	=	Emissions of particulate matter from the affected facility, in kg/MW-hr (lb/MW-hr).
N	=	Total number of exhaust streams at which emissions are quantified.
En	=	Emission of particulate matter from each exhaust stream in kg/hr (lb/hr), as determined in subparagraph (g) of this subparagraph.
p	=	Average furnace power input during the sampling period, in megawatts as determined according to subparagraph (6)(b) of this rule.

***Authority**: T.C.A. §§68–25–105 and 4–5–202. **Administrative History**: Original rule filed January 10, 1977; effective February 9, 1977. Amendment filed September 4, 1981; effective October 19, 1981.*

1200–3–16–.28 LIME MANUFACTURING PLANTS.

(1) Applicability and designation of the affected facility.

(a) The provisions of this rule are applicable to the following affected facilities commenced on or after November 6, l988, used in the manufacture of lime: rotary lime kilns and lime hydrators.

(b) The provisions of this rule are not applicable to facilities used in the manufacture of lime at kraft pulp mills.

(2) Definitions.

(a) “Lime manufacturing plant” includes any plant which produces a lime product from limestone by calcination. Hydration of the lime product is also considered to be part of the source.

(b) “Lime product” means the product of the calcination process including, but not limited to, calcitic lime, dolomitic lime, and dead-burned dolomite.

(Rules 1200-3-16-.28, continued)

(c) "Rotary lime kiln" means a unit with an inclined rotating drum which is used to produce a lime product from limestone by calcination.

(d) "Lime hydrator" means a unit used to produce hydrated lime product.

(3) Standard for particulate matter.

(a) On and after the date on which the performance test required to be conducted by paragraph .01(5) of this Chapter is completed, no owner or operator subject to the provisions of this paragraph shall cause to be discharged into the atmosphere:

1. from any rotary lime kiln any gases which contain particulate matter in excess of 0.15 kilogram per megagram of limestone feed (0.30 lb/ton).

2. From any lime hydrator any gases which contain particulate matter in excess of 0.075 kilogram per megagram of lime feed (0.15 lb/ton).

(4) Standard for visible emissions.

(a) On and after the date on which the performance test required to be conducted by paragraph .01(5) of this chapter is completed, no owner or operator subject to the provisions of this subpart shall cause to be discharged into the atmosphere from any rotary lime kiln any gases which exhibit ten (10/) percent opacity or greater.

(5) Monitoring of Emissions and Operations.

(a) The owner or operator subject to the provisions of this rule shall install, calibrate, maintain, and operate a continuous monitoring system, except as provided in subparagraph (b) of this paragraph, 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 forty (40%) percent opacity.

(b) The owner or operator of any rotary lime kiln using a positive-pressure fabric filter control device or a control device with a multiple stack exhaust or a roof monitor may, in lieu of the continuous opacity monitoring requirement of subparagraph (a) of this paragraph, 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 three Method 9 tests and record the results. Visible emission observations shall occur during normal operation of the rotary lime kiln at least once per day. For at least three 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. Records shall be maintained of any 6-minute average that is in excess of the emissions specified in subparagraph (4)(a) of this rule.

(c) The owner or operator of any lime hydrator using a wet scrubbing emission control device subject to the provisions of this rule shall install, calibrate, maintain, and operate the following continuous monitoring devices:

1. A monitoring device for the continuous measuring of the scrubbing liquid flow rate. The monitoring device must be accurate within $5 percent of design scrubbing liquid flow rate.

2. A monitoring device for the continuous measurement of the electric current, in amperes, used by the scrubber. The monitoring device must be accurate within $10 percent over its normal operating range.

(Rules 1200-3-16-.28, continued)

(d) For the purpose of conducting a performance test under paragraph .01(5) of this Chapter, the owner or operator of any lime manufacturing plant subject to the provisions of this rule shall install, calibrate, maintain, and operate a device for measuring the mass rate of limestone feed to any affected rotary lime kiln and the mass rate of lime feed to any affected lime hydrator. The measuring device used must be accurate to within +5 percent of the mass rate over its operating range.

(e) For the purpose of reports required under subparagraph .01(7)(c) of this chapter, periods of excess emissions that shall be reported are defined as all six-minute periods during which the average opacity of the plume from any lime kiln subject to subparagraph (a) of this paragraph is 10 percent or greater.

(6) Test Methods and Procedures.

(a) For determining the concentration of particulate matter and associated moisture content, the sampling time for each run shall be at least 60 minutes and the sampling rate shall be at least 0.85 std m3/h, dry basis (0.53 dscf/min), except that shorter sampling times, when necessitated by process variables or other factors, may be approved by the Technical Secretary.

(b) Because of the high moisture content (40 to 85 percent by volume) of the exhaust gases from hydrators, the Method 5 sample train may be modified to include a calibrated orifice immediately following the sample nozzle when testing lime hydrators. In this configuration, the sampling rate necessary for maintaining isokinetic conditions can be directly related to exhaust gas velocity without a correction for moisture content. Extra care should be exercised when cleaning the sample train with the orifice in this position with the following test runs.

(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 three 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. Records shall be maintained of any 6-minute average that is in excess of the emissions limit specified in subparagraph (4)(a) of this rule.

Authority*: T.C.A. §§68–25–105 and 4–5–202.* ***Administrative History****: Original rule filed July 27, 1979; effective September 10, 1979. Amendment filed September 21, 1988; effective November 6, 1988.*

1200–3–16–.29 KRAFT PULP MILLS.

(1) Applicability and Designation of Affected Facility.

(a) The provisions of this rule 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 rule 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 subpart (4)(a)1.(iv) of this rule, any facility under subparagraph (a) of this paragraph that commences construction or modification after November 6, l988 is subject to the requirements of this rule.

(2) Definitions.

(Rules 1200-3-16-.29, continued)

(a) "Kraft pulp mill" means any stationary source which produces pulp from wood by cooking (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.

(b) "Neutral sulfite semichemical pulping operation" means any operation in which pulp is produced from wood by cooking (digesting) wood chips in a solution of sodium sulfite and sodium bicarbonate, followed by mechanical defibrating (grinding).

(c) "Total reduced sulfur (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 (as referenced in 1200-3-16- .01(5)(g)).

(d) "Digester system" means each continuous digester or each batch digester used for the cooking of wood in white liquor, and associated flash tank(s), blow tank(s), chip steamer(s), and condenser(s).

(e) "Brown stock washer system" means brown stock washers and associated knotters, vacuum pumps, and filtrate tanks used to wash the pulp following the digestion system. Diffusion washers are excluded from this definition.

(f) "Multiple-effect evaporator system" means the multiple-effect evaporators and associated condenser(s) and hotwell(s) used to concentrate the spent cooking liquid that is separated from the pulp (black liquor).

(g) "Black liquor oxidation system" means the vessels used to oxidize, with air or oxygen, the black liquor, and associated storage tank(s).

(h) "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.

(i) "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 percent or less.

(j) "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 percent.

(k) "Black liquor solids" means the dry weight of the solids which enter the recovery furnace in the black liquor.

(l) "Green liquor sulfidity" means the sulfidity of the liquor which leaves the smelt dissolving tank.

(m) "Smelt dissolving tank" means a vessel used for dissolving the smelt collected from the recovery furnace.

(n) "Lime kiln" means a unit used to calcine lime mud, which consists primarily of calcium carbonate, into quicklime, which is calcium oxide.

(o) "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.

(3) Standard for Particulate Matter and Opacity.

(a) On and after the date on which the performance test required to be conducted by paragraph .01(5) of this chapter is completed, no owner or operator subject to the provisions of this rule shall cause to be discharged into the atmosphere:

1. From any recovery furnace any gases which:

(i) Contain particulate matter in excess of 0.10 g/dscm (0.044 gr/dscf) corrected to 8 percent oxygen.

(ii) Exhibit 35 percent opacity or greater.

2. From any smelt dissolving tank any gases which contain particulate matter in excess of 0.1 g/kg black liquor solids (dry weight) (0.2 lb/ton black liquor solids (dry weight)).

3. From any lime kiln any gases which contain particulate matter in excess of:

(i) 0.15 g/dscm (0.067 gr/dscf) corrected to 10 percent oxygen, when gaseous fossil fuel is burned.

(ii) 0.30 g/dscm (0.13 gr/dscf) corrected to 10 percent 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 paragraph .01(5) of this chapter is completed, no owner or operator subject to the provisions of this rule shall 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 ppm by volume on a dry basis, corrected to 10 percent oxygen, unless the following conditions are met:

(i) The gases are combusted in a lime kiln subject to the provisions of part (a)5 of this paragraph; or,

(ii) The gases are combusted in a recovery furnace subject to the provisions of parts (a)2 or (a)3 of this paragraph; or,

(iii) 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 rule, and are subjected to a minimum temperature of 12000F for at least 0.5 second; or,

(iv) It has been demonstrated to the Technical Secretary's satisfaction by the owner or operator that incinerating the exhaust gases from a new, modified, or reconstructed brown stock washer system is technologically or economically unfeasible. Any exempt system will become subject to the provisions of this rule if the facility is changed so that the gases can be incinerated.

(v) 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, this system shall not discharge any gases to the atmosphere which contain TRS in excess

of 5 ppm by volume on a dry basis, corrected to the actual oxygen content of the untreated gas stream.

(vi) The uncontrolled exhaust gases from a new, modified, or reconstructed digester system contain TRS less than 0.005 g/kg ADP (0.01 lb/ton ADP).

2. From any straight kraft recovery furnace any gases which contain TRS in excess of 5 ppm by volume on a dry basis, corrected to 8 percent 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 percent oxygen.

4. From any smelt dissolving tank any gases which contain TRS in excess of 0.016 g/kg black liquor solids at H2S (0.033 lb/ton black liquor solids as H2S).

5. From any lime kiln any gases which contain TRS in excess of 8 ppm by volume on a dry basis, corrected to 10 percent oxygen.

(5) Monitoring of Emissions and Operations

(a) Any owner or operator subject to the provisions of this rule 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 percent 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 subpart (4)(a)1(iii) or (iv) of this rule apply. These systems shall be located downstream of the control device(s) and the spans of these continuous monitoring system(s) shall be set:

(i) 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.

(ii) At 20 percent oxygen for the continuous oxygen monitoring system.

(b) Any owner or operator subject to the provisions of this rule shall install, calibrate, maintain, and operate the following continuous monitoring devices:

1. For any incinerator, a monitoring device which measures and records 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 subpart (4)(a)1(iii) of this rule apply. The monitoring device is to be certified by the manufacturer to be accurate within $ 1 percent of the temperature being measured.

2. For any lime kiln or smelt dissolving tank using a scrubber emission control device:

(i) A monitoring device for the continuous measurement of the pressure loss of the gas stream through the control equipment. The monitoring device is to be certified by the

manufacturer to be accurate to within a gauge pressure of + 500 pascals (ca. $ 2 inches water gauge pressure).

(ii) A monitoring device for the continuous measurement of the scrubbing liquid supply pressure to the control equipment. The monitoring device is to be certified by the manufacturer to be accurate within + 15 percent of design scrubbing liquid supply pressure. The pressure sensor or tap is to be located close to the scrubber liquid discharge point. The Technical Secretary shall be consulted for approval of alternative locations.

(c) Any owner or operator subject to the provisions of this rule shall, except where the provisions of subpart (4)(a)1.(iv) or part (4)(a)4. of this rule apply.

1. Calculate and record on a daily basis 12-hour average TRS concentrations for the two consecutive periods of each operating day. Each 12-hour average shall be determined as the arithmetic mean of the appropriate 12 contiguous 1-hour average total reduced sulfur concentrations provided by each continuous monitoring system installed under part (a)2. of this paragraph.

2. Calculate and record on a daily basis 12-hour average oxygen concentrations for the two 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 part (c)1. of this paragraph and shall be determined as an arithmetic mean of the appropriate 12 contiguous 1-hour average oxygen concentrations provided by each continuous monitoring system installed under part (a)2. of this paragraph.

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:

$$Ccorr = Cmeas\ (21-X/21-Y)$$

where:

Ccorr	=	the concentration corrected for oxygen.
Cmeas	=	the concentration uncorrected for oxygen.
X	=	The volumetric oxygen concentration in percentage to be corrected to (8 percent for recovery furnaces and 10 percent for lime kilns, incinerators, or other devices).
Y	=	the measured 12-hour average volumetric oxygen oncentration.

4. Record once per shift measurements obtained from the continuous monitoring devices installed under part (b)2. of this paragraph.

(d) For the purpose of reports required under 1200–3–16–.01(7)(c), any owner or operator subject to the provisions of this rule shall report semiannually periods of excess emissions as follows:

1. For emissions from any recovery furnace periods of excess emissions are:

(i) 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.

(ii) All 6-minute average opacities that exceed 35 percent.

(Rules 1200-3-16-.29, continued)

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:

(i) All 12-hour average TRS concentrations above 5 ppm by volume unless the provisions of subparts (4)(a)1.(i), (ii), or (iv) of this rule apply; or

(ii) 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 subpart (4)(a)1.(iii) of this rule apply.

(e) The Technical Secretary will not consider periods of excess emissions reported under subparagraph (d) of this paragraph to be indicative of a violation of rule .01(6)(d) of this chapter 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:

(i) One percent for TRS emissions from recovery furnaces.

(ii) Six percent for average opacities from recovery furnaces.

2. The Technical Secretary 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) For determining the concentration of particulate matter and associated moisture content, 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 Technical Secretary. Water shall be used as the cleanup solvent instead of acetone in the sample recovery procedure outlined in Method 5 (as specified in 1200–3–16–.01(5)(g)5.).

(b) In-stack filtration as specified in 1200–3–16–.01(5)(g)17. may be used for determining compliance with subpart (3)(a)1.(i) of this rule provided, that a constant value of 0.009 g/dscm (0.004 gr/dscf) is added to the results of Method 17 and the stack temperature is no greater than 2050C (ca. 4000F). Water shall be used as the cleanup solvent instead of acetone in the sample recovery procedure outlined in Method 17 (as referenced in 1200–3–16–.01(5)(g)17.).

(c) For the purpose of determining compliance with paragraph (4) of this rule, the following reference methods shall be used:

1. Reference method listed in 1200–3–16–.01(5)(g)16. or at the discretion of the owner or operator, 1200–3–16–.01(5)(g)16., subpart (i) for the concentration of TRS.

2. The reference method listed in 1200–3–16–.01(5)(g)3. for gas analysis, and

3. When determining compliance with part (4)(a)4. of this rule, use the results of Method 2, Method 16 or Method 16A, and the black liquor solids feed rate in the following equation to determine the TRS emission rate on an equivalent hydrogen sulfide (H2S) basis.

E = (CTRS)(F)(Qsd)/BLS

Where:

E	=	mass of TRS emitted per unit of black liquor solids (g/kg)(lb/ton)
CTRS	=	average combined concentration of TRS as determined by Method 16 or 16A during the test period, PPM.
F	=	0.001417 g H2S/m3 PPM for metric units

0.08844 x 10-6 lb H2S/ft3 PPM for English units

Qsd	=	dry volumetric stack gas flow rate corrected to standard conditions, dscm/hr (dscf/hr)
BLS	=	black liquor solids feed rate, kg/hr (ton/hr)

4. When determining whether a furnace is a straight kraft recovery furnace or a cross recovery furnace, TAPPI Method T.624 (note: All references to TAPPI refer to the Technical Association of the Pulp and Paper Industry, Dunwoody Park, Atlanta, Georgia 30341. Copies of the methods are available for purchase by writing TAPPI at the above address. Be sure and specify the desired method.) shall be used to determine sodium sulfide, sodium hydroxide and sodium carbonate. These determinations shall be made three times daily from the green liquor and the daily average values shall be converted to sodium oxide (Na2O) and substituted into the following equation to determine the green liquor sulfidity:

GLS = 100 CNa2S/(CNa2S+CNaOH $ CNa2 CO3)

where:

GLS	=	percent green liquor sulfidity
CNa2S	=	average concentration of Na2S expressed as Na2O (mg/1)
CNaOH	=	average concentration of NaOH expressed as Na2O (mg/1)
CNa2CO3	=	average concentration of Na2CO3 expressed as Na2O(mg/l)

5. When determining compliance with subpart (4)(a)1.(vi) of this rule, use the results of Method 2, Method 16 or Method 16A, and the pulp production rate in the equation specified in part (6)(c)3. of this rule, except substitute the pulp production rate (PPR) (kg/hr (tons/hr)) for the black liquor solids feed rate (BLS).

(d) All concentrations of particulate matter and TRS required to be measured by this paragraph from lime kilns or incinerators shall be corrected 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 part (5)(c)3. of this rule.

***Authority**: T.C.A. §§68–25–105. **Administrative History**: Original rule filed August 28, 1979; effective October 12, 1979. Amendment filed September 4, 1981; effective October 30, 1981. Amendment filed September 21, 1988; effective November 6, 1988.*

1200–3–16–.30 GRAIN ELEVATORS.

(1) Applicability and Designation of Affected Facility.

(a) The provisions of this rule apply to each affected facility at any grain terminal elevator or any grain storage elevator, except as provided under subparagraph (5)(a) of this rule. 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 subparagraph (a) of this paragraph which commences construction, modification, or reconstruction after December 10, l979 is subject to the requirements of this rule.

(2) Definitions.

(a) “Grain” means corn, wheat, sorghum, rice, rye, oats, barley, and soybeans.

(b) “Grain elevator” means any plant or installation at which grain is unloaded, handled, cleaned, dried, stored, or loaded.

(c) “Grain terminal elevator” means any grain elevator which has a permanent storage capacity of more than 88,100 m3 (ca. 2.5 million U.S. bushels), except those located at animal food manufacturers, cereal manufacturers, breweries, and livestock feedlots.

(d) “Permanent storage capacity” means grain storage capacity which is inside a building, bin, or silo.

(e) “Railcar” means railroad hopper car or boxcar.

(f) “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 m3 (ca. 1 million bushels).

(g) “Process emission” means the particulate matter which is collected by a capture system.

(h) “Fugitive emission” means the particulate matter which is not collected by a capture sytem and is released directly into the atmosphere from an affected facility at a grain elevator.

(i) “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.

(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) “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.

(l) “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.

(m) “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 two perforated metal sheets.

(n) "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 (racks).

(o) "Unloading leg" means a device which includes a bucket-type elevator which is used to remove grain from a barge or ship.

(3) Standards for Particulate Matter and Opacity.

(a) On and after the date on which the performance test required to be conducted by paragraph .01(5) of this chapter is completed, no owner or operator subject to the provisions of this rule shall discharge or cause the discharge into the atmosphere any gases which exhibit greater than 0 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 in paragraph .01(5) of this chapter is completed, no owner or operator subject to the provisions of this rule shall cause to be discharged into the atmosphere from any affected facility except a grain dryer any process emission which:

1. Contains particulate matter in excess of 0.023 g/dscm (ca. 0.01 gr/dscf).

2. Exhibits greater than 0 percent opacity.

(c) On and after the date on which the performance test required to be conducted by paragraph .01(5) of this Chapter is completed, no owner or operator subject to the provisions of this rule shall discharge or cause the discharge into the atmosphere any fugitive emissions from:

1. Any individual truck unloading station, railcar unloading station, or railcar loading station, which exhibits greater than 5 percent opacity.

2. Any grain handling operation which exhibits greater than 0 percent opacity.

3. Any truck loading station which exhibits greater than 10 percent opacity.

4. Any barge or ship loading station which exhibits greater than 20 percent 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 ft3/bu).

3. Rather than meet the requirements of subparagraphs (1) and (2), of this paragraph the owner or operator may use other methods of emission control if it is demonstrated to the Technical Secretary's satisfaction that they would reduce emissions of particulate matter to the same level or less.

(Rules 1200-3-16-.30, continued)

(4) Test Methods and Procedures.

For determination of concentration of particulate matter, the sampling time for each run shall be at least 60 minutes and the sample volume shall be 1.7 dscm (ca. 60 dscf). If the method 5 sampling procedure is used, the sampling probe and filter holder shall be operated without heaters.

(5) Modifications.

(a) The following physical changes or changes in the method of operation shall not by themselves be considered a modification of any existing facility:

1. The addition of gravity loadout spouts to existing grain storage or grain transfer bins.

2. The installation of automatic 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.

Authority*: T.C.A. §§68–25–105 and 4–5–202.* ***Administrative History****: Original rule filed April 26, 1979; effective December 10, 1979.*

1200–3–16–.31 STATIONARY GAS TURBINES.

(1) Applicability.

The provisions of this rule 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 (10.16 million BTU/hr), based on the lower heating value of the fuel fired.

(2) Definitions.

(a) “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.

(b) “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.

(c) “Regenerative cycle gas turbine” means any stationary gas turbine which recovers heat from the gas turbine exhaust gases to preheat the inlet combustion air to the gas turbine.

(d) “Combined cycle gas turbine” means any stationary gas turbine which recovers heat from the gas turbine exhaust gases to heat water or generate steam.

(e) “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.

(f) “Ice fog” means an atmospheric suspension of highly reflective ice crystals.

(g) “ISO standard day conditions” means 288 degrees Kelvin, 60 percent relative humidity and 101.3 kilopascals pressure (14.7 psia).

(Rules 1200-3-16-.31, continued)

(h) "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.

(i) "Peak load" means 100 percent of the manufacturer's design capacity of the gas turbine at ISO standard day conditions.

(j) "Base load" means the load level at which a gas turbine is normally operated.

(k) "Fire-fighting turbine" means any stationary gas turbine that is used solely to pump water for extinguishing fires.

(l) "Turbines employed in oil/gas production or oil/gas transportation" means any stationary gas turbine used to provide power to extract crude oil/natural gas from the earth or to move crude oil/natural gas or products refined from these substances through pipelines.

(m) A "Metropolitan Statistical Area" or "MSA" as defined by the Department of Commerce.

(n) "Offshore platform gas turbines" means any stationary gas turbine located on a platform in an ocean.

(o) "Garrison facility" means any permanent military installation.

(p) "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.

(q) "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.

(r) "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.

(s) "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.

(3) Standard for Nitrogen Oxides.

(a) On and after the date of the performance test required by rule 1200–3–16–.01(5) is completed, every owner or operator subject to the provisions of this rule as specified in subparagraphs (b), (c), and (d) of this paragraph shall comply with one of the following, except as provided in subparagraphs (e), (f), (g), (h), (i), (j), (k), and (l) of this paragraph.

1. No owner or operator subject to the provisions of this rule shall cause to be discharged into the atmosphere from any stationary gas turbine, any gases which contain nitrogen oxides in excess of:

$$STD = 0.0075 \frac{14.4 + F}{Y}$$

where:

(Rules 1200-3-16-.31, continued)

STD = allowable NOx emissions (percent by volume at 15 percent oxygen and on a dry basis).

Y = manfacturer'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 factility. The value of Y shall not exceed 14.4 kilojoules per watt hour.

F = NOx emission allowances for fuel-bound nitrogen as defined in part 3. of this subparagraph.

2. No owner or operator subject to the provisions of this paragraph shall cause to be discharged into the atmosphere from any stationary gas turbine, any gases which contain nitrogen oxides in excess of:

$$STD = 0.0150 \frac{14.4}{Y} + F$$

where:

STD = allowable NOx emissions (percent by volume at 15 percent oxygen and on a dry basis).

Y = 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 shall not exceed 14.4 kilojoules per watt hour.

F = NOx emission allowance for fuel-bound nitrogen as defined in part 3. of this subparagraph.

3. F shall be defined according to the nitrogen content of the fuel as follows:

Fuel-Bound Nitrogen (percent by weight)	F (NOx percent by volume)
N less than 0.015	0
0.015 N less than 0.1	0.04(N)
0.1 less than N less than or equal to 0.25	0.004 + 0.0067(N-0.1)
N greater than 0.25	0.005

where:

N = 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 Technical Secretary before the initial performance test required by paragraph .01(5) of this chapter.

(Rules 1200-3-16-.31, continued)

(b) Electric utility stationary gas turbines with a heat input at peak load greater than 107.2 gigajoules per hour (101.6 million BTU/hr) based on the lower heating value of the fuel fired shall comply with the provisions of part 1200–3–16–.31(3)(a)1.

(c) Stationary gas turbines with a heat input at peak load equal to or greater than 10.7 gigajoules per hour (10.16 million BTU/hour) but less than or equal to 107.2 gigajoules per hour (101.6 million BTU/hour) based on the lower heating value of the fuel fired, shall comply with the provisions of part 1200–3–16–.31(3)(a)2.

(d) Stationary gas turbines with a manufacturer's rated base load at ISO conditions of 30 megawatts or less except as provided in subparagraph (3)(b) of this rule shall comply with part (3)(a)2 of this rule.

Note, this emission standard is not exclusively limited to those turbines generating electricity even though the source description is expressed in electrical terms. It is applicable to any industrial turbine having a rated power output of 30 megawatts or less. Given 745.7 watts is equivalent to one horsepower, then 30 megawatts is equivalent to 40,231 horsepower.

(e) Stationary gas turbines with a heat input at peak load equal to or greater than 10.7 gigajoules per hour (10.16 million BTU/hour) but less than or equal to 107.2 gigajoules per hour (101.6 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 subparagraph (a) of this paragraph.

(f) Stationary gas turbines using water or steam injection for control of NOx emissions are exempt from subparagrah (a) of this paragraph 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 subparagraph (a) of this paragraph.

(h) Stationary gas turbines engaged by manufacturers in research and development of equipment for both gas turbine emission control techniques and gas turbine efficiency improvement are exempt from subparagraph (a) of this paragraph on a case-by-case basis as determined by the Technical Secretary.

(i) Exemptions from the requirements of subparagraph (a) of this paragraph will be granted on a case-by-case basis as determined by the Technical Secretary in specific geographical areas where mandatory water restrictions are required by governmental agencies because of drought conditions. These exemptions will 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 the September 10, 1979, *Federal Register* (44 FR 52792) to comply with part (a)1 of this paragraph, except electric utility stationary gas turbines, are exempt from subparagraph (a) of this paragraph.

(k) Stationary gas turbines with a heat input greater than or equal to 10.7 gigajoules per hour (10.16 million BTU/hour) when fired with natural gas are exempt from part (a)2. of this paragraph when fired with an emergency fuel.

(l) Regenerative cycle gas turbines with a heat input less than or equal to 107.2 gigajoules per hour (101.6 million BTU/hour) are exempt from subparagraph (a) of this paragraph.

(Rules 1200-3-16-.31, continued)

(4) Standard for Sulfur Dioxide. On and after the date on which the performance test required to be conducted by paragraph .01(5) of this chapter is completed, every owner or operator subject to the provisions of this rule shall comply with one or the other of the following conditions:

(a) No owner or operator subject to the provisions of this rule shall cause to be discharged into the atmosphere from any stationary gas turbine any gases which contain sulfur dioxide in excess of 0.015 percent by volume at 15 percent oxygen and on a dry basis.

(b) No owner or operator subject to the provisions of this rule shall burn in any stationary gas turbine any fuel which contains sulfur in excess of 0.8 percent by weight.

(5) Monitoring of Operations.

(a) The owner or operator of any stationary gas turbine subject to the provisions of this paragraph and using water injection to control NOx emissions shall install and operate a continuous monitoring system to monitor and record the fuel consumption and the ratio of water to fuel being fired in the turbine. This system shall be accurate to within $5.0 percent and shall be approved by the Technical Secretary.

(b) The owner or operator of any stationary gas turbine subject to the provisions of this rule 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 Technical Secretary before they can be used to comply with subparagraph (b) of this paragraph.

(c) For the purpose of reports required under subparagraph .01(7)(c) of this chapter, 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 paragraph 1200-3- 16-.31(3) by the performance test required in paragraph .01(5) of this chapter 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 1200–3–16–.01(5). 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 1200–3–16–.31(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 percent.

3. Ice fog. Each period during which an exemption provided in 1200–3–16–.31(3)(g) is in effect shall be reported in writing to the Technical Secretary 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 subparagraph (3)(k) of this rule is in effect shall be included in the report required in 1200–5–3–16–.01(7)(c). For each report, the type, reasons, and duration of the firing of the emergency fuel shall be reported.

(6) Test Methods and Procedures.

(a) The reference methods shall be used to determine compliance with the standards prescribed in paragraph 1200–3–16–.31(3) as follows:

1. Reference Method 20 as specificed in 1200–3–16–.01(5)(g)20. for the concentration of nitrogen oxides and oxygen. For affected facilities under this rule, the span value shall be 300 parts per million of nitrogen oxides.

(i) 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:

$$NOx = (NOxobs) \frac{Pref\ Tamb}{Pobs} \quad 0.5\ e19\ (Hobs - 0.00633) \quad \frac{Tamb}{288\ K} \quad 1.53$$

where:

NOx = emissions of NOx at 15 percent oxygen and ISO standard ambient conditions.

NOobs = measured NOx emissions at 15 percent oxygen, ppmv.

Pref = reference combustor inlet absolute pressure at 101.3 kilopascals ambient pressure.

Pobs = measured combustor inlet absolute pressure at test ambient pressure.

Hobs = specific humidity of ambient air at test.

e = transcendental constant (2.718).

Tamb = temperature of ambient air at test.

The adjusted NOx emission level shall be used to determine compliance with paragraph 1200–3–16–.31(3).

(ii) 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 1200– 3–16–.01(5) to ISO standard day conditions. These ambient condition correction factors shall be substantiated with data and must be approved for use by the Technical Secretary before the initial performance test required by 1200–3–16–.01(5).

(Rules 1200-3-16-.31, continued)

(iii) The water-to-fuel ratio necessary to comply with paragraph 1200–3–16–.31(3) will be determined the intial performance test by measuring NOx emission using reference method 20 as specified in 1200–3–16–.01(5)(g)20. and the water-to- fuel ratio necessary to comply with paragraph 1200–3–16–.31(3) at 30, 50, 75 and 100 percent of peak load or at four 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 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 Technical Secretary and shall be accurate within +5 percent.

(b) The method for determining compliance with paragraph 1200–3–16–.31(4), except as provided in 1200–3–16–.01(5)(b), shall be as follows:

1. Reference Method 20 as specified in 1200–3–16–.01(5)(g)20. for the concentration of sulfur dioxide and oxygen, or

2. ASTM D2880-71 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 shall also be used to comply with paragraph 1200–3–16–.31(5)(b).

(i) The applicable ranges of some ASTM methods mentioned above 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 Technical Secretary.

(c) Analysis for the purpose of determining the sulfur content and the nitrogen content of the fuel as required by 1200–3–16–.31(5)(b), this rule may be performed by the owner/operator, a service contractor retained by the owner/operator, the fuel vendor, or any other qualified agency provided that the analytical methods employed by these agencies comply with the applicable subparagraphs of this paragraph.

Authority*: T.C.A. §§68–25–105 and 4–5–202.* ***Administrative History****: Original rule filed March 9, 1981; effective May 15, 1981. Amendment filed September 21, 1988; effective November 6, 1988. Amendment filed January 31, 1997; effective April 16, 1997.*

1200–3–16–.32 AMMONIUM SULFATE MANUFACTURE.

(1) Applicability.

(a) The affected facility to which the provisions of this rule 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 subparagraph (a) of this paragraph that commences construction or modification after February 28, l983 is subject to the requirements of this rule.

(2) Definitions.

"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, superstructure, material charger systems, exhaust systems, and integral control systems and instrumentation.

"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.

"Ammonium sulfate manufacturing plant" means any plant which produces ammonium sulfate.

"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.

"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.

"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 1200–3–16–.01(5) is completed, no owner or operator of an ammonium sulfate dryer subject to the provisions of this rule shall 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 percent opacity.

(4) Monitoring of operations.

(a) The owner or operator of any ammonium sulfate manufacturing plant subject to the provisions of this rule shall install, calibrate, maintain, and operate flow monitoring devices 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 +5 percent over its range. However, if the plant uses weigh 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 rule 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 $ 5 percent over its operating range.

(5) Test methods and procedures.

(a) Reference methods in 1200–3–16–.01(5)(g) of this chapter, except as provided in 1200–3–16–.01(5)(b), shall be used to determine compliance with 1200–3–16–.32(3) as follows:

1. Method 5 as specified in 1200–3–16–.01(5)(g)5. for the concentration of particulate matter.

2. Method 1 as specified in 1200–3–16–.01(5)(g)1. for sample and velocity traverses.

3. Method 2 as specified in 1200–3–16–.01(5)(g)2. for velocity and volumetric flow rate.

4. Method 3 as specified in 1200–3–16–.01(5)(g)3. for gas analysis.

(Rules 1200-3-16-.32, continued)

(b) For Method 5, the sampling time for each run shall be at least 60 minutes and the volume shall be at least 1.50 dry standard cubic meters (53 dry standard cubic feet).

(c) For each run, the particulate emission rate, E, shall be computed as follows:

E = Qsd x Cs 1000

1. E is the particulate emission rate (kg/h).

2. Qsd is the average volumetric flow rate (dscm/h) as determined by Method 2; and

3. Cs is the average concentration (g/dscm) of particulate matter as determined by Method 5.

(d) For each run, the rate of ammonium sulfate production, P (Mg/h), shall be determined by direct measurement using product weigh 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 x B x C x 0.0808

where:

P = Ammonium sulfate production rate in megagrams per hour.

A = Sulfuric acid flow rate to the reactor/crystallizer in liters per minute averaged over the time period taken to conduct the run.

B = Acid density (a function of acid strength and temperature) in grams per cubic centimeter.

C = Percent acid strength in decimal form.

0.0808 = 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 by using the following equation:

P = D x E x F x (6.0 x 10-5)

where:

P = Production rate of caprolactam by-product ammonium sulfate in megagrams per hour.

D = 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 = Density of the process stream solution in grams per liter.

F = Percent mass of ammonium sulfate in the process solution in decimal form.

(6.0 x 10-5) = 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:

1. R is the dryer emission rate (kg/Mg);

2. E is the particulate emission rate (kg/h) from (c) above; and

3. P is the rate of ammonium sulfate production (Mg/h) from (d) above.

***Authority**: T.C.A. §§68–25–105 and 4–5–202.* ***Administrative History**: Original rule filed January 27, 1983; effective February 28, 1983.*

1200–3–16–.33 GLASS MANUFACTURING PLANTS.

(1) Applicability.

(a) Each glass melting furnace is an affected facility to which the provisions of this rule apply.

(b) Any facility under subparagraph (a) of this paragraph that commences construction or modification after March 2, l983 is subject to the requirements of this rule.

(c) This rule 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

(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 percent silicon dioxide, 4 to 10 percent total R2O, (e.g. Na2O and K2O), 5 to 35 percent boric oxides, and 0 to 13 percent other oxides. (Note: R represents a metal).

(c) “Container glass” means glass made of soda-lime recipe, clear or colored, which is pressed and/or blown into bottles, jars, ampoules, and other products listed in Standard Industrial Classification 3221 (SIC 3221). (Note: All references to Standard Industrial Classification or SIC refers to the Standard Industrial Classification Manual which is available for purchase by written request to the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402).

(d) “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 raw material for nonexperimental furnaces.

(e) “Flat glass” means glass made of soda-lime recipe and produced into continuous flat sheets and other products listed in SIC 3211.

(Rules 1200-3-16-.33, continued)

(f) "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.

(g) "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, 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 fiberglass manufacturing, are not considered part of the glass melting furnace.

(h) "Glass produced" means the weight of the glass pulled from the glass melting furnace.

(i) "Hand glass melting furnace" means a glass melting furnace where the molten glass is removed from the furnace by a glassworker using a blowpipe or a pontil.

(j) "Lead recipe" means glass product composition of the following ranges of weight proportions: 50 to 60 percent silicon dioxide, 18 to 35 percent lead oxides, 5 to 20 percent total R2O (e.g. Na2O and K2O), 0 to 8 percent total R2O3 (e.g. Al2O3), 0 to 15 percent total RO (e.g., CaO, MgO), other than lead oxide and 5 to 10 percent other oxides (note: R represents a metal).

(k) "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 SIC 3229. It is separated into:

1. Glass of borosilicate recipe.

2. Glass of soda-lime and lead recipes.

3. Glass of opal, fluoride, and other recipes.

(l) "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; replacement of refractory portions of the glass conditioning and distribution system.

(m) "Soda-lime recipe" means glass product composition of the following ranges of weight proportions: 60 to 75 percent silicon dioxide, 10 to 17 percent total R2O (e.g. Na2O and K2O), 8 to 20 percent total RO but not to include any PbO (e.g. CaO and MgO), 0 to 8 percent total R2O3 (e.g., Al2O3), and 1 to 5 percent other oxides (note: R represents a metal).

(n) "Textile fiberglass" means fibrous glass in the form of continuous strands having uniform thickness.

(o) "With modified processes" means using any technique designed to minimize emissions without the use of add-on pollution controls.

(p) "Wool fiberglass" means fibrous glass of random texture, including fiberglass insulation and other products listed in SIC 3296.

(Rules 1200-3-16-.33, continued)

(3) Standards for particulate matter.

(a) On and after the date on which the performance test required to be conducted by paragraph 1200–3–16–.01(5) is completed, no owner or operator of a glass melting furnace subject to the provisions of this rule shall 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 1200–3–16–.33(3)(d) Table 1, 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 = Particulate matter emission limit, g of particulate/kg of glass produced.

X = Emission rate specified in 1200–3–16–.33 (3)(d) Table 1 for furnaces fired with gaseous fuel.

Y = Decimal percent of liquid fuel heating value to total (gaseous and liquid) fuel heating value fired in the glass melting furnaces as determined in subparagraph (7)(f) of this rule (joules/joules).

Z = (1-Y).

(b) Conversion of a glass melting furnace to the use of liquid fuel is not considered a modification for the purposes of 1200–3–16–.01(9)(a).

(c) Rebricking and the cost of rebricking is not considered a reconstruction for the purposes of 1200–3–16–.01(9)(b).

(d) Table 1. Emission Rates

(g of particulate / kg of glass produced)

Glass manufacturing plant industry segment	Furnace fired with gaseous fuel	Furnace fired with liquid fuel
Container glass	0.1	0.13
Pressed and blown glass		
(a) Borosilicate Recipes	0.5	0.65
(b) Soda-Lime and Lead Recipes	0.1	0.13
(c) Other - Than Borosilicate, Soda-Lime, and Lead Recipes (including opal, fluoride, and other recipes)	0.25	0.325
Wool fiberglass	0.25	0.325
Flat glass	0.225	0.225

(Rules 1200-3-16-.33, continued)

(e) An owner or operator of an experimental furnace is not subject to the requirements of this paragraph.

(f) During routine maintenance of add-on pollution controls, an owner or operator of a glass melting furnace subject to the provisions of subparagraph (a) of this paragraph is exempt from the provisions of subparagraph (a) of this paragraph 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 Technical Secretary 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 and 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 furnace with modified processes is not subject to the provisions of 1200–3–16–.33(3) if the affected facility complies with the provisions of this paragraph.

(b) On and after the date on which the performance test required to be conducted by paragraph (5) of Rule 1200–3–16–.01 is completed no owner or operator of a glass melting furnace with modified processes subject to the provisions of this rule shall cause to be discharged into the atmosphere from the affected facility:

1. Particulate matter at emission rates exceeding 0.5 gram of particulate per kilogram of glass produced (g/kg) as measured according to subparagraph (e) of this paragraph for container glass, flat glass, and pressed blown glass with soda-lime recipe melting furnaces.

2. Particulate matter at emission rates exceeding 1.0 g/kg as measured according to subparagraph (e) of this paragraph for pressed and blown glass with a borosilicate recipe melting furnace.

3. Particulate matter at emission rates exceeding 0.5 g/kg as measured according to subparagraph (e) of this paragraph 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 subparagraph (b) of the paragraph 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 paragraph (5) of rule 1200–3–16–.01 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 percent upper confidence level of a normal distribution of average opacity values.

5. For purposes of paragraph (7) of rule 1200–3–16–.01, report to the Technical Secretary as excess emissions all of the 6-minute periods during which the average opacity as measured by the continuous monitoring system installed under part (c)1. of this paragraph, exceeds the opacity value corresponding to the 97.5 percent upper confidence level determined under part (c)4. of this paragraph.

(d) The Technical Secretary may approve an application for an alternative continuous monitoring system if the owner or operator has obtained written approval for the alternative system from the Administrator of the U.S. Environmental Protection Agency.

1. After receipt and consideration of a written application and written approval from the Administrator of the U.S. Environmental Protection Agency, the Technical Secretary 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 part (b)1. of this paragraph.

2. After the Technical Secretary approves an alternative continuous monitoring system for an affected facility, the requirements of parts (c)1. through (c)5. of this paragraph will not apply for that affected facility.

3. An owner or operator may redetermine the opacity value corresponding to the 97.5 percent upper confidence level as described in part (c)4. of this paragraph if the owner or operator:

(i) Conducts continuous opacity monitoring during each test run of a performance test that demonstrates compliance with an emission limit of subparagraph (b) of this paragraph.

(ii) Recalculates the 6-minute opacity averages as described in part (c)3. of this paragraph and

(iii) Uses the redetermined opacity value corresponding to the 97.5 percent upper confidence level for the purposes of part (c)5. of this paragraph.

(e) Test methods and procedures as specified in paragraph (7) of rule 1200–3–16–.33 shall be used to determine compliance with this paragraph except that to determine compliance for any glass melting furnace using modified processes and fired with either a gaseous fuel or liquid fuel containing less than 0.50 weight percent sulfur, Method 5 specified in 1200–3–16–.01(5)(g)5. shall be used with the probe and filter holder heating system in the sampling train set to provide a gas temperature of 120 + 140C.

(5) Reserved.

(6) Reserved.

(7) Test Methods and Procedures.

(a) Reference methods in 1200–3–16–.01(5)(g), except as provided under 1200–3–16–.01(5)(b), shall be used to determine the compliance with paragraph (3) and (4) of this rule as follows:

1. Method 1 as specified in 1200–3–16–.01(5)(g)1. shall be used for sample and velocity traverses, and

2. Method 2 as specified in 1200–3–16–.01(5)(g)2. shall be used to determine velocity and volumetric flow rate.

(Rules 1200-3-16-.33, continued)

3. Method 3 as specified in 1200–3–16–.01(5)(g)3. shall be used for gas analysis.

4. Method 5 as specified in 1200–3–16–.01(5)(g)5. shall be used to determine the concentration of particulate matter and the associated moisture content.

(b) For Method 5, the probe and filter holder heating system in the sampling train shall be set to provide a gas temperature no greater than 1770C. The sampling time for each run shall be at least 60 minutes and the collected particulate shall weigh at least 50 mg. In sources containing SO2 or SO3, the filter material must be a type that is unreactive to SO2 or SO3.

(c) The particulate emission rate, E, shall be computed as follows:

E = Q x C

Where:

1. E is the particulate emission rate (g/hr)
2. Q is the average volumetric flow rate (dscm/hr) as found from Method 2
3. C is the average concentration (g/dscm) of particulate matter as found from Method 5, modified as specified in subparagraph (7)(b) above.

(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:

1. R is the furnace emission rate (g/kg)
2. E is the particulate emission rate (g/hr) from (c) above
3. A is the zero production rate correction:
   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 and lead) glass
   A is 454 g/hr for pressed and blown (borosilicate) glass, wool fiberglass, and flat glass
4. P is the rate of glass production (kg/hr) from (d) above.

(f) When gaseous and liquid fuels are fired simultaneously in a glass melting furnace, the heat input of each fuel, expressed in joules, is 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 is 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 are determined in accordance with American Society of Testing and Materials (A.S.T.M.) Method D 240-76 (liquid fuels) and D 1826-77 (gaseous fuels), as applicable. 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.

(Note: All references to ASTM in this rule refers to the American Society for Testing Materials. Copies of methods are available for purchase by writing to ASTM, l916 Race Street, Philadelphia, PA 19103 or by writing to the Tennessee Division of Air Pollution Control, 701

(Rules 1200-3-16-.33, continued)

Broadway, 4th Floor, Customs House, Nashville, TN 37219. Be sure and specify which method is desired.)

(g) If an owner or operator changes an affected facility from a glass melting furnace with modified processes to 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 Technical Secretary 60 days before the change is scheduled to occur.

Authority*: T.C.A. §§68–25–105 and 4–5–202.* ***Administrative History****: Original rule filed January 31, 1983; effective March 2, 1983. Amendment filed September 21, 1988; effective November 6, 1988.*

1200–3–16–.34 AUTOMOBILE AND LIGHT DUTY TRUCK SURFACE COATING OPERATIONS.

(1) Applicability.

(a) The provisions of this rule 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) Exempted from the provisions of this rule 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 exempted.

(c) The provisions of this rule apply to any affected facility identified in subparagraph (a) of this paragraph that begins construction, reconstruction, or modification after November 6, 1988.

(2) Definitions and Abbreviations

(a) Definitions:

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. “Motor vehicle” for the purposes of this rule means every vehicle which is self propelled excluding motorized bicycles and every vehicle which is not propelled by electric power obtained from overhead trolley wires. The words “motor vehicle” shall not mean any mobile home or house trailer.

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 (EDP)” means a method of applying a prime coat by which the automobile or light-duty truck body is submerged in a tank filled with coating material and an electrical field is used to effect the deposition of the coating material on the body.

6. “Electrostatic spray application” means a spray application method that uses an electrical potential to increase the transfer efficiency of the coating solids. Electrostatic spray application can be used for prime coat, guide coat, or topcoat operations.

7. “Flash-off 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.

(Rules 1200-3-16-.34, continued)

8. "Guide coat operation" means the guide coat spray booth, flash-off area and bake oven(s) 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.

9. "Light-duty truck" means any motor vehicle rated at 3,850 kilograms gross vehicle weight or less, designed mainly to transport property.

10. "Plastic body" means an automobile or light-duty truck body constructed of synthetic organic material.

11. "Plastic body component" means any component of an automobile or light-duty truck exterior surface constructed of synthetic organic material.

12. "Prime coat operation" means the prime coat spray booth or dip tank, flash-off area, and bake oven(s) which are used to apply and dry or cure the initial coating on components of automobile or light-duty truck bodies.

13. "Purge" or "line purge" means the coating material expelled from the spray system when clearing it.

14. "Solvent-borne" means a coating which contains five percent or less water by weight in its volatile fraction.

15. "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.

16. "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.

17. "Surface coating operation" means any prime coat, guide coat, or topcoat operation on an automobile or light-duty truck surface coating line.

18. "Topcoat operation" means the topcoat spray booth, flash-off area, and bake oven(s) which are used to apply and dry or cure the final coating(s) on components of automobile and light-duty truck bodies.

19. "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.

20. "VOC content" means all volatile organic compounds that are in a coating expressed as kilograms of VOC per liter (pounds per gallon) of coating solids.

21. "Waterborne" or "water reducible" means a coating which contains more than five weight percent water in its volatile fraction.

(b) Abbreviations:

1. Caj = concentration of VOC (as carbon) in the effluent gas flowing through stack (j) leaving the control device (parts per million by volume).

(Rules 1200-3-16-.34, continued)

2. Cbi = concentration of VOC (as carbon) in the effluent gas flowing through stack (i) entering the control device (parts per million by volume).

3. Cfk = 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. Dci = density of each coating (i) as received (kilograms per liter) (pounds per gallon).

5. Ddj = density of each type VOC dilution solvent (j) added to the coatings, as received (kilograms per liter or pounds per gallon).

6. Dr = density of VOC recovered from an affected facility (kilograms per liter or pounds per gallon).

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 or pounds per gallon).

10. Lci = volume of each coating (i) consumed, as received (liters or gallons).

11. Lcil = volume of each coating (i) consumed by each application method (l), as received (liters or gallons).

12. Ldj = volume of each type VOC dilution solvent (j) added to the coatings, as received (liters or gallons).

13. Lr = volume of VOC recovered from an affected facility (liters or gallons).

14. Ls = volume of solids in coatings consumed (liters or gallons).

15. Md = total mass of VOC in dilution solvent (kilograms or pounds).

16. Mo = total mass of VOC in coatings as received (kilograms or pounds).

17. Mr = total mass of VOC recovered from an affected facility (kilograms or pounds).

18. N = volume weighted average mass of VOC per volume of applied coating solids after the control device kilograms of VOC or pounds of VOC liter of applied solids(gallon of applied solids)

19. Qaj = volumetric flow rate of the effluent gas flowing through stack (j) leaving the control device (dry standard cubic meters (feet) per hour).

20. Qbi = volumetric flow rate of the effluent gas flowing through stack (i) entering the control device (dry standard cubic meters (feet) per hour).

21. Qfk = volumetric flow rate of the effluent gas flowing through exhaust stack (k) not entering the control device (dry standard cubic meters (feet) per hour).

22. T = overall transfer efficiency.

(Rules 1200-3-16-.34, continued)

23. Tl = transfer efficiency for application method (l).

24. Vsi = proportion of solids by volume in each coating (i) as received liter solids or gallons of solids liter coating gallons of coating , and

25. Woi = proportion of VOC by weight in each coating (i), as received kilograms VOC or pounds VOC kilograms coating pounds coating

(3) Standards for volatile organic compounds.

On and after the date on which the initial performance test required by 1200–3–16–.01(5) is completed, no owner or operator subject to the provisions of this rule shall 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 (1.34 pounds of VOC per gallon) of applied coating solids of each prime coat operation.

(b) 1.40 kilograms of VOC per liter (11.69 pounds of VOC per gallon) of applied coating solids from each guide coat operation.

(c) 1.47 kilograms of VOC per liter (12.28 pounds of VOC per gallon) of applied coating solids from each topcoat operation.

(4) Performance test and compliance provisions.

(a) Subparagraphs 1200–3–16–.01(5)(d) and (f) do not apply to the performance test procedures required by this paragraph.

(b) The owner or operator of an affected facility shall conduct an initial performance test in accordance with 1200–3–16–.01(5)(a) and thereafter for each calendar month for each affected facility according to the procedures in this paragraph.

(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 paragraph (3) of this rule.

(i) 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, as specified in 1200–3–16–.01(5)(g)24. The Technical Secretary 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, as specified in 1200–3–16–.01(5)(g)24 or an equivalent or alternative method. The owner or operator shall determine from company records on a monthly basis the volume of coating consumed, as received, and the mass of solvent used for thinning purposes. The volume weighted average of the total mass of VOC per volume of coating solids used each calendar month will be determined by the following procedures.

(Rules 1200-3-16-.34, continued)

(I) 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:

$$Mo + Md = \sum_{i=l}^{n} Lci\ Dci\ Woi + \sum_{j=1}^{m} LdjDdj$$

(SUM LdjDdj will be zero if no VOC solvent is added to the coatings, as received).

(II) 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:

$$Ls = \sum_{i=1}^{n} Lci\ vsi$$

(III) 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

In lieu of using the values listed above for transfer efficiencies, any owner or operator may petition the Board for use of a different transfer efficiency based on scientific evidence that the proposed values are more correct than those listed above for their sources. Prior to any approval by the Board, a public hearing shall be held to allow input from the public. If the petition is granted, the approved values shall be included on any permit issued to the source and shall serve in lieu of those listed above.

I. 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:

$$T = \frac{\sum_{i=1}^{n} \sum_{1=1}^{p} T1\ Vsi\ Lcil}{Ls}$$

(IV) Calculate the volume solids weighted average mass of VOC per volume of applied coating solids (G) during each calendar month for each affected facility by the following procedures:

I. For prime coat operations, use the following procedure: G is equal to the sum of (Mo + Md) for 6 out of 7 most recent calendar months of normal operation divided by the respective sum of (LsT).

II. For guide coat and topcoat operations, use the following equation:

$$G = \frac{Mo + Md}{LsT}$$

(ii) 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 paragraph (3) of this rule, the affected facility is in compliance. Each monthly calculation is a performance test for the purpose of this rule.

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 limits specified under paragraph (3) of this rule.

(i) 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 subpart (4)(c)1(i) of this rule.

(ii) Calculate the volume weighted average mass of VOC per volume of applied solids emitted after the control device, by the following equation:

N=G(1–FE)

(I) 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:

$$F = \frac{\sum_{i=1}^{n} Qbi\ Cbi}{}$$

(Rules 1200-3-16-.34, continued)

$$\sum_{1=1}^{n} Qbi\ Cbi + \sum_{1=1}^{p} Qfk\ Cfk$$

In lieu of using the method above, any owner or operator may petition the Board for use of a different method based on scientific evidence that the proposed method is more correct than that method above for their sources. Prior to any approval by the Board, a public hearing shall be held to allow input from the public. If the petition is granted, the approved method shall be included on any permit issued to the source and shall serve in lieu of the method above.

I. In subsequent months, the owner or operator shall use the most recently determined capture fraction for the performance test.

(II) Determines 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:

$$E = \frac{\sum_{i=1}^{n} Qbi\ Cbi - \sum_{j=l}^{m} Qaj\ Caj}{\sum_{i=l}^{n} Qbi\ Cbi}$$

I. In subsequent months, the owner or operator shall use the most recently determined VOC destruction efficiency for the performance test.

(III) If an emission control device controls the emissions from more than one affected facility, the owner or operator shall measure the VOC concentration (Cbi) in the effluent gas entering the control device (in parts per million by volume) and the volumetric flow rate (Qbi) 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.

(iii) 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 paragraph (3) of this rule, the affected facility is in compliance. Each monthly calculation is a performance test for the purposes of this rule.

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 paragraph (3) of this rule.

(i) Caculate the mass of VOC (Mo+ Md) used during each calendar month for each affected facility as described under subpart (4)(c)1(i) of this rule.

(ii) Calculate the total volume of coating solids (Ls) used in each calendar month for each affected facility as described under subpart (4)(c)1(i) of this rule.

(iii) Calculate the mass of VOC recovered (Mr) each calendar month for each affected facility by the following equation: Mr = LrDr

(iv) 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:

$$N = \frac{Mo + Md - Mr}{LsT}$$

(v) 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 paragraph (3) of this rule, the affected facility is in compliance. Each monthly calculation is a performance test for the purposes of this rule.

(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 paragraph (3) of this rule 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 + 0.75 percent of the temperature being measured expressed in degrees Celsius or +2.50C.

(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 parts 1. and 2. of this subparagraph in the initial compliance report required by 1200–3–16–.01(5).

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 1200–3–16–.01(5)(a) 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 paragraph (3) of this rule and a description of the method used to establish the fraction of the VOC captured and sent to the control device.

(Rules 1200-3-16-.34, continued)

(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 paragraph (3) of this rule. This report shall be postmarked not later than ten 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 should be reported.

(c) Where compliance with paragraph (3) of this rule is achieved through the use of incineration, the owner or operator shall continuously record the incinerator combustion temperature during coating operations for 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 defined below.

1. For thermal incinerators, every three-hour period shall be reported during which the average temperature measured is more than 280C less than the average temperature during the most recent control device performance test at which the destruction efficiency was determined as specified under paragraph (3) of this rule. Readings should be taken a minimum of one (1) every fifteen (15) minutes within the specified three-hour period.

2. For catalytic incinerators, every three-hour period shall be reported during which the average temperature immediately before the catalyst bed, when the coating system is operational, is more than 280C 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 paragraph (4) of this rule. In addition, every three-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 percent 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 paragraph (4) of this rule. Readings should be taken a minimum of one (1) every fifteen (15) minutes within the specified three-hour period.

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 Technical Secretary 30 days in advance of any test by Reference Method 25 as specified in 1200–3–16–.01(5)(g)25.

(7) Reference methods and procedures.

(a) The reference methods in 1200–3–16–.01(5)(g) shall be used to conduct performance tests.

1. Reference Method 24 as specified 1200–3–16–.01(5)(g)24. or an equivalent or an alternative method approved by the Technical Secretary 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. Manufacturers' formulation data is approved by the Technical Secretary as an alternative method to Method 24. In the event of dispute, Reference Method 24 shall be the referee method.

2. Reference Method 25 as specified in 1200–3–16–.01(5)(g)25 or an equivalent or alternative method approved by the Technical Secretary 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.

(Rules 1200-3-16-.34, continued)

3. The following methods shall be used to determine the volumetric flow rate in the effluent gas in a stack:

(i) Method 1 as specified in 1200–3–16–.01(5)(g)1. for sample and velocity traverses.

(ii) Method 2 as specified in 1200–3–16–.01(5)(g)2. for velocity and volumetric flow rate.

(iii) Method 3 as specified in 1200–3–16–.01(5)(g)3. for gas analysis, and

(iv) Method 4 as specified in 1200–3–16–.01(5)(g)4 for stack gas moisture.

(b) For reference Method 24, the coating sample must be a 1-liter sample taken in a 1-liter container.

(c) For Reference Method 25, the sampling time for each of three runs must be at least one 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 Technical Secretary. The Technical Secretary 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 Technical Secretary that the testing of representative stacks would yield results comparable to those that would be obtained by testing all stacks.

(8) Modifications.

The following physical or operational changes are not by themselves, considered modifications of existing facilities:

(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.

***Authority**: T.C.A. §§68–25–105 and 4–5–202.* ***Administrative History**: Original rule filed September 21, 1988; effective November 6, 1988.*

1200–3–16–.35 ASPHALT PROCESSING AND ASPHALT ROOFING MANUFACTURE.

(1) Applicability and designation of affected facilities.

The affected facilities to which this rule 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 that commence construction or modification after November 6, 1988.

(2) Definitions.

(a) “Afterburner (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.

(Rules 1200-3-16-.35, continued)

(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 asphalt (asphalts diluted with solvents to reduce viscosity for low temperature applications) and emulsified asphalts (asphalts dispersed in water with an emulsifying agent) are not subject to this regulation.

(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) "Electostatic precipitator (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 (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 1200–3–16–.01(5)(b) requires a performance test to be completed, no owner or operator subject to the provisions of this rule shall cause to be discharged into the atmosphere from any saturator:

1. Particulate matter in excess of:

(i) 0.04 kilograms of particulate per megagram (0.04 lb/1000 lb) of asphalt shingle or mineral-surfaced roll roofing producted; or

(ii) 0.4 kilograms per megagram (0.4 lb/1000 lb) of saturated felt or smooth-surfaced roll roofing produced.

2. Exhaust gases with opacity greater than 20 percent; and

3. Any visible emissions from a saturator capture system for more than 20 percent of any period of consecutive valid observations totaling 60 minutes. Saturators that were constructed before November 6, l988, and that have not been reconstructed since that date and that become subject to these standards through modification are exempt from the visible emissions standards. Saturators that have been newly constructed or reconstructed since November 6, l988 are subject to the visible emissions standard.

(b) On and after the date on which 1200–3–16–.01(5)(b) requires a performance test to be completed, no owner or operator subject to the provisions of this rule shall cause to be discharged into the atmosphere from any blowing still:

1. Particulate matter in excess of 0.67 kilograms of particulate per megagram (0.67 lb/1000 lb) 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 (0.71 lb/1000 lb) 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 (0.6 lb/1000 lb) 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 (0.64 lb/1000 lb) 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 0 percent unless an opacity limit for the blowing still when fuel oil is used to fire the afterburner has been established by the Technical Secretary in accordance with the procedures in subparagraph (5)(k) of this rule.

(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 rule shall cause to be discharged into the atmosphere from any asphalt storage tank exhaust gases with opacity greater than 0 percent, except for one consecutive 15-minute period in any 24-hour period when the transfer lines are being blown for clearing. The control device shall not be bypassed during this 15-minute period. If, however, the emissions from any asphalt storage tank(s) are ducted to a control device for a saturator, the combined emissions shall meet the emission limit contained in subparagraph (a) of this paragraph during the time the saturator control device is operating. At any other time the asphalt storage tank(s) must meet the opacity limit specified above 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 rule shall cause to be discharged into the atmosphere from any mineral handling and storage facility emissions with opacity greater than 1 percent.

(4) Monitoring of operations.

(a) The owner or operator subject to the provisions of this rule, and using either an electrostatic precipitator or a high velocity air filter to meet the emission limit in part (3)(a)1. and/or (3)(b)1. of this rule 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 +150C (+270F) over its range.

(b) The owner of operator subject to the provisions of this rule and using an afterburner to meet the emission limit in (3)(a)1 and/or (3)(b)1 of this rule shall continuously monitor and record the temperature in the combustion zone of the afterburner. The monitoring instrument shall have an accuracy of +100C (+180F) over its range.

(c) An owner or operator subject to the provisions of this rule and using a control device not mentioned in subparagraphs (a) and (b) of this paragraph shall provide to the Technical Secretary information describing the operation of the control device and the process

parameter(s) which would indicate proper operation and maintenance of the device. The Technical Secretary may require continuous monitoring and will determine the process parameters to be monitored.

(d) The industry is exempted from the quarterly reports required under 1200–3–16–.01(7)(c). The owner/operator is required to record and report the operating temperature of the control device during the performance test and, as required by 1200–3–16.01(7)(d), maintain a file of the temperature monitoring results for at least two years.

(5) Test methods and procedures.

(a) Reference methods in 1200–3–16–.01(5)(g), except as provided in 1200–3–16–.01(5)(b), shall be used to determine compliance with the standards prescribed in paragraph (3) of this rule as follows:

1. Method 5A as specified in 1200–3–16–.01(5)(g)5(ii) for the concentration of particulate matter.

2. Method 1 as specified in 1200–3–16–.01(5)(g)1. for sample and velocity traverses;

3. Method 2 as specified in 1200–3–16–.01(5)(g)2. for velocity and volumetric flow rate;

4. Method 3 as specified in 1200–3–16–.01(5)(g)3. for gas analysis; and

5. Method 9 as specified in 1200–3–16.01(5)(g)9. for opacity.

(b) The Technical Secretary will determine compliance with the standards prescribed in part (3)(a)3. of this rule by using Method 22, as specified in 1200–3–16–.01(5)(g)22., modified so that readings are recorded every 15 seconds for a period of consecutive observations during representative conditions (in accordance with 1200–3–16– .01(5)(c)) totaling 60 minutes. A performance test shall consist of one run.

(c) For Method 5A as specified in 1200–3–16–.01(5)(g)5.(ii), 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:

$$E = Qsd \times Cs$$

Where:

1. E is the particulate emission rate, Kg/hr (lb/hr);

2. Qsd is the average volumetric flow rate, dscm/hr (dscf/hr), as determined by Method 2; and

(Rules 1200-3-16-.35, continued)

3. Cs is the average concentration, Kg/dscm (lb/dscf), of particulate matter as determined by Method 5A.

(e) The asphalt roofing production rate, P, Mg/hr (TPH), shall be determined by dividing the weight 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, Ps, Mg/hr (TPH), 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:

$$M = \frac{Vd}{c}$$

M = weight of asphalt in megagrams (English Units: tons)

V = volume of asphalt in cubic meters (English Units: ft3)

d = density of asphalt in kilograms per cubic meter (English Units: lb/ft3)

c = conversion factor 1,000 kilograms per megagram (English Units: 2,000 lb/ton)

The density of asphalt at any measured temperature is calculated by using the following equation:

d =1056.1 – (0.6176 *x* 0C) (Metric Units) or

d =65.92 – (0.0214 *x* 0F) (English Units)

The method of measurement shall have an accuracy of +10 percent.

(g) The saturator emission rate shall be computed as follows: R = E/P.

(h) The blowing still emission rate shall be computed as follows: Rs = E/Ps where:

1. R is the saturator emission rate, Kg/Mg (lb/ton);

2. Rs is blowing still emission rate, Kg/Mg (lb/ton);

3. E is the particulate emission rate, Kg/hr (lb/hr), from subparagraph (c) of this pararaph;

4. P is the asphalt roofing production rate, Mg/hr (TPH); and

5. Ps is the asphalt charging rate, Mg/hr (TPH).

(i) Temperature shall be measured and continuously recorded with the monitor required under subparagraph (4)(a) or (b) of this rule during the measurement of particulate by Method 5A and reported to the Technical Secretary with the performance test results.

(Rules 1200-3-16-.35, continued)

(j) If at a later date the owner or operator believes the emission limits in subparagraphs (3)(a) and (b) of this rule are being met even though the temperature measured in accordance with subparagraph (4) of this rule is exceeding that measured during the performance test, he may submit a written request to the Technical Secretary to repeat the performance test and procedure outlined in subparagraph (h) of this paragraph.

(k) If fuel oil is to be used to fire an afterburner used to control a blowing still, the owner or operator may petition the Technical Secretary in accordance with 1200–3–16–.01(6) to establish an opacity standard for the blowing still that will be the opacity standard when fuel oil is used to fire the afterburner. To obtain this opacity standard, the owner or operator must request the Technical Secretary to determine opacity during an initial, or subsequent, performance test when fuel oil is used to fire the afterburner. Upon receipt of the results of the performance test, the Technical Secretary will make a finding concerning compliance with the mass standard for the blowing still. If the Technical Secretary finds that the facility was in compliance with the mass standard during the performance test but failed to meet the zero opacity standard, the Technical Secretary will establish as a condition on the operating permit of the source an opacity standard for the blowing still that will be the opacity standard when fuel oil is used to fire the afterburner. When the afterburner is fired with natural gas, the zero percent opacity remains the applicable opacity standard.

Authority*: T.C.A. §§68–25–105 and 4–5–202.* ***Administrative History****: Original rule filed September 21, 1988; effective November 6, 1988.*

1200–3–16–.36 INDUSTRIAL SURFACE COATING: LARGE APPLIANCES.

(1) Applicability.

(a) The provisions of this rule apply to each surface coating operation in a large appliance surface coating line.

(b) The provisions of this rule apply to each affected facility identified in subparagraph (a) of this paragraph that commences construction, modification, or reconstruction after November 6, 1988.

(2) Definitions and Symbols.

(a) Definitions

1. “Applied coating solids” means the coating solids that adhere to the surface of the large appliance part being coated.

2. “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 2500F are not included in this definition.

3. “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.

4. “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.

(Rules 1200-3-16-.36, continued)

5. "Coating application station" means that portion of the large appliance surface coating operation where a prime coat or a top coat is applied to large appliance parts or products (e.g., dip tank, spray booth, or flow coating unit).

6. "Curing oven" means a device that uses heat to dry or cure the coating(s) applied to large appliance parts or products.

7. "Electrodeposition" (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.

8. "Flashoff area" means the portion of a surface coating line between the coating application station and the curing oven.

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 regulation, 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(s), 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 coating solids used.

14. "VOC content" means the proportion of a coating that is volatile organic compounds (VOC's), expressed as kilograms of VOC's per liter of coating solids.

15. "VOC emissions" means the mass of volatile organic compounds (VOC's), expressed as kilograms of VOC's per liter of applied coating solids, emitted from a surface coating operation.

(b) Symbols

Ca = the concentration of VOC's in a gas stream leaving a control device and entering the atmosphere (parts per million by volume, as carbon).

Cb = the concentration of VOC's in a gas stream entering a control device (parts per million by volume, as carbon).

Cf = the concentration of VOC's in a gas stream emitted directly to the atmosphere (parts per million by volume, as carbon).

Dc = density of coating (or input stream), as received (kilograms per liter).

Dd = density of a VOC-solvent added to coatings (kilograms per liter).

(Rules 1200-3-16-.36, continued)

Dr = density of a VOC-solvent recovered by an emission control device (kilograms per liter).

E = the VOC destruction efficiency of a control device (fraction).

F = the proportion of total VOC's emitted by an affected facility that enters a control device (fraction).

G = the volume-weighted average mass of VOC's in coatings consumed in a calendar month per unit volume of applied coating solids (kilograms per liter).

Lc = the volume of coating consumed, as received (liters).

Ld = the volume of VOC-solvent added to coatings (liters).

Lr = the volume of VOC-solvent recovered by an emission control device (liters).

Ls = the volume of coating solids consumed (liters).

Md = the mass of VOC-solvent added to coatings (kilograms).

Mo = the mass of VOC's in coatings consumed, as received (kilograms).

Mr = the mass of VOC's recovered by an emision control device (kilograms).

N = the volume-weighted average mass of VOC's emitted to the atmosphere per unit volume of applied coating solids (kilograms per liter).

Qa = the volumetric flow rate of a gas stream leaving a control device and entering the atmosphere (dry standard cubic meters per hour).

Qb = the volumetric flow rate of a gas stream entering a control device (dry standard cubic meters per hour).

Qf = the volumetric flow rate of a gas stream emitted directly to the atmosphere (dry standard cubic meters per hour).

R = the overall VOC emission reduction achieved for an affected facility (fraction).

T = the transfer efficiency (fraction).

Vs = the proportion of solids in a coating (or input stream), as received (fraction by volume).

Wo = the proportion of VOC's in a coating (or input stream), as received (fraction by weight).

(3) Standard for volatile organic compounds.

On or after the date on which the performance test required by 1200–3–16–.01(5) is completed, no owner or operator of an affected facility subject to the provisions of this rule shall discharge or cause the discharge of VOC emissions that exceed 0.90 kilogram of VOC's per liter of applied coating solids from any surface coating operation on a large appliance surface coating line.

(Rules 1200-3-16-.36, continued)

(4) Performance test and compliance provisions.

(a) Subparagraphs 1200–3–16–.01(5)(d) and (f) do not apply to the performance test procedures required by this rule.

(b) The owner or operator of an affected facility shall conduct an initial performance test as required under 1200–3–16–.01(5)(a) and thereafter a performance test each calendar month for each affected facility according to the procedures in this subparagraph.

1. An owner or operator shall use the following procedures for any affected facility that does not use a capture system and control device to comply with the emissions limit specified under paragraph (3) of this rule. 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 as specified in rule 1200–3–16–.01(5)(g). The Technical Secretary 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 Technical Secretary.

(i) Except as provided in sub-part (b)1.(iv) of this paragraph, the weighted average of the total mass of VOC's consumed per unit volume of coating solids applied each calendar month will be determined as follows:

(I) Calculate the mass of VOC's consumed (Mo + Md) during the calendar month for each affected facility by the following equation:

$$Mo + Md = \sum_{i=1}^{n} LciDciWoi + \sum_{j=1}^{m} LdjDdj \qquad \text{Equation (1)}$$

(Sum Ldj Ddj will be 0 if no VOC-solvent is added to the coatings, as received)

where

n is the number of different coatings used during the month, and

m is the the number of different VOC-solvents added to coatings during the calendar month.

(II) Calculate the total volume of coatings solids used (Ls) in the calendar month for each affected facility by the following equation:

$$Ls = \sum_{i=1}^{n} Lci\ Vsi \qquad \text{Equation (2)}$$

where

n is the number of different coatings used during the calendar month.

(Rules 1200-3-16-.36, continued)

(III) Select the appropriate transfer efficiency from Table 1. If the owner or operator can demonstrate to the satisfaction of the Technical Secretary that transfer efficiencies other than those shown are appropriate, the Technical Secretary will approve their use on a case-by-case basis. Transfer efficiencies for application methods not listed shall be determined by the Technical Secretary on a case-by-case basis. An owner or operator must submit sufficient data for the Technical Secretary to judge the accuracy of the transfer efficiency claims.

TABLE 1. - TRANSFER EFFICIENCIES

Application Method	Transfer efficiency (Tk)
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 Technical Secretary and compute the weighted average transfer efficiency by the following equation:

$$T = \frac{\sum_{i=1}^{n} \sum_{k=1}^{m} Lcik\ Vsik\ Tk}{Ls} \qquad \text{Equation (3)}$$

where

n is the number of coatings (or input streams) used, and

m is the number of application methods used.

(IV) Calculate the volume-weighted average mass of VOC's consumed per unit volume of coating solids applied (G) during the calendar month for each affected facility by the following equation:

$$G = \frac{Mo + Md}{Ls\ T} \qquad \text{Equation (4)}$$

(ii) Calculate the volume-weighted average of VOC emissions to the atmosphere (N) during the calendar month for each affected facility by the following equation:

(Rules 1200-3-16-.36, continued)

$$N = G \qquad \text{Equation (5)}$$

(iii) Where the volume-weighted average mass of VOC's discharged to the atmosphere per unit volume of coating solids applied (N) is equal to or less than 0.90 kilogram per liter, the affected facility is in compliance.

(iv) If each individual coating used by an effected facility has a VOC content, as received, which when divided by the lowest transfer efficiency at which the coating is applied, results in a value equal to or less than 0.90 kilogram per liter, the affected facility is in compliance, provided no VOC's are added to the coating during distribution or application.

2. An owner or operator shall use the following procedures for any affected facility that uses a capture system and a control device that destroys VOC's (e.g., incinerator) to comply with the emission limit specified under paragraph (3) of this rule.

(i) 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 (I), (II), and (III) below. 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 procedures in (I), (II), and (III) below, shall be repeated when directed by the Technical Secretary or when the owner or operator elects to operate the control device or capture system at conditions different from the initial performance test.

(I) Determine the fraction (F) of total VOC's emitted by an affected facility that enters the control device using the following equation:

$$F = \frac{\sum_{i=1}^{n} Cbi\ Qbi}{\sum_{i=1}^{n} Cbi\ Qbi + \sum_{k=1}^{p} Cfk\ Qfk} \qquad \text{Equation (6)}$$

Where

n is the number of gas streams entering the control device
p is the number of gas streams emitted directly to the atmosphere.

(II) 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:

$$E = \frac{\sum_{i=1}^{n} Qbi\ Cbi - \sum_{j=1}^{m} QajCaj}{\sum_{i=1}^{n} Qbi\ Cbi} \qquad \text{Equation (7)}$$

i=1

Where

n is the number of gas streams entering the control device, and
m is the number of gas streams leaving the control device and entering the atmosphere.

(III) Determine overall reduction efficiency (R) using the following equation:

R = EF. Equation (8)

(ii) Calculate the volume-weighted average fo the total mass of VOC's per unit volume of applied coating solids (G) during each calendar month for each affected facility using equations (1), (2), (3) if applicable, and (4).

(iii) Calculate the volume-weighted average of VOC emissions to the atmosphere (N) during each calendar month by the following equation:

N = G (1-R) Equation (9)

(iv) If the volume-weighted average mass of VOC's emitted to the atmosphere for each calendar month (N) is equal to or less than 0.90 kilogram per liter of applied coating solids, the affected facility is in compliance.

3. An owner or operator shall use the following procedure for any affected facility that uses a control device for VOC recovery (e.g., carbon adsorber) to comply with the applicable emission limit specified under paragraph (3) of this rule.

(i) Calculate the total mass of VOC's consumed (Mo + Md) and the volume-weighted average of the total mass of VOC's per unit volume of applied coating solids (G) during each calendar month for each affected facility using equations (1), (2), (3) if applicable, and (4).

(ii) Calculate the total mass of VOC's recovered (Mr) during each calendar month using the following equation:

Mr = LrDr Equation (10)

(iii) Calculate overall reduction efficiency of the control device (R) for each calendar month for each affected facility using the following equation:

$$R = \frac{Mr}{Mo + Md} \qquad \text{Equation (11)}$$

(iv) Calculate the volume-weighted average mass of VOC's emitted to the atmosphere (N) for each calendar month for each affected facility using equation (9).

(v) If the volume-weighted average mass of VOC's emitted to the atmosphere for each calendar month (N) is equal to or less than 0.90 kilogram per liter of applied coating solids, the affected facility is in compliance. 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 paragraph (3) of this rule 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 0.75 percent of the temperature being measured expressed in degrees Celsius or + 2.50C.

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 1200–3–16–.01(5)(a) apply only to the initial performance test. Each owner or operator subject to the provisions of this rule shall include the following data in the report of the initial performance test required under 1200–3–16–.01(5)(a):

1. Except as provided in part (a)2 of this paragraph, the volume-weighted average mass of VOC's emitted to the atmosphere per volume of applied coating solids (N) for a period of 1 calendar month from each affected facility.

2. For each affected facility where compliance is determined under the provisions of sub-part (4)(b)1.(iv) of this rule, a list of the coatings used during a period of 1 calendar month, the VOC content of each coating calculated from data determined using Reference Method 24 (as specified in 1200–3–16–.01(5)(g)), 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 will be reported:

(i) The proportion of total VOC's emitted that enters the control device (F),

(ii) The VOC reduction efficiency of the control device (E),

(iii) The average combustion temperature (or the average temperature upstream and downstream of the catalyst bed), and

(iv) A description of the method used to establish the amount of VOC's captured and sent to the incinerator.

4. For each affected facility where compliance is achieved through use of a solvent recovery system, the following additional information will be reported:

(i) The volume of VOC-solvent recovered (Lr), and

(ii) The overall VOC emission reduction achieved (R).

(Rules 1200-3-16-.36, continued)

(b) Following the initial performance test, the owner or operator of an affected facility shall identify and record:

1. Each instance in which the volume-weighted average of the total mass of VOC's emitted to the atmosphere per volume of applied coating solids (N) is greater than the limit specified under paragraph (3) of this rule.

2. Where compliance with paragraph (3) of this rule is achieved through use of thermal incineration, each 3-hour period of coating operation during which the average temperature of the device was more than 280C below the average temperature of the device during the most recent performance test at which destruction efficiency was determined as specified under paragraph (4) of this rule.

3. Where compliance with paragraph (3) of this rule 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 280C below the average temperature at the same location during the most recent performance test at which destruction efficiency was determined as specified under paragraph (4) of this rule. Additionally, all 3-hour periods of coating operations during which the average temperature difference across the catalyst bed is less than 80 percent of the average temperature difference across the catalyst bed during the most recent performance test at which destruction efficiency was determined as specified under paragarph (4) of this rule will be recorded.

(c) Each owner or operator subject to the provisions of this rule 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 1200–3–16–.01(5)(g), except as provided under 1200–3–16–.01(5)(b), shall be used to determine compliance with paragraph (3) of this rule 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. Procedures to determine VOC emissions are provided in paragraph (4) of this rule.

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.

6. Method 4 for stack gas moisture.

(Rules 1200-3-16-.36, continued)

(b) For Method 24, the coating sample must be a 1-liter sample taken into a 1-liter container at a point where the sample will be representative of the coating material.

(c) For Method 25, the sample time for each of three runs is to be at least 60 minutes and the minimum sample volume is to 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 Technical Secretary.

(d) The Technical Secretary will approve sampling of representative stacks on a case-by-case basis if the owner or operator can demonstrate to the satisfaction of the Technical Secretary that the testing of representative stacks would yield results comparable to those that would be obtained by testing all stacks.

Authority*: T.C.A. §§68–25–105 and 4–5–202.* ***Administrative History****: Original rule filed September 21, 1988; effective November 6, 1988.*

1200–3–16–.37 SURFACE COATING OF METAL FURNITURE.

(1) Applicability.

(a) The affected facility to which the provisions of this rule apply is each metal furniture surface coating operation in which organic coatings are applied.

(b) This rule applies to each affected facility identified in subparagraph (a) of this paragraph on which construction, modification, or reconstruction is commenced after November 6, 1988.

(2) Definitions and symbols.

(a) Definitions

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 (EDP)” means a method of applying coatings in which the part is submerged in a tank filled with the coatings and in which an electrical potential is used to enhance deposition of the coatings on the part.

4. “Electrostatic spray application” means a spray application method that uses an electrical potential to increase the transfer efficiency of the coatings.

5. “Flash-off area” means the portion of a surface coating operation between the coating application area and bake oven.

6. “Flow coating” means a method of applying coatings in which the part is carried through a chamber containing numerous nozzles which direct unatomized streams of coatings from many different angles onto the surface of the part.

7. “Organic coating” means any coating used in a surface coating operation, including dilution solvents, from which volatile organic compound emissions occur during the application or the curing process. For the purpose of this rule, powder coatings are not included in this definition.

(Rules 1200-3-16-.37, continued)

8. "Powder coating" means any surface coating which is applied as a dry powder and is fused into a continuous coating film through the use of heat.

9. "Spray application" means a method of applying coatings by atomizing and directing the atomized spray toward the part to be coated.

10. "Surface coating operation" means the system on a metal furniture surface coating line used to apply and dry or cure an organic coating on the surface of the metal furniture part or product. The surface coating operation may be a prime coat or a top coat operation and includes the coating application station(s), flash-off area, and curing oven.

11. "Transfer efficiency" means the ratio of the amount of coating solids deposited onto the surface of a part or product to the total amount of coating solids used.

12. "VOC content" means the proportion of a coating that is volatile organic compounds (VOC's), expressed as kilograms of VOC's per liter of coating solids.

13. "VOC emissions" means the mass of volatile organic compounds (VOC's), expressed as kilograms of VOC's per liter of applied coating solids, emitted from a metal furniture surface coating operation.

(b) Symbols

Ca = the VOC concentration in each gas stream leaving the control device and entering the atmosphere (parts per million by volume, as carbon).

Cb = the VOC concentration in each gas stream entering the control device (parts per million by volume, as carbon).

Cf = the VOC concentration in each gas stream emitted directly to the atmosphere (parts per million by volume, as carbon).

Dc = density of each coating, as received (kilograms per liter).

Dd = density of each diluent VOC solvent (kilograms per liter).

Dr = density of VOC solvent recovered by an emission control device (kilograms per liter).

E = VOC destruction efficiency of the control device (fraction).

F = the proportion of total VOC's emitted by an affected facility that enters the control device (fraction).

G = the volume-weighted average mass of VOC's in coatings consumed in a calendar month per unit volume of coating solids applied (kilograms per liter).

Lc = the volume of each coating consumed, as received (liters).

Ld = the volume of each diluent VOC-solvent added to coatings (liters).

Lr = the volume of VOC-solvent recovered by an emission control device (liters).

Ls = the volume of coating solids consumed (liters).

Md = the mass of diluent VOC-solvent consumed (kilograms).

Mo = the mass of VOC's in coatings consumed, as received (kilograms).

Mr = the mass of VOC's recovered by an emission control device (kilograms).

N = the volume weighted average mass of VOC emissions to the atmosphere per unit volume of coating solids applied (kilograms per liter).

Qa = the volumetric flow rate of each gas stream leaving the control device and entering the atmosphere (dry standard cubic meters per hour).

Qb = the volumetric flow rate of each gas stream entering the control device (dry standard cubic meters per hour).

Qf = the volumetric flow rate of each gas stream emitted directly to the atmosphere (dry standard cubic meters per hour).

R = the overall VOC emission reduction achieved for an affected facility (fraction).

T = the transfer efficiency (fraction).

Vs = the proportion of solids in each coating (or input stream), as received (fraction by volume).

Wo = the proportion of VOC's in each coating (or input stream), as received (fraction by weight).

(3) Standard for volatile organic compounds (VOC).

(a) On and after the date on which the initial performance test required to be conducted by 1200–3–16–.01(5)(a) is completed, no owner or operator subject to the provisions of this rule shall 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) Subparagraphs 1200–3–16–.01(5)(d) and (f) do not apply to the performance test procedures required by this rule.

(b) The owner or operator of an affected facility shall conduct an initial performance test as required under 1200–3–16–.01(5)(a) and thereafter a performance test each calendar month for each affected facility according to the procedures in this paragraph.

(c) The owner or operator shall use the following procedures for determining monthly volume-weighted average emissions of VOC's in kilograms per liter of coating solids applied (G).

1. An owner or operator shall use the following procedures for any affected facility which does not use a capture system and control device to comply with the emissions limit specified under paragraph (3) of this rule. 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 (as specified in 1200–3–16–.01(5)(g)). The Technical Secretary 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. The owner or operator shall determine the volume of coating and the mass of VOC solvent used for thinning

(Rules 1200-3-16-.37, continued)

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 Technical Secretary.

(i) Calculate the volume-weighted average of the total mass of VOC's consumed per unit volume of coating solids applied (G) during each calendar month for each affected facility, except as provided under parts 2 and 3 of this subparagraph. Each monthly calculation is considered a performance test. Except as provided in subpart (iv) of this part, the volume-weighted average of the total mass of VOC's consumed per unit volume of coating solids applied (G) each calendar month will be determined by the following procedures.

(I) Calculate the mass of VOC's used (Mo $ Md) during each calendar month for each affected facility by the following equation:

$$Mo + Md = \sum_{i=1}^{n} Lci\ Dci\ Woi + \sum_{j=1}^{m} Ldj\ Ddj$$

(SUM Ldj Ddj will be 0 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.

(II) Calculate the total volume of coating solids used (Ls) in each calendar month for each affected facility by the following equation:

$$Ls = \sum_{i=1}^{n} Lci\ Vsi$$

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 Technical Secretary that transfer efficiencies other than those shown are appropriate, the Technical Secretary will approve their use on a case-by- case basis. Transfer efficiency values for application methods not listed below shall be determined by the Technical Secretary on a case-by-case basis. An owner or operator must submit sufficient data for the Technical Secretary 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	.25
Manual electrostatic spray	.60

(Rules 1200-3-16-.37, continued)

Nonrotational automatic electrostatic spray	.70
Rotating head electrostatic spray (manual and automatic)	.80
Dip coat and flow coat	.90
Electrodeposition	.95

Where more than one application method is used within a single surface coating operation, the owner or operator shall determine the composition and volume of each coating applied by each method through a means acceptable to the Technical Secretary and compute the weighted average transfer efficiency by the following equation:

$$T = \frac{\sum_{i=1}^{n} \sum_{k=1}^{p} Lcik\ Vsik\ Tk}{Ls}$$

Where n is the number of coatings used and p is the number of application methods used.

(III) Calculate the volume-weighted average mass of VOC's consumed per unit volume of coating solids applied (G) during the calendar month for each affected facility by the following equation:

$$G = \frac{Mo + Md}{LsT}$$

(ii) Calculate the volume-weighted average of VOC emissions to the atmosphere (N) during the calendar month for each affected facility by the following equation:

$$N = G$$

(iii) 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.

(iv) If each individual coating used by an affected facility has a VOC content, as received, which when divided by the lowest transfer efficiency at which the coating is applied, results in a value equal to or less than 0.90 kilogram per liter, the affected facility is in compliance provided no VOC's are added to the coatings during distribution or application.

2. An owner or operator shall use the following procedures for any affected facility that uses a capture system and a control device that destroys VOC's (e.g., incinerator) to comply with the emission limit specified under paragraph (3) of this rule.

(i) 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 items (i)(I), (II) and (III) of this part. 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 items (i)(I), (II) and (III) of this part shall be repeated when directed by the Technical Secretary or when the owner or operator elects to operate the control device or capture system at conditions different from the initial performance test.

(I) Determine the fraction (F) of total VOC's emitted by an affected facility that enters the control device using the following equation:

$$F = \frac{\sum_{i=1}^{n} Cbi\ Qbi}{\sum_{i=1}^{n} Cbi\ Qbi + \sum_{j=1}^{m} Cfj\ Qfj}$$

Where n is the number of gas streams entering the control device and m is the number of gas streams emitted directly to the atmosphere.

(II) 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:

$$E = \frac{\sum_{i=1}^{n} Qbi\ Cbi - \sum_{j=1}^{m} Qaj\ Caj}{\sum_{i=1}^{n} Qbi\ Cbi}$$

Where: n is the number of gas streams entering the control device, and m is the number of gas streams leaving the control device and entering the atmosphere.

(III) Determine the overall reduction efficiency (R) using the following equation:

$$R = EF$$

(ii) Calculate the volume-weighted average of the total mass of VOC's per unit volume of coating solids applied (G) during each calendar month for each affected facility using equations in items 1(i)(I), (II) and (III) of this subparagraph.

(iii) Calculate the volume-weighted average of VOC emissions to the atmosphere (N) during each calendar month by the following equation:

$$N = G\ (1-R)$$

(iv) If the volume-weighted average mass of VOC's emitted to the atmosphere for each calendar month (N) is less than or equal to 0.90 kilogram per liter of coating solids applied, the affected facility is in compliance. Each monthly calculation is a performance test.

(Rules 1200-3-16-.37, continued)

3. An owner or operator shall use the following procedure for any affected facility which uses a control device that recovers the VOC's (e.g., carbon adsorber) to comply with the applicable emission limit specified under paragraph (3) of this rule.

   (i) Calculate the total mass of VOC's consumed (Mo + Md) and the volume-weighted average of the total mass of VOC's per unit volume of coating solids applied (G) during each calendar month for each affected facility using equations in items 1(i)(I), (II) and (III) of this subparagraph.

   (ii) Calculate the total mass of VOC's recovered (Mr) during each calendar month using the following equation:

   $$Mr = Lr\ Dr$$

   (iii) Calculate overall reduction efficiency of the control device (R) for each calendar month for each affected facility using the following equation:

   $$R = \frac{Mr}{Mo + Md}$$

   (iv) Calculate the volume-weighted average mass of VOC's emitted to the atmosphere (N) for each calendar month for each affected facility using the equation in sub-part 2.(iii) of this subparagraph.

   (v) If the weighted average mass of VOC's emitted to the atmosphere for each calendar month (N) is less than or equal to 0.90 kilogram per liter of coating solids applied, the affected facility is in compliance. Each monthly calculation is a performance test.

(5) Monitoring of emissions and operations.

(a) The owner or operator of an affected facility which uses a capture system and an incinerator to comply with the emission limits specified under paragraph (3) of this rule 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 percent of the temperature being measured expressed in degrees Celsius or +2.50C.

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 paragraph (3) of this rule shall install the equipment necessary to determine the total volume of VOC-solvent recovered daily.

(Rules 1200-3-16-.37, continued)

(6) Reporting and recordkeeping requirements.

(a) The reporting requirements of 1200–3–16–.01(5)(a) apply only to the initial performance test. Each owner or operator subject to the provisions of this rule shall include the following data in the report of the initial performance test required under 1200–3–16–.01(5)(a).

1. Except as provided in part (a)2 of this paragraph, the volume-weighted average mass of VOC's emitted to the atmosphere per volume of applied coating solids (N) for a period of one calendar month from each affected facility.

2. For each affected facility where compliance is determined under the provisions of subpart (4)(c)1(iv) of this rule, 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 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 will be reported:

(i) The proportion of total VOC's emitted that enters the control device (F),

(ii) The VOC reduction efficiency of the control device (E),

(iii) The average combustion temperature (or the average temperature upstream and downstream of the catalyst bed), and

(iv) A description of the method used to establish the amount of VOC's captured and sent to the incinerator.

4. For each affected facility where compliance is achieved through the use of a solvent recovery system, the following additional information will be reported:

(i) The volume of VOC-solvent recovered (Lr), and

(ii) The overall VOC emission reduction achieved (R).

(b) Following the initial performance test, the owner or operator of an affected facility shall identify and record:

1. Each instance in which the volume-weighted average of the total mass of VOC's emitted to the atmosphere per volume of applied coating solids (N) is greater than the limit specified under paragraph (3) of this rule.

2. Where compliance with paragraph (3) of this rule 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 280C below the average temperature of the device during the most recent performance test at which destruction efficiency was determined as specified under paragraph (4) of this rule.

3. Where compliance with paragraph (3) of this rule 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 280C 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

(Rules 1200-3-16-.37, continued)

under paragraph (4) of this rule. 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 percent of the average temperature difference across the catalyst bed during the most recent performance test at which destruction efficiency was determined as specified under paragraph (4) of this rule will be recorded.

(c) Each owner or operator subject to the provisions of this rule 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 1200–3–16–.01(5)(g) except as provided under 1200–3–16–.01(5)(b) shall be used to determine compliance with paragraph (3) of this rule 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. 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.

6. Method 4 for stack gas moisture.

(b) For Method 24, the coating sample must be at least a 1 liter sample in a 1 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, the minimum sampling time for each of 3 runs is 60 minutes and the minimum sample volume is 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 Technical Secretary.

(d) The Technical Secretary will approve testing of representative stacks on a case-by-case basis if the owner or operator can demonstrate to the satisfaction of the Technical Secretary that testing of representative stacks yields results comparable to those that would be obtained by testing all stacks.

***Authority**: T.C.A. §§68–25–105 and 4–5–202.* ***Administrative History**: Original rule filed September 21, 1988; effective November 6, 1988.*

1200–3–16–.38 METAL COIL SURFACE COATING.

(1) Applicability.

(a) The provisions of this rule 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) This rule applies to any facility identified in subparagraph (a) of this paragraph that commences construction, modification or reconstruction after November 6, l988.

(2) Definitions and Symbols.

(a) Definitions

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 station 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(s) 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(s) on the surface of the metal coil.

7. "Quench station" means that portion of the metal coil surface coating operation where the coated metal coil is cooled, usually by a water spray, after baking or curing.

8. "VOC content" means the quantity, in kilograms per liter of coating solids, of volatile organic compounds (VOC) in a coating.

(b) Symbols

Ca = the VOC concentration in each gas stream leaving the control device and entering the atmosphere (parts per million by volume, as carbon).

Cb = the VOC concentration in each gas stream entering the control device (parts per million by volume, as carbon).

Cf = the VOC concentration in each gas stream emitted directly to the atmosphere (parts per million by volume, as carbon).

(Rules 1200-3-16-.38, continued)

Dc = density of each coating, as received (kilograms per liter).

Dd = density of each VOC-solvent added to coatings (kilograms per liter).

Dr = density of VOC-solvent recovered by an emission control device (kilograms per liter).

E = VOC destruction efficiency of the control device (fraction).

F = the proportion of total VOC's emitted by an affected facility that enters the control device (fraction).

G = volume-weighed average mass of VOC's in coatings consumed in a calendar month per unit volume of coatings solids applied (kilograms per liter).

Lc = the volume of each coating consumed, as received (liters).

Ld = the volume of each VOC-solvent added to coatings (liters).

Lr = the volume of VOC-solvent recovered by an emission control device (liters).

Ls = the volume of coatings solids consumed (liters).

Md = the mass of VOC-solvent added to coatings (kilograms).

Mo = the mass of VOC's in coatings consumed, as received (kilograms).

Mr = the mass of VOC's recovered by an emission control device (kilograms).

N = the volume-weighted average mass of VOC emissions to the atmosphere per unit volume of coating solids applied (kilograms per liter).

Qa = the volumetric flow rate of each gas stream leaving the control device and entering the atmosphere (dry standard cubic meters per hour).

Qb = the volumetric flow rate of each gas stream entering the control device (dry standard cubic meters per hour).

Qf = the volumetric flow rate of each gas stream emitted directly to the atmosphere (dry standard cubic meters per hour).

R = the overall VOC emission reduction achieved for an affected facility (fraction).

S = the calculated monthly allowable emission limit (kilograms of VOC per liter of coating solids applied).

Vs = the proportion of solids in each coating, as received (fraction by volume).

Wo = the proportion of VOC's in each coating, as received (fraction by weight).

(3) Standards for volatile organic compounds.

(a) On and after the date on which paragraph 1200–3–16–.01(5) requires a performance test to be completed, each owner or operator subject to this rule shall not cause to be discharged into the atmosphere more than:

(Rules 1200-3-16-.38, continued)

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(s); or

2. 0.14 kg VOC/1 of coating solids applied for each calendar month for each affected facility that continuously uses an emission control device(s) operated at the most recently demonstrated overall efficiency; or

3. 10 percent of the VOC's applied for each calendar month (90 percent emission reduction) for each affected facility that continuously uses an emission control device(s) operated at the most recently demonstrated overall efficiency; or

4. a value between 0.14 (or a 90-percent emission reduction) and 0.28 kg VOC/1 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) Subparagraphs 1200–3–16–.01(5)(d) and (f) do not apply to the performance test.

(b) The owner or operator of an affected facility shall conduct an initial performance test as required under subparagraph 1200–3–16–.01(5)(a) and thereafter a performance test for each calendar month for each affected facility according to the procedures in this paragraph.

(c) The owner or operator shall use the following procedures for determining monthly volume-weighted average emissions of VOC's in kg/1 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 part (3)(a)1. of this rule. 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 (as specified in 1200–3–16–.01(5)(g)24). The Technical Secretary 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 Technical Secretary.

(i) Calculate the volume-weighted average of the total mass of VOC's consumed per unit volume of coatings solids applied during each calendar month for each affected facility, except as provided under sub-part (iv) of this part. The weighted average of the total mass of VOC's used per unit volume of coatings solids applied each calendar month is determined by the following procedures.

(I) Calculate the mass of VOC's used (Mo $ Md) during each calendar month for each affected facility by the following equation:

$$Mo + Md = \sum_{i=1}^{n} LciDciWoi + \sum_{j=1}^{m} LdjDdj \quad \text{EQUATION 1}$$

(Rules 1200-3-16-.38, continued)

(SUM LdjDdj will be 0 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 VOC solvents added to coatings used during the calendar month.

(II) Calculate the total volume of coating solids used (Ls) in each calendar month for each affected facility by the following equation:

$$Ls = \sum_{i=1}^{n} VsiLci \quad \text{EQUATION 2}$$

Where:

n is the number of different coatings used during the calendar month.

(III) Calculate the volume-weighted average mass of VOC's used per unit volume of coatings solids applied (G) during the calendar month for each affected facility by the following equation:

$$G = \frac{Mo + Md}{Ls} \quad \text{EQUATION 3}$$

(ii) Calculate the volume-weighted average of VOC emissions to the atmosphere (N) during the calendar month for each affected facility by the following equation:

$$N = G \quad \text{EQUATION 4}$$

(iii) Where the volume-weighted average mass of VOC's discharged to the atmosphere per unit volume of coating solids applied (N) is equal to or less than 0.28 kg/1, the affected facility is in compliance.

(iv) 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/1 of coating solids, the affected facility is in compliance provided no VOC's are added to the coating during distribution or application.

2. An owner or operator shall use the following procedures for each affected facility that continuously uses a capture system and a control device that destroys VOC's (e.g. incinerator) to comply with the emission limit specified under part (3)(a)2 or 3.

(i) 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 items (c)2(i)(I), (II) and (III) of this paragraph. 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 items (c)2(i)(I), (II) and (III) of this paragraph shall be repeated when directed by the

(Rules 1200-3-16-.38, continued)

Technical Secretary or when the owner or operator elects to operate the control device or capture system at conditions different from the initial performance test.

(I) Determine the fraction (F) of total VOC's emitted by an affected facility that enters the control device using the following equation:

$$F = \frac{\sum_{i=1}^{l} CbiQbi}{\sum_{i=1}^{1} CbiQbi + \sum_{i=1}^{p} CfiQfi} \qquad \text{EQUATION 5}$$

Where:

1 is the number of gas streams entering the control device, and

p is the number of gas streams emitted directly to the atmosphere.

(II) Determine the destruction efficiency of the control device (E) using values of 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:

$$E = \frac{\sum_{i=1}^{n} QbiCbi - \sum_{j=1}^{m} QajCaj}{\sum_{i=1}^{n} QbiCbi} \qquad \text{EQUATION 6}$$

Where:

n is the number of gas streams entering the control device, and
m is the number of gas stream 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 paragraph (7) of this rule. 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 must 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 Technical Secretary is satisfied that the enclosure is adequately containing VOC emissions, no additional enclosure is required for the performance test.

(III) Determine overall reduction efficiency (R) using the following equation:

$$R = EF \qquad \text{EQUATION 7}$$

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

(Rules 1200-3-16-.38, continued)

(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 follows:

(ii) Calculate the volume-weighted average of the total mass of VOC's per unit volume of coating solids applied (G) during each calendar month for each affected facility using equations in items (c)1.(i)(I), (II) and (III) of this paragraph.

(iii) Calculate the volume-weighted average of VOC emissions to the atmosphere (N) during each calendar month by the following equation:

$$N = G\,(1-R) \qquad \text{EQUATION 8}$$

(iv) If the volume-weighted average mass of VOC's emitted to the atmosphere for each calendar month (N) is less than or equal to 0.14 kg/1 of coating solids applied, the affected facility is in compliance. Each monthly calculation is a performance test.

3. An owner or operator shall use the following procedure for each affected facility that uses a control device that recovers the VOC's (e.g. carbon adsorber) to comply with the applicable emission limit specified under part (3)(a)2. or 3. of this rule.

(i) Calculate the total mass of VOC's consumed (Mo $ Md) during each calendar month for each affected facility using Equation 1 in item (c)1.(i)(I) of this paragraph.

(ii) Calculate the total mass of VOC's recovered (Mr) during each calendar month using the following equation:

$$Mr = LrDr \qquad \text{EQUATION 9}$$

(iii) Calculate the overall reduction efficiency of the control device (R) for each calendar month for each affected facility using the following equation:

$$R = \frac{Mr}{Mo + Md} \qquad \text{EQUATION 10}$$

If the overall 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 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 follows.

(iv) Calculate the total volume of coating solids consumed (Ls) and the volume-weighted average of the total mass of VOC's per unit volume of coating solids applied (G) during each calendar month for each affected facility using equations in items (c)1(i)(II) and (III) of this paragraph.

(v) Calculate the volume-weighted average mass of VOC's emitted to the atmosphere (N) for each calendar month for each affected facility using the equation in sub-part (c)2.(iii).

(vi) If the weighted average mass of VOC's emitted to the atmosphere for each calendar month (N) is less than or equal to 0.14 kg/1 of coating solids applied, the affected facility is in compliance. Each monthly calculation is a performance test.

(Rules 1200-3-16-.38, continued)

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 part (3)(a)4 of this rule.

(i) Calculate the total volume of coating solids applied without the control device in operation (Lsn) during each calendar month for each affected facility using the following equation:

EQUATION 11

$$Lsn = \sum_{i=1}^{n} VsiLci$$

Where:

n is the number of coatings used during the calendar month without the control device in operation.

(ii) Calculate the total volume of coating solids applied with the control device in operation (Lsc) during each calendar month for each affected facility using the following equation:

EQUATION 12

$$Lsc = \sum_{i=1}^{m} VsiLci$$

Where:

m is the number of coatings used during the calendar month with the control device in operation.

(iii) Calculate the mass of VOC's used without the control device in operation (Mon + Mdn) during each calendar month for each affected facility using the following equation:

$$Mon + Mdn = \sum_{i=1}^{n} LciDciWoi + \sum_{j=1}^{m} LdjDdj$$

EQUATION 13

Where:

n is the number of different coatings used without the control device in operation during the calendar month, and

m is the number of different VOC-solvents added to coatings used without the control device in operation during the calendar month.

(iv) Calculate the volume-weighted average of the total mass of VOC's consumed per unit volume of coating solids applied without the control device in operation (Gn) during each calendar month for each affected facility using the following equation:

(Rules 1200-3-16-.38, continued)

$$Gn = \frac{Mon + Mdn}{Lsn}$$ EQUATION 14

(v) Calculate the mass of VOC's used with the control device in operation (Moc + Mdc) during each calendar month for each affected facility using the following equation:

$$Moc + Mdc = \sum_{i=1}^{n} LciDciWoi + \sum_{j=1}^{m} LdjDdj$$

EQUATION 15

Where:

n is the number of different coatings used with the control device in operation during the calendar month, and

m is the number of different VOC-solvents added to coatings used with the control device in operation during the calendar month.

(vi) Calculate the volume-weighted average of the total mass of VOC's used per unit volume of coating solids applied with the control device in operation (Gc) during each calendar month for each affected facility using the following equation:

$$Gc = \frac{Moc + Mdc}{Lsc}$$ EQUATION 16

(vii) Determine the overall reduction efficiency (R) for the capture system and control device using the procedures in items 2.(i)(I), (II) and (III) or sub- parts 3.(i),(ii) and (iii) of this subparagraph whichever is applicable.

(viii) Calculate the volume-weighted average of VOC emissions to the atmosphere (N) during each calendar month for each affected facility using the following equation:

$$N = \frac{GnLsn + GcLsc\ (1-R)}{Lsn + Lsc}$$ EQUATION 17

(ix) Calculate the emission limit(s) for each calendar month for each affected facility using the following equation:

$$S = \frac{0.28\ Lsn + 0.1\ GcLsc}{Lsn + Lsc} \quad \text{or} \quad \frac{0.28\ Lsn + 0.14\ Lsc}{Lsn + Lsc}$$

EQUATION 18

whichever is greater.

(Rules 1200-3-16-.38, continued)

(x) If the volume-weighted average mass of VOC's emitted to the atmosphere for each calendar month (N) is less than or equal to the calculated emission limit (S) for the calendar month, the affected facility is in compliance. Each monthly calculation is a performance test.

(5) Monitoring of emissions and operations.

(a) Where compliance with the numerical limit specified in part (3)(a)1 or 2. of this rule 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 paragraph (4) of this rule.

(b) Where compliance with the limit specified in part (3)(a)4. of this rule 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 paragraph (4) of this rule.

(c) If thermal incineration is used, each owner or operator subject to the provisions of this rule shall install, calibrate, operate, and maintain a device that continously records the combustion temperature of any effluent gases incinerated to achieve compliance with part (3)(a)2,3 or 4 of this rule. This device shall have an accuracy of + 2.5o C or $ 0.75 per cent 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 280C (500F) below the temperature at which compliance with part (3)(a)2.,3. or 4. of this rule was demonstrated during the most recent measurement of incinerator efficiency required by paragraph 1200–3–16–.01(5). The records required by 1200–3–16–.01(7) 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 + 2.50C or + 0.75 percent 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 percent of the temperature difference at which compliance was demonstrated during the most recent measurements of incinerator efficiency or when the inlet temperature falls more than 280C (500F) below the temperature at which compliance with part (3)(a)2.,3. or 4. of this rule was demonstrated during the most recent measurement of incinerator efficiency required by paragraph 1200–3–16–.01(5). The records required by paragraph 1200–3–16–.01(7) shall identify each such occurrence and its duration.

(6) Reporting and recordkeeping requirements.

(a) Where compliance with the numerical limit specified in part (3)(a)1.,2. or 4. of this rule 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 rule shall include in the initial compliance report required by paragraph 1200–3–16–.01(5) the weighted average of the VOC content of coatings used during a period of one calendar month for each affected facility. Where compliance with part (3)(a)4. of this rule 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.

(Rules 1200-3-16-.38, continued)

(b) Where compliance with part (3)(a)2.,3. or 4. of this rule is achieved through the use of an emission control device that destroys VOC's, each owner or operator subject to the provisions of this rule shall include the following data in the initial compliance report required by paragraph 1200–3–16–.01(5).

1. The overall VOC destruction rate used to attain compliance with part (3)(a)2.,3. or 4. of this rule and the calculated emission limit used to attain compliance with part (3)(a)4. of this rule; 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 part (3)(a)2.,3. or 4. of this rule.

(c) Each owner or operator subject to the provisions of this rule 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 subparagraph 1200–3–16–.01(5)(g) except as provided under subparagraph 1200–3–16–.01(5)(b) shall be used to determine compliance with paragraph (3) of this rule 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, the coating sample must be at least a 1-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, the sampling time for each of three runs is to be at least 60 minutes, and the minimum sample volume is to 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 Technical Secretary.

(d) The Technical Secretary will approve testing of representative stacks on a case-by-case basis if the owner or operator can demonstrate to the satisfaction of the Technical Secretary that testing of representative stacks yields results comparable to those that would be obtained by testing all stacks.

***Authority**: T.C.A. §868–25–105 and 4–5–202.* ***Administrative History**: Original rule filed September 21, 1988; effective November 6, l988.*

1200–3–16–.39 GRAPHIC ARTS INDUSTRY: PUBLICATION ROTOGRAVURE PRINTING.

(1) Applicability.

(a) Except as provided in subparagraph (b) of this paragraph, the affected facility to which the provisions of this rule apply is each publication rotogravure printing press.

(b) The provisions of this rule do not apply to proof presses.

(c) Any facility under subparagraph (a) of this paragraph that commences construction, modification, or reconstruction after November 6, 1988 is subject to the requirements of this rule.

(2) Definitions and notations.

(a) Definitions.

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 four consecutive weeks as specified in paragraphs of this rule.

6. "Proof press" means any device used only to check the quality of the image formation of newly engraved or etched gravure cylinders and 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:

(i) Catalogues, including mail order and premium,

(Rules 1200-3-16-.39, continued)

(ii) Direct mail advertisements, including circulars, letters, pamphlets, cards, and printed envelopes,

(iii) Display advertisements, including general posters, outdoor advertisements, car cards, window posters; counter and floor displays; point-of-purchase, and other printed display material,

(iv) Magazines,

(v) Miscellaneous advertisements, including brochures, pamphlets, catalogue sheets, circular folders, announcements, package inserts, book jackets, market circulars, magazine inserts, and shopping news,

(vi) Newspapers, magazine and comic supplements for newspapers, and preprinted newspaper inserts, including hi-fi and spectacolor rolls and sections,

(vii) Periodicals, and

(viii) 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. “Solvent-borne ink systems” means ink and related coating mixtures whose volatile portion consists essentially of VOC solvent with not more than five 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 a condenser(s) or a vessel(s) 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 five weight percent water, as applied to the gravure cylinder.

(b) Symbols.

DB = the density at the base temperature of VOC solvent used or recovered during one performance averaging period.

Dci = the density of each color of raw ink and each related coating (i) used at the subject facility (or facilities), at the coating temperature when the volume of coating used is measured.

(Rules 1200-3-16-.39, continued)

Ddi = the density of each VOC solvent (i) added to the ink for dilution at the subject facility (or facilities), at the solvent temperature when the volume of solvent used is measured.

Dgi = the density of each VOC solvent (i) used as a cleaning agent at the subject facility (or facilities), at the solvent temperature when the volume of cleaning solvent used is measured.

Dhi = the density of each quantity of water (i) added at the subject facility (or facilities) for dilution of waterborne ink systems at the water temperature when the volume of dilution water used is measured.

Dmi = the density of each quantity of VOC solvent and miscellaneous solvent-borne waste inks and waste VOC solvents (i) recovered from the subject facility (or facilities), at the solvent temperature when the volume of solvent recovered is measured.

Doi = the density of the VOC solvent contained in each raw ink and related coating (i) used at the subject facility (or facilities), at the coating temperature when the volume of coating used is measured.

Dwi = the density of the water contained in each waterborne raw ink and related coating (i) used at the subject facility (or facilities), at the coating temperature when the volume of coating used is measured.

Lci = the measured liquid volume of each color of raw ink and each related coating (i) used at the facility of a corresponding VOC content, Voi or Woi, with a VOC density, Doi, and a coating density Dci.

Ldi = the measured liquid volume of each VOC solvent (i) with corresponding density Ddi, added to dilute the ink used at the subject facility (or facilities).

Lgi = the measured liquid volume of each VOC solvent (i) used as a cleaning agent at the subject facility (or facilities), at the solvent temperature when the volume of cleaning solvent used is measured.

Lhi = the measured liquid volume of each quantity of water (i) added at the subject facility (or facilities) for dilution of waterborne ink systems at the water temperature when the volume of dilution water used is measured.

Lmi = the measured liquid volume of each quantity of VOC solvent and miscellaneous solvent-borne waste inks and waste VOC solvents (i) recovered from the subject facility (or facilities), at the solvent temperature when the volume of solvent recovered is measured.

Lo = the corrected liquid volume of VOC in the raw inks and related coatings used.

Lt = the total corrected liquid volume of VOC used.

Lr = the total corrected liquid volume of VOC solvent recovered.

Mci = the mass, determined by direct weighing, of each color of raw ink and each related coating (i) used at the subject facility (or facilities).

(Rules 1200-3-16-.39, continued)

Md = the mass, determined by direct weighing, of VOC solvent added to dilute the ink used at the subject facility (or facilities) during one performance averaging period.

Mg = the mass, determined by direct weighing, of VOC solvent used as a cleaning agent at the subject facility (or facilities) during one performance averaging period.

Mh = the mass, determined by direct weighing, of water added for dilution with waterborne ink systems used at the subject facility (or facilities) during one performance averaging period.

Mm = the mass, determined by direct weighing, of VOC solvent and miscellaneous solvent-borne waste inks and waste VOC solvents recovered from the subject facility (or facilities) during one performance averaging period.

Mo = the total mass of VOC solvent contained in the raw inks and related coatings used at the subject facility (or facilities) during one performance averaging period.

Mr = the total mass of VOC solvent recovered from the subject facility (or facilities) during one performance averaging period.

Mt = the total mass of VOC solvent used at the subject facility (or facilities) during one performance averaging period.

Mv = the total mass of water used with waterborne ink systems at the subject facility (or facilities) during one performance averaging period.

Mw = the total mass of water contained in the waterborne raw inks and related coatings used at the subject facility (or facilities) during one performance averaging period.

P = the average VOC emission percentage for the subject facility (or facilities) for one performance averaging period.

Pa = the average VOC emission percentage for the affected facility.

Pb = the average VOC emission percentage for both affected and existing facilities controlled in common by the same air pollution control equipment.

Pe = the average VOC emission percentage for the existing facility.

Pf = the average VOC emission percentage for all affected and existing facilities located within the same plant boundary.

Voi = 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 (or facilities).

Vwi = the water content, expressed as a volume fraction of water volume per total volume of coating, of each color of waterborne raw ink and related coating (i) used at the subject facility (or facilities).

Woi = the VOC content, expressed as a weight fraction of mass of VOC per total mass of coating, of each color of raw ink and related coating (i) used at the subject facility (or facilities).

(Rules 1200-3-16-.39, continued)

Wwi = 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 (or facilities).

(c) Subscripts.

a = affected facility.
b = both affected and existing facilities controlled in common by the same air pollution control equipment.
e = existing facility.
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 1200–3–16–.01(5) and after the date required for completion of the test, no owner or operator subject to the provisions of this rule shall cause to be discharged into the atmosphere from any affected facility VOC equal to more than 16 percent 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 (or facilities) shall conduct performance tests in accordance with 1200–3–16–.01(5) under the following conditions:

1. The performance averaging period for each test is 30 consecutive calendar days and not an average of three separate runs as prescribed under subparagraph 1200–3–16–.01(5)(f).

2. Except as provided under subparagraphs (f) and (g) of this paragraph, if affected facilities routinely share the same raw ink storage/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 must be employed during the test. For this case, an overall emission percentage for the combined facilities as well as for only the affected facilities must 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:

(i) Non-resettable totalizer metering device(s) for indicating the cumulative liquid volume used at each affected facility; or

(ii) 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 subpart (i) of this part; or

(iii) 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 subparagraph (d), (f) or (g) of this paragraph.

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.

(Rules 1200-3-16-.39, continued)

5. Records of the measured amounts used at the affected facility and the liquid temperature at which the amounts were measured are maintained for each shipment of all purchased material or on at least a weekly basis for:

   (i) The raw inks and related coatings used;

   (ii) The VOC and water content of each raw ink and related coatings used as determined according to paragraph (6) of this rule;

   (iii) The VOC solvent and water added to the inks used;

   (iv) The VOC solvent used as a cleaning agent; and

   (v) The VOC solvent recovered.

6. The density variations with temperature of the raw inks, related coatings, VOC solvents used, and VOC solvent recovered are determined by the methods stipulated in subparagraph (6)(d) of this rule.

7. The calculated emission percentage may be reported as rounded-off to the nearest whole number.

8. Printing press startups and shutdowns are not included in the exemption provisions under 1200–3–16–.01(5)(c). 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 solvent-borne ink systems with a solvent recovery system, compliance is determined by the following procedures, except as provided in subparagraphs (d), (e), (f), and (g) of this paragraph.

1. The mass of VOC in the solvent-borne and waterborne raw inks and related coatings used is determined by the following equation:

$$(Mo)a = \sum_{i=1}^{k} (Mci)a(Woi)a + \sum_{i=1}^{m} (Lci)a(Dci)a(Woi)a + \sum_{i=1}^{n} (Lci)a(Voi)a(Doi)a$$

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 is determined by the following equation:

$$(Mt)a = (Mo)a + \sum^{m} (Ldi)a(Ddi)a + (Md)a +$$

(Rules 1200-3-16-.39, continued)

$$\sum_{i=1}^{n} (Lgi)a(Dgi)a + (Mg)a$$

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 is determined by the following equation:

$$(Mw)a = \sum_{i=1}^{k} (Mci)a(Wwi)a + \sum_{i=1}^{m} (Lci)a(Dci)a(Wwi)a + \sum_{i=1}^{n} (Lci)a(Vwi)a(Dwi)a$$

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 is determined by the following equation:

$$(Mv)a = (Mw)a + (Mh)a + \sum_{i=1}^{m} (Lhi)a(Dhi)a$$

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 is determined by the following equation:

$$(Mr)a = (Mm)a + \sum_{i=1}^{k} (Lmi)a(Dmi)a$$

Where "k" is the total number of VOC solvents, miscellaneous solvent-borne waste inks, and waste VOC solvents measured as recovered by volume with different densities.

6. The average VOC emission percentage for the affected facility is determined by the following equation:

$$Pa = \frac{(Mt)a - (Mr)a}{(Mt)a + (Mv)a} \times 100$$

(c) If an affected facility controlled by a solvent recovery system uses only solvent-borne ink systems, the owner or operator may choose to determine compliance on a direct mass or a

(Rules 1200-3-16-.39, continued)

density-corrected liquid volume basis. Except as provided in subparagraphs (d), (e), (f) and (g) of this paragraph, compliance is determined as follows:

1. On a direct mass basis, compliance is determined according to subparagraph (b) of this paragraph, except that the water term, Mv, does not apply.

2. On a density-corrected liquid volume basis, compliance is determined by the following procedures:

   (i) 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, is chosen by the owner or operator.

   (ii) The corrected liquid volume of VOC in the raw inks and related coatings used is determined by the following equation:

$$(Lo)a = \sum_{i=1}^{k} \frac{(Mci)a(Woi)a}{DB} + \sum_{i=1}^{m} \frac{Lci)a(Dci)a(Woi)a}{DB} + \sum_{i=1}^{n} \frac{(Lci)a(Voi)a(Doi)a}{DB}$$

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.

   (iii) The total corrected liquid volume of VOC used is determined by the following equation:

$$(Lt)a = Lo)a + \sum_{i=1}^{m} \frac{(Ldi)a(Ddi)a}{DB} + \frac{(Md)a}{DB} + \sum_{i=1}^{n} \frac{(Lgi)a(Dgi)a}{DB} + \frac{(Mg)a}{DB}$$

Where “m” and “n” are the respective total numbers of VOC dilution and cleaning solvents measured as used by volume with different densities.

   (iv) The total corrected liquid volume of VOC solvent recovered is determined by the following equation:

(Rules 1200-3-16-.39, continued)

$$(Lr)a = \frac{(Mm)a}{DB} + \sum_{i=1}^{k} \frac{(Lmi)a(Dmi)a}{DB}$$

Where "k" is the total number of VOC solvents, miscellaneous solvent-borne waste inks, and waste VOC solvents measured as recovered by volume with different densities.

(v) The average VOC emission percentage for the affected facility is determined by the following equation:

$$Pe = \frac{(Lt)e - (Lr)e}{(Lt)e} \times 100$$

(d) If two or more affected facilities are controlled by the same solvent recovery system, compliance is determined by the procedures specified in subparagraph (b) or (c) of this paragraph, whichever applies, except that (Lt)a and (Lr)a, (Mt)a, (Mr)a, and (Mv)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 is assumed to be equal.

(e) Except as provided under subparagraph (f) of this paragraph, if an existing facility (or facilities) and an affected facility (or facilities) 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 (or facilities) and then conducting a performance test on the combined facilities as follows:

1. Before the initial startup of the affected facility (or facilities) and at any other time as requested by the Technical Secretary, the owner or operator shall conduct emission test(s) on the existing facility (or facilities) controlled by the subject solvent recovery system. The solvent recovery system must handle VOC emissions from only the subject existing facility (or facilities), not from affected facilities, during the emission test.

2. During the emission test, the affected facilities are subject to the standard stated in paragraph (3) of this rule.
3. The emission test is conducted over a 30 consecutive calendar day averaging period according to the conditions stipulated in parts (a)1. through (a)5. of this paragraph except that the conditions pertain to only existing facilities instead of affected facilities.

4. The owner or operator of the existing facility (or facilities) shall provide the Technical Secretary at least 30 days prior notice of the emission test to afford the Technical Secretary the opportunity to have an observer present.

5. The emission percentage for the existing facility (or facilities) during the emission test is determined by one of the following procedures:

(i) If the existing facility (or facilities) uses a combination of waterborne and solvent-borne ink systems, the average VOC emission percentage must be determined on a direct mass basis according to subparagraph (b) or (d) of this paragraph, whichever applies, with the following equation:

$$Pe = \frac{(Mt)e - (Mr)e}{(Mt)e + (Mv)e} \times 100$$

where the water and VOC solvent amounts pertain to only existing facilities.

(ii) If the existing facility (or facilities) uses only solvent-borne 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 subparagraph (c) or (d) of this paragraph, whichever applies. On a direct mass basis, the average VOC emission percentage is determined by the equation presented in subpart (i) of this part. On a density-corrected liquid volume basis, the average VOC emission percentage is determined by the following equation:

$$Pa = \frac{(Lt)a - (Lr)a}{(Lt)a} \times 100$$

where the VOC solvent amounts pertain to only existing facilities.

6. The owner or operator of the existing facility (or facilities) shall furnish the Technical Secretary a written report of the results of the emission test.

7. After completion of the separate emission test on the existing facility (or facilities), the owner or operator shall conduct performance test(s) on the combined facilities with the solvent recovery system handling VOC emissions from both the existing and affected facilities.

8. During performance test(s), the emission percentage for the existing facility (or facilities), Pe, is assumed to be equal to that determined in the latest emission test. The Technical Secretary may request additional emission tests if any physical or operational changes occur to any of the subject existing facilities.

9. The emission percentage for the affected facilty (or facilities) during performance test(s) with both existing and affected facilities connected to the solvent recovery system is determined by one of the following procedures:

(i) If any of the combined facilities uses both waterborne and solvent-borne ink systems, the average VOC emission percentage must be determined on a direct mass basis according to subparagraph (b) or (d) of this paragraph, whichever applies, with the following equation:

$$Pa = \frac{(Mt)b - (Mr)b - \frac{(Pe)}{100}((Mt)e + (Mv)e)}{(Mt)a + (Mv)a} \times 100$$

where (Mt)a and (Mr)b are the collective VOC solvent amounts pertaining to all the combined facilities.

(ii) If all of the combined facilities use only solvent-borne ink systems, the owner or operator may choose to determine performance of the affected facility (or facilities) either on a direct mass basis or a density-corrected liquid volume basis according to

subparagraph (c) or (d) of this paragraph, whichever applies. On a direct mass basis, the average VOC emission percentage is determined by the equation presented in subpart (i) of this part. On a density-corrected liquid volume basis, the average VOC emission percentage is determined by the following equation:

$$Pa = \frac{(Lt)b - (Lr)e - \frac{(Pe))}{100}}{(Lt)a} \times 100$$

where (Lt)b and (Lr)b are the collective VOC solvent amounts pertaining to all the combined facilities.

(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 is determined by one of the following procedures:

1. If any of the combined facilities uses both waterborne and solvent-borne ink systems, the combined average VOC emission percentage must be determined on a direct mass basis according to subparagraph (b) or (d) of this paragraph, whichever applies, with the following equation:

$$Pb = \frac{(Mt)b - (Mr)b}{(Mt)b + (Mv)b} \times 100$$

2. If all of the combined facilities use only solvent-borne 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 subparagraph (c) or (d) of this paragraph, whichever applies. On a direct mass basis, the average VOC emission percentage is determined by the equation presented in part 1 of this subparagraph. On a density-corrected liquid volume basis, the average VOC emission percentage is determined by the following equation:

$$Pb = \frac{(Lt)b - (Lr)b}{(Lt)b} \times 100$$

(g) If all existing and affected facilities located within the same plant boundary use waterborne ink systems or solvent-borne 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 is determined by one of the following procedures:

1. If any of the facilities use waterborne ink systems, the total plant average VOC emission percentage must be determined on a direct mass basis according to subparagraph (b) of this paragraph with the following equation:

$$Pf = \frac{(Mt)f - (Mr)a - (Mr)e - (Mr)b}{(Mt)f + (Mv)f} \times 100$$

where (Mt)f and (Mv)f are the collective VOC solvent and water amounts used at all the subject plant facilities during the performance test.

2. If all of the plant facilities use only solvent-borne 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 subparagraph (c) of this paragraph. On a direct mass basis, the total plant average VOC emission percentage is determined by the equation presented in part 1. of this subparagraph. On a density-corrected liquid volume basis, the total plant average VOC emission percentage is determined by the following equation:

$$Pf = \frac{(Lt)f - (Lr)a - (Lr)e - (Lr)b}{(Lt)f} \times 100$$

Where (Lt)f is the collective VOC solvent amount used at all the subject plant facilities during the performance test.

(5) Monitoring of operations and recordkeeping.

(a) After completion of the performance test required under 1200–3–16–.01(5), the owner or operator of any affected facility using waterborne ink systems or solvent-borne 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 is estimated as follows:

1. The performance averaging period for monitoring of proper operation and maintenance is 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/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 is 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 part 4. of this subparagraph, temperatures and liquid densities determined during the most recent performance test are 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 is calculated according to the procedures under subparagraphs (4)(b) through (g) of this rule, 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 solvent-borne ink systems shall determine the VOC content of the raw inks and related coatings used at the affected facility by:

1. Analysis using Reference Method 24A, of routine weekly samples of raw ink and related coatings in each respective storage tank; or

2. Analysis using Reference Method 24A 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 solvent-borne ink systems shall use the results of verification analyses by Reference Method 24A to determine compliance when discrepancies with ink manufacturer's 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 facility by:

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 Technical Secretary in accordance with 1200–3–16–.01(5)(b).

(d) The owner or operator of any affected facility shall determine the density of raw inks, related coatings, and VOC solvents by:

1. Making a total of three determinations for each liquid sample at specified temperatures using the procedure outlined in ASTM D 1475-60 (Reapproved 1980). It is available from the American Society of Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103 or by writing to the Tennessee Division of Air Pollution Control, 4th Floor, Customs House, 701 Broadway, Nashville, Tennessee 37219. Be sure and specify which method is desired. The temperature and density is recorded as the arithmetic average of three determinations; or

2. Using literature values, at specified temperatures, acceptable to the Technical Secretary.

(e) If compliance is determined according to subparagraph (4)(e), (f), or (g) of this rule, the existing as well as affected facilities are subject to the requirements of subparagraphs (a) through (d) of this paragraph.

***Authority**: T.C.A. §68–25–105 and 4–5–202.* ***Administrative History**: Original rule filed September 21, 1988; effective November 6, 1988.*

1200–3–16–.40 BEVERAGE CAN SURFACE COATING.

(1) Applicability.

(a) The provisions of this rule 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 rule apply to each affected facility which is identified in subparagraph (a) of this paragraph and commences construction, modification, or reconstruction after November 6, 1988.

(2) Definitions and Symbols.

(a) Definitions.

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 operating" 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 surface 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 (VOC) that are in a coating. VOC content is expressed in terms of kilograms of VOC per litre of coating solids.

(b) Symbols.

Ca = the VOC concentration in each gas stream leaving the control device and entering the atmosphere (parts per million as carbon)

Cb = the VOC concentration in each gas stream entering the control device (parts per million as carbon)

Dc = density of each coating, as received (kilograms per litre)

Dd = density of each VOC-solvent added to coatings (kilogram per litre)

Dr = density of VOC-solvent recovered by an emission control device (kilograms per litre)

E = VOC destruction efficiency of the control device (fraction)

F = the proportion of total VOC emitted by an affected facility which enters the control device to total emissions (fraction)

G = the volume-weighted average of VOC in coatings consumed in a calendar month per volume of coating solids applied (kilograms per litre of coating solids)

(Rules 1200-3-16-.40, continued)

He = the fraction of VOC emitted at the coater and flashoff areas captured by a collection system

Hh = the fraction of VOC emitted at the cure oven captured by a collection system

Lc = the volume of each coating consumed, as received (litres)

Ld = the volume of each VOC-solvent added to coatings (litres)

Lr = the volume of VOC-solvent recovered by an emission control device (litres)

Ls = the volume of coating solids consumed (litres)

Md = the mass of VOC-solvent added to coatings (kilograms)

Mo = the mass of VOC-solvent in coatings consumed, as received (kilograms)

Mr = the mass of VOC-solvent recovered by emission control device (kilograms)

N = the volume-weighted average mass of VOC emissions to atmosphere per unit volume of coating solids applied (kilograms per litre of coating solids)

Qa = the volumetric flow rate of each gas stream leaving the control device and entering the atmosphere (dry standard cubic meters per hour)

Qb = the volumetric flow of each gas stream entering the control device (dry standard cubic meters per hour)

R = the overall emission reduction efficiency for an affected facility (fraction)

Se = the fraction of VOC in coating and diluent VOC-solvent emitted at the coater and flashoff area for a coating operation

Sh = the fraction of VOC in coating and diluent solvent emitted at the cure oven for a coating operation

Vs = the proportion of solids in each coating, as received (fraction by volume)

Wo = 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 1200–3–16–.01(5)(a) is completed, no owner or operator subject to the provisions of this rule shall 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 litre of coating solids from each two-piece can exterior base coating operation, except clear base coat;

(b) 0.46 kilogram of VOC per litre of coating solids from each two-piece can clear base coating operation and from each overvarnish coating operation; and

(c) 0.89 kilogram of VOC per litre of coating solids from each two-piece can inside spray coating operation.

(4) Performance test and compliance provisions.

(a) 1200–3–16–.01(5)(d) does not apply to monthly performance tests and 1200–3–16–.01(5)(f) does not apply to the performance test procedures required by this rule.

(b) The owner or operator of an affected facility shall conduct an initial performance test as required under 1200–3–16–.01(5)(a) 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 paragraph (3) of this rule. The owner or opertor shall determine the VOC-content of the coatings from formulation data supplied by the manufacturer of the coating or by an analysis of each coating, as received, using Reference Method 24 (as specified in rule 1200–3–16–.01(5)(g)24.). The Technical Secretary 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 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 exiting 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 Technical Secretary.

(i) Calculate the volume-weighted averge of the total mass of VOC per volume of coating solids used during the calendar month for each affected facility, except as provided under sub-part (iv) of this part. 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.

(I) Calculate the mass of VOC used (Mo + Md) during the calendar month for the affected facility by the following equation:

$$Mo + Md = \underset{i=l}{\overset{n}{SUM}} Lci\ Dci\ Woi + \underset{j=l}{\overset{m}{SUM}} Ldj\ Ddj \qquad \text{Equation (1)}$$

(Sum Ldj Ddj will be O 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.

(II) Calculate the total volume of coating solids used (Ls) in the calendar month for the affected facility by the following equation:

$$Ls = \underset{i=1}{\overset{n}{SUM}} Lci\ Vsi \qquad \text{Equation (2)}$$

where n is the number of different coatings used during the calendar month.

(III) Calculate the volume-weighed average mass of VOC per volume of solids used (G) during the calendar month for the affected facility by the following equation:

(Rules 1200-3-16-.40, continued)

$$G = \frac{Mo + Md}{Ls} \qquad \text{Equation (3)}$$

(ii) 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:

$$N = G \qquad \text{Equation (4)}$$

(iii) 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 paragraph (3) of this rule, the affected facility is in compliance.

(iv) If each individual coating used by an affected facility has a VOC content equal to or less than the limit specified in paragraph (3) of this rule, 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 control device that destroys VOC (e.g. incinerator) to comply with emissions limit specified in paragraph (3) of this rule.

(i) 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 items (I), (II), and (III) below. In subsequent months, the owner or opertor 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 items (I), (II) and (III) below, shall be repeated when directed by the Technical Secretary or when the owner or operator elects to operate the control device or capture system at conditions different from the initial performance test.

(I) Determine the fraction (F) of total VOC used by the affected facility that enters the control device using the following equation:

$$F = Se\ He = Sh\ Hh \qquad \text{Equation (5)}$$

where He an Hh shall be determined by a method that has been previously approved by the Technical Secretary. The owner or operator may use the values of Se and Sh specified in Table 1 or other values determined by a method that has been previously approved by the Technical Secretary.

(Rules 1200-3-16-.40, continued)

Table 1. – Distribution of VOC Emissions

Coating operation	Emission distribution Coater/ flashoff (Se)	Curing oven (Sh)
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

(II) 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:

$$E = \frac{\sum_{I=1}^{n} Qbi\ Cbi - \sum_{j=1}^{m} Qaj\ Caj}{\sum_{i=1}^{n} Qbi\ Cbi} \qquad \text{Equation (6)}$$

where n is the number of vents before the control device, and m is the number of vents after the control device.

(III) Determine overall reduction efficiency (R) using the following equation:

$$R = EF \qquad \text{Equation (7)}$$

(ii) 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 equations (1), (2) and (3).

(iii) Calculate the volume-weighted average of VOC emissions discharged to the atmosphere (N) during the calendar month by the following equation:

$$N = G\ x\ (1 - R) \qquad \text{Equation (8)}$$

(iv) 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 in paragraph (3) of this rule, 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 in paragraph (3) of this rule.

(i) 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 equations (1), (2) and (3).

(ii) Calculate the total mass of VOC recovered (Mr) during each calendar month using the following equation:

(Rules 1200-3-16-.40, continued)

$$Mr = Lr\ Dr \qquad \text{Equation (9)}$$

(iii) Calculate overall reduction efficiency of the control device (R) for the calendar month for the affected facility using the following equation:

$$R = \frac{Mr}{Mo + Md} \qquad \text{Equation (10)}$$

(iv) Calculate the volume-weighted average mass of VOC discharged to the atmosphere (N) for the calendar month for the affected facility using equation (8).

(v) 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 in paragraph (3) of this rule, 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 paragraph (3) of this rule 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, 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. This device shall have an accuracy the greater of + 0.75 percent of the temperature being measured expressed in degrees Celsius or + 2.50C.

(c) Each temperature measuement 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 rule 1200–3–16–.01(5)(a).

1. Where only coatings which individually have a VOC content equal to or less than the limits specified in paragraph (3) of this rule 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 the coatings used for each affected facility and the VOC content of each coating calculated from data determined using either Reference Method 24 (as specified in 1200–3–16–.01(5)(g)24.) or data supplied by the manufacturer of the coatings.

2. Where one or more coatings which individually have a VOC content greater than the limits specified under paragraph (3) of this rule 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 compliance is achieved through the use of incineration, the owner or operator shall include in the initial performance test required under 1200–3–16–.01(5)(a) 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, capture

efficiency, and the destruction of efficiency of the incinerator used to attain compliance with the applicable emission limit specified under paragraph (3) of this rule. 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 semiannual period ending June 30 and December 31 a written report to the Technical Secretary of exceedances of VOC content and incinerator operating temperatures when compliance with paragraph (3) of this rule is achieved through the use of incineration. All semiannual reports shall be postmarked by the 30th day following the end of each semiannual 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 paragraph (3) of this rule.

2. Where compliance with paragraph (3) of this rule 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 280C below the average temperature of the device during the most recent performance test at which destruction efficiency was determined as specified under paragraph (4) of this rule.

3. Where compliance with paragraph (3) of this rule is achieved through the use of catalytic incineration, 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 280C 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 paragraph (4) of this rule and all 3-hour periods, when cans are being processed, during which the average temperature difference across the catalyst bed is less than 80 percent of the average temperature difference across the catalyst bed during the most recent performance test at which destruction efficiency was determined as specified under paragraph (4) of this rule.

(c) Each owner or operator subject to the provisions of this rule 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 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 1200–3–16–.01(5)(g) except as provided in 1200–3–16–.01(5)(b), shall be used to conduct performance tests.

1. Reference Method 24 (as specified in 1200–3–16–.01(5)(g)24.), an equivalent or alternative method approved by the Technical Secretary, or manufacturers 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 reference 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 operation shall notify the Technical Secretary 30 days in advance of any test using Reference Method 25. The following reference methods are to be used in conjunction with Reference Method 25:

(i) Method 1 for sample and velocity traverses,

(ii) Method 2 for velocity and volumetric flow rate,

(iii) Method 3 for gas analysis, and

(iv) 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 Technical Secretary. The Technical Secretary 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 Technical Secretary that the testing of representative stacks would yield results comparable to those that would be obtained by testing all stacks.

Authority*: T.C.A. §§68–25–105 and 4–5–202.* ***Administrative History****: Original rule filed September 21, 1988; effective November 6, 1988.*

1200–3–16–.41 METALLIC MINERAL PROCESSING PLANTS.

(1) Applicability.

(a) The provisions of this rule 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 rule. At uranium ore processing plants, all facilities subsequent to and including the beneficiation of uranium ore are exempted from the provisions of this rule.

(b) An affected facility under subparagraph (a) of this paragraph that commences construction or modification after November 6, 1988 is subject to the requirements of this rule.

(2) Definitions.

(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 further 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 shall 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 for 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 shall 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.

(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) "Railcar 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 materials 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) of 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 steam.

(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) Standards:

(a) On and after the date on which the performance test required to be conducted by paragraph 1200–3–16–.01(5) is completed, no owner or operator subject to the provisions of this rule shall cause to be discharged into the atmosphere from an affected facility any stack emissions that:

1. Contain particulate matter in excess of 0.05 grams per dry standard cubic meter.

2. Exhibit greater than 7 percent 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 no later than 180 days after initial startup, no owner or operator subject to the provisions of this rule shall cause to be discharged into the atmosphere from an affected facility any process fugitive emissions that exhibit greater than 10 percent opacity.

(4) Reconstruction:

(a) The cost of replacement of ore-contact surfaces on processing equipment shall 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 subparagraph 1200–3–16–.01(9)(b). Ore-contact surfaces are: Crushing surfaces; screen meshes, bars, and plates; conveyor belts; elevator buckets; and pan feeders.

(b) Under subparagraph 1200–3–16–.01(9)(b), the "fixed capital cost of the new components" includes the fixed capital cost of all depreciable components (except components specified in subparagraph (a) of this paragraph) that are or will be replaced pursuant to all continuous programs of component replacement commenced within any 2- year period following November 6, 1988.

(5) Monitoring:

(a) The owner or operator subject to the provisions of this rule 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 scrubbing 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.

(Rules 1200-3-16-.41, continued)

(b) The owner or operator subject to the provisions of this rule 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 percent 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:

(a) The owner or operator subject to the provisions of this rule shall conduct a performance test and submit to the Technical Secretary a written report of the results of the test as specified in subparagraph 1200–3–16–.01(5)(a).

(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 semiannual reports to the Technical Secretary of occurrences when the measurements of the scrubber pressure loss (or gain) and liquid flow differ by more than + 30 percent from those measurements recorded during the most recent performance test.

(d) The reports required under subparagraph (c) of this paragraph 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 subparagraph 1200–3–16–.01(5)(g) except as provided under 1200–3–16.01(5)(b), shall be used to determine compliance with the standards prescribed under paragraph (3) of this rule 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;

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 maximum filter temperature of 1210C (2500F)) 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.

(Rules 1200-3-16-.41, continued)

***Authority**: T.C.A. §§68–25–105 and 4–5–202.* ***Administrative History**: Original rule filed September 21, 1988; effective November 6, 1988.*

1200–3–16–.42 PRESSURE SENSITIVE TAPE AND LABEL SURFACE COATING OPERATIONS.

(1) Applicability.

(a) The affected facility to which the provisions of this rule 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 subparagraph (3)(a) of this rule, however, the affected facility is subject to the requirements of all other applicable paragraphs of this rule. If the amount of VOC input exceeds 45 Mg per 12 month period, the coating line will become subject to subparagraph (3)(a) of this rule and all other paragraphs of this rule.

(c) This rule applies to any affected facility which begins construction, modification, or reconstruction after November 6, 1988.

(2) Definitions and Symbols.

(a) Definitions

1. “Coating applicator” means an apparatus used to apply a surface coating to a continuous web.

2. “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 (as specified in 1200–3–16–.01(5)(g)24.).

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.

(Rules 1200-3-16-.42, continued)

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) Symbols

"a" means the gas stream vents exiting the emission control device.

"b" means the gas stream vents entering the emission control device.

"Caj" means the concentration of VOC (carbon equivalent) in each gas stream (j) exiting the emission control device, in parts per million by volume.

"Cbi" means the concentration of VOC (carbon equivalent) in each gas stream (i) entering the emission control device, in parts per million by volume.

"Cfk" means the concentration of VOC (carbon equivalent) in each gas stream (k) emitted directly to the atmosphere in parts per million by volume.

"G" means the calculated weighted average mass (kg) of VOC per mass (kg) of coating solids applied each calendar month.

"Mci" means the total mass (kg) of each coating (i) applied during the calendar month as determined from facility records.

"Mr" means the total mass (kg) of solvent recovered for a calendar month.

"Qaj" means the volumetric flow rate of each effluent gas stream (j) exiting the emission control device, in dry standard cubic meters per hour.

"Qbi" means the volumetric flow rate of each effluent gas stream (i) entering the emission control device, in dry standard cubic meters per hour.

"Qfk" means the volumetric flow rate of each effluent gas stream (k) emitted to the atmosphere, in dry standard cubic meters per hour.

"R" means the overall VOC emission reduction achieved for a calendar month (in percent).

"Rq" means the required overall VOC emission reduction (in percent).

"Woi" means the weight fraction of organics applied of each coating (i) applied during a calendar month as determined from Reference Method 24 or coating manufacturer's formulation data.

"Wsi" means the weight fraction of solids applied of each coating (i) applied during a calendar month as determined from Reference Method 24 or coating manufacturer's formulation data.

(Rules 1200-3-16-.42, continued)

(3) Standard for volatile organic compounds:

(a) On and after the date on which the performance test required by paragraph 1200–3–16–.01(5) has been completed each owner or operator subject to this rule shall:

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;

(i) a 90 percent overall VOC emission reduction as calculated over a calendar month; or

(ii) the percent overall VOC emission reduction specified in subparagraph (4)(b) of this rule as calculated over a calendar month.

(4) Compliance provisions:

(a) To determine compliance with paragraph (3) of this rule 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 a 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 (as specified in 1200–3–16–.01(5)(g)) or by the coating manufacturer's formulation data.

2. Compute the weighted average by the following equation:

$$G = \frac{\overset{n}{\underset{i-1}{SUM}} Woi\ Mci}{\overset{n}{\underset{i=1}{SUM}} Wsi\ Mci}$$

Where:

n = the number of coatings

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 part (3)(a)1. of this rule.

(b) To determine compliance with part (3)(a)2. of this rule, the owner or operator shall calculate the required overall VOC emission reduction according to the following equation:

$$Rq = \frac{G-0.20}{G} \times 100$$

If Rq is less than or equal to 90 percent, then the required overall VOC emission reduction is Rq. If Rq is greater than 90 percent, then the required overall VOC emission reduction is 90 percent.

(Rules 1200-3-16-.42, continued)

(c) Where compliance with the emission limits specified in part (3)(a)2. of this rule 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:

$$R = \frac{Mr}{\sum_{i=1}^{n} Woi\ Mci} \times 100$$

Where:

n = the number of coatings

If the R value is equal to or greater than the Rq value specified in subparagraph (b) of this paragraph, then compliance with part (3)(a)2. of this rule is demonstrated.

(d) Where compliance with emission limit specified in part (3)(a)2. of this rule 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 subparagraph (b) of this paragraph to the overall VOC emission reduction demonstrated in the most recent performance test which complied with part (3)(a)2.of this rule. 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 part (3)(a)2. of this rule.

(e) Where compliance with part (3)(a)2. of this rule 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 280C (500F) below the average temperature of the device during the most recent performance test complying with part (3)(a)2.of this rule. 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 280C (500F) below the average temperature of the device during the most recent performance test complying with part (3)(a)2. of this rule, and all 3-hour periods (during actual coating operations) during which 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 complying with part (3)(a)2. of this rule.

(f) After the initial performance test required for all affected facilities under paragraph 1200–3–16–.01(5), compliance with the VOC emission limitation and percentage reduction requirements under paragraph (3) of this rule 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 part (3)(a)2. of this rule is determined by the methods

specified in subparagraphs (c) and (d) of this paragraph 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 recovered 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 recovered from both the existing and affected facilities over a calendar month period. The mass of solvent determined in part (h)1. of this paragraph from the existing facility shall be subtracted from the total mass of recovered solvent to obtain the mass of solvent recovered from the affected facility (or facilities). The overall VOC emission reduction of the affected facility (or facilities) can then be determined as specified in subparagraph (c) of this paragraph.

(i) If a common emission control devices 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 subparagraph (5)(c) of this rule. This concentration is used in the calculation for both the existing and affected facilities.

3. The volumetric flow out of the common control device attribute to the affected facility (or facilities) shall be calculated by first determining the ratio of the volumetric flow entering the common control device attributable to the affected facility (facilities) to the total volumetric flow entering the common control device from both existing and affected facilities. The multiplication of this ratio by the total volumetric flow out of the common control device yields the flow attributable to the affected facility (facilities). Compliance is determined by the use of the equation specified in subparagraph (5)(c) of this rule.

(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 part (3)(a)2. of this rule is being attained.

(5) Performance test procedures:

(a) The performance test for affected facilities complying with paragraph (3) of this rule without the use of add-on controls shall be identical to the procedures specified in subparagraph (4)(a) of this rule.

(b) The performance test for affected facilities controlled by a solvent recovery device shall be conducted as follows:

(Rules 1200-3-16-.42, continued)

1. The performance test shall be a one calendar month test and not the average of three runs as specified in subparagraph 1200–3–16–.01(5)(f).

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 parts (4)(a)1. and 2. of this rule.

3. Calculate the required percent overall VOC emission reduction as specified in subparagraph (4)(b) of this rule.

4. Inventory VOC usage and VOC recovery for a one calendar month period.

5. Determine the percent overall VOC emission reduction as specified in subparagraph (4)(c) of this rule.

(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 subparagraph 1200–3–16–.01(5)(f).

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 subparagraph (4)(a) of this rule. In this application the quantities of Woi, Wsi and Mci shall be determined for the time period of each test run and not a calendar month as specified in paragraph (2) of this rule.

3. Calculate the required percent overall VOC emission reduction as specified in subparagraph (4)(b) of this rule.

4. Determine the percent overall VOC emission reduction of the solvent destruction device by the following equation and procedures:

$$R = \frac{\sum_{i=1}^{n} Qbi\ Cbi - \sum_{j=1}^{m} Qaj\ Caj}{\sum_{i=1}^{n} Qbi\ Cbi + \sum_{k=1}^{p} Qfk\ Cfk} \times 100$$

Where:

m = the number of effluent gas streams (j) exiting the emission control device.

n = the number of effluent gas streams (i) entering the emission control device.

p = the number of effluent gas streams (k) that emit to the atmosphere.

(i) 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 subparagraph (7)(b) of this rule.

(Rules 1200-3-16-.42, continued)

(ii) 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 Technical Secretary is satisfied that the enclosure is totally capturing fugitive VOC emissions, then no additional total enclosure will be required for the performance test.

(iii) For each affected facility where the value of R is greater than or equal to the value of Rq, calculated in subparagraph (4)(b) of this rule, compliance with part (3)(a)2. of this rule is demonstrated.

(6) Monitoring of operations and recordkeeping:

(a) The owner or operator of an affected facility subject to this rule shall maintain a calendar month record of all coatings used and the results of the reference test method specified in subparagraph (7)(a) of this rule 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 recovered by the device over a calendar month period. The monitoring device shall be accurate within + 2.0 percent. The owner or operator shall maintain a calendar month record of the amount of solvent recovered by the device.

(d) The owner or operator of an affected facility operating at the conditions specified in subparagraph (1)(b) of this rule 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 + 0.75 percent of the temperature being measured expressed in degrees Celsius or + 2.50C.

(f) The owner or operator of an affected facility controlled by a catalytic incineration 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 shall be 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 paragraphs (4) and (6) of this rule must be retained for at least two years following the date of the measurements.

(7) Test methods and procedures:

(a) The VOC content per unit of coating solids applied and compliance with part (3)(a)1. of this rule shall be determined by either Reference Method 24 and the equations specified in paragraph (4) of this rule 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 Technical Secretary may require an owner or operator to perform Method 24 tests during such months as he 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 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 shall be used to determine the sampling location, volumetric flowrate, 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 Technical Secretary.

(8) Reporting requirements:

(a) For all affected facilities subject to compliance with paragraph (3) of this rule, the performance test data and results from the performance test shall be submitted to the Technical Secretary as specified in subparagraph 1200–3–16–.01(5)(a).

(b) The owner or operator of each affected facility shall submit semiannual reports to the Technical Secretary of exceedances of the following:

1. The VOC emission limits specified in paragraph (3) of this rule; and

2. The incinerator temperature drops as defined under subparagraph (4)(e) of this rule. The reports required under subparagraph (b) shall be postmarked within 30 days following the end of the second and fourth calendar quarters.

Authority*: T.C.A. §§68–35–105 and 4–5–202.* ***Administrative History****: Original rule filed September 21, 1988; effective November 6, 1988.*

1200–3–16–.43 EQUIPMENT LEAKS OF VOC IN THE SYNTHETIC ORGANIC CHEMICALS MANUFACTURING INDUSTRY.

(1) Applicability.

(a) 1. The provisions of this rule apply to affected facilities in the synthetic organic chemicals manufacturing industry.

2. The group of all equipment within a process unit is an affected facility.

(b) Any affected facility under subparagraph (a) of this paragraph that commences construction or modification after November 6, 1988.

(c) Addition or replacement of equipment for the purpose of process improvement which is accomplished without a capital expenditure shall not by itself be considered a modification under this rule.

(Rules 1200-3-16-.43, continued)

(d) 1. If an owner or operator applies for one of the exemptions in this subparagraph, then the owner or operator shall maintain records as required in subparagraph (7)(i) of this rule.

2. Any affected facility that has the design capacity to produce less than 1,000 Mg/yr is exempt from paragraph (3) of this rule.

3. If an affected facility produces heavy liquid chemicals only from heavy liquid feed or raw materials, then it is exempt from paragraph (3) of this rule.

4. Any affected facility that produces beverage alcohol is exempt from paragraph (3) of this rule.

5. Any affected facility that has no equipment in VOC service is exempt from paragraph (3) of this rule.

(2) Definitions.

(a) "Capital expenditure" means, in addition to the definition in 1200–3–16–.01(4)(a)2., 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 *x* A, where

(i) 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 *x* (B 100);

(ii) 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

(iii) The applicable basic annual asset guideline repair allowance, B, is as follows:

(I) 12.5 for the Synthetic Organic Chemical Manufacturing Industry.

(II) 4.5 for Onshore Natural Gas Processing Plants.

(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 block 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 connector in VOC service and any devices or systems required by this rule.

(Rules 1200-3-16-.43, continued)

(h) "Existing facility" means the group of all equipment, within a process unit, in existence on November 6, l988 and any replacements in kind of such equipment from the compliment considered to be the existing facility.

(i) "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.

(j) "In gas/vapor service" means that the piece of equipment contains process fluid that is in the gaseous state at operating conditions.

(k) "In heavy liquid service" means that the piece of equipment is not in gas/vapor service or in light liquid service.

(l) "In light liquid service" means that the piece of equipment contains a liquid that meets the conditions specified in subparagraph (6)(e) of this rule.

(m) "Liquids dripping" means any visible leakage from the seal including spraying, misting, clouding, and ice formation.

(n) "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.

(o) "Pressure release" means the emission of materials resulting from system pressure being greater than set pressure of the pressure relief device.

(p) "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.

(q) "Process unit" means components assembled to produce, as intermediate or final products, one or more of the chemicals specified in paragraph (10) of this rule. A process unit can operate independently if supplied with sufficient feed or raw materials and sufficient storage facilities for the product.

(r) "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.

(s) "Quarter" means a 3-month period; the first quarter concludes on the last day of the last full month during the 180 days following initial startup.

(t) "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.

(u) "Replacement cost" means the capital needed to purchase all the depreciable components in a facility.

(v) "Sensor" means a device that measures a physical quantity or the change in a physical quantity such as temperature, pressure, flow rate, pH, or liquid level.

(Rules 1200-3-16-.43, continued)

(w) "In-situ sampling systems" means nonextractive samplers or in-line samplers.

(x) "Synthetic organic chemicals manufacturing industry" means the industry that produces, as intermediates or final products, one or more of the chemicals specified in paragraph (10) of this rule.

(y) "In vacuum service" means that equipment is operating at an internal pressure which is at least 5 kilopascals (kPa) below ambient pressure.

(z) "In VOC Service" means that the piece of equipment contains or contacts a process fluid that is at least 10 percent VOC by weight. (The provisions of subparagraph (6)(d) of this rule 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 rule shall demonstrate compliance with the requirements of sub-paragraphs (3)(a) to (j) for all equipment within 180 days of initial startup.

2. Compliance with subparagraphs (3)(a) to (j) of this rule will be determined by review of records and reports, review of performance test results, and inspection using the methods and procedures specified in paragraph (6) of this rule.

3. (i) An owner or operator may request a determination of equivalence of a means of emission limitation to the requirements of subparagraphs (3)(b), (c), (e), (f), (g), (h), and (j) of this rule as provided in paragraph (5) of this rule.

(ii) If the Technical Secretary makes a determination that a means of emission limitation is at least equivalent to the requirements of subparagraphs (3)(b), (c), (e), (f), (g), (h), and (j) of this rule, an owner or operator shall comply with the requirements of that determination.

4. Equipment that is in vacuum service is excluded from the requirements of subparagraphs (3)(b) to (j) if it is identified as required in part (7)(e) 5 of this rule.

(b) Pumps in light liquid service

1. (i) Each pump in light liquid service shall be monitored monthly to detect leaks by the methods specified in subparagraph (6)(b) of this rule, except as provided in part (3)(a) 3. of this rule and parts 4., 5., and 6. of this subparagraph.

(ii) 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. (i) If an instrument reading of 10,000 ppm or greater is measured, a leak is detected.

(ii) If there are indications of liquids dripping from the pump seal, a leak is detected.

3. (i) 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 subparagraph (3)(i) of this rule.

(Rules 1200-3-16-.43, continued)

(ii) 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 part 1. of this subparagraph, provided the following requirements are met:

(i) Each dual mechanical seal system is:

(I) Operated with the barrier fluid at a pressure that is at all times greater than the pump stuffing box pressure; or

(II) 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 subparagraph (3)(j) of this rule; or

(III) Equipped with a system that purges the barrier fluid into a process stream with zero VOC emissions to the atmosphere.

(ii) The barrier fluid system is in heavy liquid service or is not in VOC service.

(iii) Each barrier fluid system is equipped with a sensor that will detect failure of the seal system, the barrier fluid system, or both.

(iv) Each pump is checked by visual inspection, each calendar week, for indications of liquids dripping from the pump seals.

(v) (I) Each sensor as described in sub-part 4. (iii) of this subparagraph is checked daily or is equipped with an audible alarm, and

(II) 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.

(vi) (I) 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 item 4.(v)(II) of this subparagraph, a leak is detected.

(II) 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 subparagraph (3)(i) of this rule.

(III) 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 parts (7)(e)l. and 2. of this rule, for no detectable emission, as indicated by an instrument reading of less than 500 ppm above background, is exempt from the requirements of parts 1., 3., and 4. of this subparagraph, if the pump:

(i) Has no externally actuated shaft penetrating the pump housing.

(Rules 1200-3-16-.43, continued)

(ii) 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 subparagraph (6)(c) of this rule, and

(iii) Is tested for compliance with sub-part 5.(ii) of this subparagrah initially upon designation, annually, and at other times requested by the Technical Secretary.

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 subparagraph (3)(j) of this rule, it is exempt from the parts 1. through 5. of this subparagraph.

(c) Compressors

1. Each compressor shall be equipped with a seal system that includes a barrier fluid system and that prevents leakage of VOC to the atmosphere, except as provided in part (3)(a)3. of this rule and parts 8. and 9. of this subparagraph.

2. Each compressor seal system as required in part 1. of this subparagraph shall be:

(i) Operated with the barrier fluid at a pressure that is greater than the compressor stuffing box pressure; or

(ii) Equipped with a barrier fluid system that is connected by a closed vent system to a control device that complies with the requirements of subparagraph (3)(j) of this rule; or

(iii) 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 shall not be in VOC service.

4. Each barrier fluid system as described in part 1. of this subparagraph shall be equipped with a sensor that will detect failure of the seal system, barrier fluid system, or both.

5. (i) Each sensor as required in part 4. of this subparagraph shall be checked daily or shall be equipped with an audible alarm.

(ii) 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 sub-part 5.(ii) of this subparagraph, a leak is detected.

7. (i) 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 subparagraph (3)(i) of this rule.

(ii) 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 parts l. and 2. of this subparagraph, 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 subparagraph (3)(j) of this rule, except as provided in part 9. of this subparagraph.

9. Any compressor that is designated, as described in parts (7)(e)l. and 2. of this rule, for no detectable emissions, as indicated by an instrument reading of less than 500 ppm above background, is exempt from the requirements of parts 1. thru 8. of this subparagraph, if the compressor:

   (i) 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 subparagraph (6)(c) of this rule; and

   (ii) Is tested for compliance with sub-part 9.(i) of this subparagraph initially upon designation, annually, and at other times requested by the Technical Secretary.

10. Any existing reciprocating compressor in a process unit which becomes an affected facility under provisions of subparagraphs 1200–3–l6–.01(9)(a) or (b) is exempt from parts (3)(c)1., 2., 3., 4., 5., and 8. of this rule, 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 parts 1., 2., 3., 4., 5., and 8. of this subparagraph.

(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 subparagraph (6)(c) of this rule.

2. (i) 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, except as provided in subparagraph (3)(i) of this rule.

   (ii) 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 subparagraph (6)(c) of this rule.

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 subparagraph (3)(j) of this rule is exempted from the requirements of parts 1. and 2. of this subparagraph.

(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 part (3)(a)3. of this rule.

2. Each closed purge system or closed vent system as required in part 1. of this subparagraph shall:

   (i) Return the purged process fluid directly to the process line with zero VOC emissions to the atmosphere; or

(Rules 1200-3-16-.43, continued)

(ii) Collect and recycle the purged process fluid with zero VOC emissions to the atmosphere; or

(iii) Be designed and operated to capture and transport all the purged process fluid to a control device that complies with the requirements of subparagraph (3)(j) of this rule.

3. In-situ sampling systems are exempt from parts 1. and 2. of this subparagraph.

(f) Open-ended valves or lines

1. (i) Each open-ended valve or line shall be equipped with a cap, blind flange, plug, or a second valve, except as provided in part (3)(a)3. of this rule.

(ii) 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 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 part 1. of this subparagraph at all other times.

(g) Valves in gas/vapor service and light liquid service.

1. Each valve shall be monitored monthly to detect leaks by the methods specified in subparagraph (6)(b) of this rule and shall comply with parts 2. through 5. of this subparagraph, except as provided in parts 6., 7., and 8. of this subparagraph, subparagraphs (4)(a) and (b) of this rule, and part (3)(a)3. of this rule.

2. If an instrument reading of 10,000 ppm or greater is measured, a leak is detected.

3. (i) 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.

(ii) If a leak is detected, the valve shall be monitored monthly until a leak is not detected for 2 successive months.

4. (i) 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 subparagraph (3)(i) of this rule.

(ii) 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:

(i) Tightening of bonnet bolts;

(ii) Replacement of bonnet bolts;

(iii) Tightening of packing gland nuts;

(iv) Injection of lubricant into lubricated packing.

6. Any valve that is designated, as described in part (7)(e)2. of this rule, for no detectable emissions, as indicated by an instrument reading of less than 500 ppm above background, is exempt from the requirements of part 1. of this rule if the valve:

(i) Has no external actuating mechanism in contact with the process fluid,

(ii) Is operated with emissions less than 500 ppm above background as determined by the method specified in subparagraph (6)(c) of this rule, and

(iii) Is tested for compliance with subpart 6.(ii) of this subparagraph initially upon designation, annually, and at other times requested by the Technical Secretary.

7. Any valve that is designated, as described in part (7)(f)1. of this rule, as an unsafe-to-monitor valve is exempt from the requirements of part 1. of this subparagraph if:

(i) 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 part 1. of this subparagraph, and

(ii) 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 part (7)(f)2. of this rule, as a difficult-to-monitor valve is exempt from the requirements of part 1. of this subparagraph if:

(i) 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.

(ii) The process unit within which the valve is located becomes an affected facility through subparagraphs 1200-3-16-.01(9)(a) or (b), or the owner or operator designates less than 3.0 percent of the total number of valves as difficult-to-monitor and

(iii) 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 subparagraph (6)(b) of this rule 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. (i) 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 subparagraph (3)(i) of this rule.

(Rules 1200-3-16-.43, continued)

(ii) 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 part (3)(g)5 of this rule.

(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:

(i) 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

(ii) When repair procedures are effected, the purged material is collected and destroyed or recovered in a control device complying with subparagraph (3)(j) of this rule.

4. Delay of repair for pumps will be allowed if:

(i) Repair requires the use of a dual mechanical seal system that includes a barrier fluid system, and

(ii) 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 rule shall comply with the provisions of this subparagraph.

2. Vapor recovery systems (for example, condensers and absorbers) shall be designed and operated to recover the VOC emissions vented to them with an efficiency of 95 percent or greater.

3. Enclosed combustion devices shall be designed and operated to reduce the VOC emissions vented to them with an efficiency of 95 percent 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 rule shall comply with the requirements of 1200–3–16–.01(11).

(Rules 1200-3-16-.43, continued)

5. Owners or operators of control devices used to comply with the provisions of this rule shall monitor these control devices to ensure that they are operated and maintained in conformance with their designs.

6. (i) Closed vent systems 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 subparagraph (6)(c) of this rule.

   (ii) Closed vent systems shall be monitored to determine compliance with this subparagraph initially in accordance with paragraph 1200–3–16–.01(5), annually and at other times requested by the Technical Secretary.

7. Closed vent systems and control devices used to comply with provisions of this rule shall be operated at all times when emissions may be vented to them.

8. Each owner or operator subject to the provisions of this subparagraph may apply to the Technical Secretary for determination of equivalence for any means of emission limitation that achieves a reduction in emissions of VOC at least equivalent to the reduction in emission achieved by the methods specified in the other parts of this subparagraph.

(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 percent.

2. The following requirements shall be met if an owner or operator wishes to comply with an allowable percentage of valves leaking:

   (i) An owner or operator must notify the Technical Secretary that the owner or operator has elected to comply with the allowable percentage of valves leaking before implementing this alternative standard, as specified in subparagraph (8)(d) of this rule.

   (ii) A performance test as specified in part 3. of this subparagraph shall be conducted initially upon designation, annually, and at other times requested by the Technical Secretary.

   (iii) If a valve leak is detected, it shall be repaired in accordance with parts (3)(g)4. and 5. of this rule.

3. Performance tests shall be conducted in the following manner:

   (i) All valves in gas/vapor and light liquid service within the affected facility shall be monitored within 1 week by the methods specified in subparagraph (6)(b). of this rule.

   (ii) If an instrument reading of 10,000 ppm or greater is measured, a leak is detected.

   (iii) 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.

(Rules 1200-3-16-.43, continued)

4. Owners and operators who elect to comply with this alternative standard shall maintain an affected facility with a leak percentage not greater than 2.0 percent.

(b) Skip period leak detection and repair:

1. (i) An owner or operator may elect to comply with one of the alternative work practices specified in sub-parts 2.(ii) and (iii) of this subparagraph.

(ii) An owner or operator must notify the Technical Secretary before implementing one of the alternative work practices, as specified in subparagraph (8)(d) of this rule.

2. (i) 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 subparagraph (3)(g) of this rule.

(ii) 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.

(iii) 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.

(iv) If the percent of valves leaking is greater than 2.0, the owner or operator shall comply with the requirements of subparagraph (3)(g) of this rule but can again elect to use this subparagraph.

(v) 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 subparagraph (4)(b) of this rule.

(vi) An owner or operator must keep a record of the percent of valves found leaking during each leak detection period.

(5) Equivalence of means of emission limitation:

(a) Each owner or operator subject to the provisions of this rule may apply to the Technical Secretary for determination of equivalence 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 rule.

(b) Determination of equivalence to the equipment, design, and operational requirements of this rule will be evaluated by the following guidelines:

1. Each owner or operator applying for an equivalence determination shall be responsible for collecting and verifying test data to demonstrate equivalence of means of emission limitation.

2. The Technical Secretary will compare test data for the means of emission limitation to test data for the equipment, design, and operational requirements.

3. The Technical Secretary may condition the approval of equivalence on requirements that may be necessary to assure operation and maintenance to achieve the same emission reduction as the equipment, design, and operational requirements.

(c) Determination of equivalence to the required work practices in this rule will be evaluated by the following guidelines:

1. Each owner or operator applying for a determination of equivalence shall be responsible for collecting and verifying test data to demonstrate equivalence of an equivalent means of emission limitation.

2. For each affected facility for which a determination of equivalence is requested, the emission reduction achieved by the required work practice shall be demonstrated.

3. For each affected facility, for which a determination of equivalence is requested, the emission reduction achieved by the equivalent means of emission limitation shall be demonstrated.

4. Each owner or operator applying for a determination of equivalence shall commit in writing to work practices(s) that provide for emission reductions equal to or greater than the emission reductions achieved by the required work practice.

5. The Technical Secretary will compare the demonstrated emission reduction for the equivalent means of emission limitation to the demonstrated emission reduction for the required work practices and will consider the commitment in part (c)4. of this paragraph.

6. The Technical Secretary may condition the approval of equivalence on requirements that may be necessary to assure operation and maintenance to achieve the same emission reduction as the required work practice.

(d) An owner or operator may offer a unique approach to demonstrate the equivalence of any equivalent means of emission limitation.

(6) Test methods and procedures:

(a) Each owner or operator subject to the provisions of this rule shall comply with the test method and procedure requirements provided in this paragraph.

(b) Monitoring, as required in paragraphs (3), (4), and (5) of this rule, shall comply with the following requirements:

1. Monitoring shall comply with Reference Method 21 (as specified in 1200–3–16–.01(5)(g)21.).

2. The detection instrument shall meet the performance criteria of Reference Method 21.

3. The instrument shall be calibrated before use on each day of its use by the methods specified in Method 21.

4. Calibration gases shall be:

(i) Zero air (less than 10 ppm of hydrocarbon in air); and

(ii) 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.

(Rules 1200-3-16-.43, continued)

(c) When equipment is tested for compliance with no detectable emissions as required in parts (3)(b)5., (c)9., (g)6., and (j)5. and subparagraph (3)(d) of this rule, the test shall comply with the following requirements:

1. The requirements of parts (b)1. thru 4. of this paragraph shall apply.

2. The background level shall be determined, as set forth in Reference Method 21.

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.

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 percent by weight. For purposes of determining the percent VOC content in the process fluid that is contained in or contacts equipment, procedures that conform to the general methods described in ASTM E-260, E-168, E-169 shall be used.

(Note: All references to ASTM in this rule refers to the American Society for Testing Materials. Copies of methods are available for purchase by writing to ASTM, 1916 Race Street, Philadelphia, PA 19103 or by writing to the Tennessee Division of Air Pollution Control, 701 Broadway, 4th Floor, Customs House, Nashville, TN 37219. Be sure and specify which method is desired).

2. If an owner or operator decides to exclude non-reactive organic compounds from the total quantity of organic compounds in determining the percent VOC content of the process fluid, the exclusion will be allowed if:

(i) Those substances excluded are those considered as having negligible photochemical reactivity by the Technical Secretary; and

(ii) The owner or operator demonstrates that the percent organic content, excluding non-reactive organic compounds, can be reasonably expected never to exceed 10 percent by weight.

3. (i) An owner or operator may use engineering judgment rather than the procedures in parts (d)1. and 2. of this paragraph to demonstrate that the percent VOC content does not exceed 10 percent by weight, provided that the engineering judgment demonstrates that the VOC content clearly does not exceed 10 percent by weight. When an owner or operator and the Technical Secretary do not agree on whether a piece of equipment is not in VOC service, however, the procedures in parts (d)1. and 2. of this paragraph shall be used to resolve the disagreement.

(ii) 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 parts (d)l. and 2. of this paragraph.

(e) Equipment is in light liquid service if the following conditions apply:

(Rules 1200-3-16-.43, continued)

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 D-2879.

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 percent by weight and

3. The fluid is a liquid at operating conditions.

(f) Samples used in conjunction with subparagraphs (d), (e), and (g) of this paragraph 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 shall be used to determine the compliance of the flares with the visible emission provisions of this rule.

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:

$$HT = K \sum_{i=1}^{n} Ci\ Hi$$

Where:

HT = Net heating value of the sample, MJ/ scm; where the net enthalpy per mole of offgas is based on combustion at 250C and 760 mm Hg, but the standard temperature for determining the volume corresponding to one mole is 20.

$$K = Constatn,\ 1.740\ x\ 10^{7} \left(\frac{1}{ppm}\right) \left(\frac{gmole}{scm}\right) \left(\frac{MJ}{kcal}\right)$$

where

standard temperature for g mole is 20^{0} C scm

Ci = Concentration of sample component i in ppm, as measured by Reference Method 18 and ASTM D2504-67 (reapproved 1977).

Hi = Net heat of combustion of sample component i, kcal/g mole. The heats of combustion may be determined using ASTM D2382-76 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 flowrate (in units of standard temperature and pressure), as determined by Reference Method 2 or 2A as appropriate; by the unobstructed (free) cross sectional area of the flare tip.

5. The maximum permitted velocity, Vmax for air-assisted flares shall be determined by the following equation:

(Rules 1200-3-16-.43, continued)

Vmax	=	8.706 + 0.7084 (HT)
Vmax	=	Maximum permitted velocity, m/sec.
8.706	=	Constant.
0.7084	=	Constant,
HT	=	The net heating value as determined in part (g)3. of this paragraph.

(7) Record-keeping requirements:

(a) 1. Each owner or operator subject to the provisions of this rule shall comply with the record-keeping requirements of this paragraph.

2. An owner or operator of more than one affected facility subject to the provisions of this rule may comply with the record-keeping requirements for these facilities in one record-keeping system if the system identifies each record by each facility.

(b) When each leak is detected as specified in subparagraphs (3)(b), (c), (g), (h), and (4)(b) of this rule, the following requirements apply:

1. A weatherproof and readily visible identification, marked with the equipment identification number, shall be attached to the leaking equipment.

2. The identification on a valve may be removed after it has been monitored for 2 successive months as specified in part (3)(g)3. of this rule and no leak has been detected during those 2 months.

3. The identification on equipment, except on a valve, may be removed after it has been repaired.

(c) When each leak is detected as specified in subparagraphs (3)(b), (c), (g), (h), and (4)(b) of this rule, 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 of 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 subparagraph (6)(a) of this rule 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 effected without a process shutdown.

7. The expected date of successful repair of the leak if a leak is not repaired within 15 days.

(Rules 1200-3-16-.43, continued)

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 subparagraph (3)(j) of this rule 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 part (3)(j)5. of this rule, 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 subparagraphs (3)(b), (c), (d), and (e) of this rule 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 subparagraphs (3)(b), (c), (d), and (e) of this rule.

(e) The following information pertaining to all equipment subject to the requirements in subparagraphs (3)(a) thru (j) of this rule 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 rule.

2. (i) A list of identification numbers for equipment that are designated for no detectable emissions under the provisions of parts (3)(b)5., (c)9. and (g)6. of this rule.

   (ii) The designation of equipment as subject to the requirements of parts (3)(b)5., (c)9., and (g)6. of this rule shall be signed by the owner or operator.

3. A list of equipment identification numbers for pressure relief devices required to comply with subparagraph (3)(d) of this rule.

4. (i) The dates of each compliance test as required in parts (3)(b)5. and (c)9., subparagraph (3)(d), and part (3)(g).6 of this rule.

   (ii) The background level measured during each compliance test.

   (iii) 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 parts (3)(g)7. and 8. of this rule 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 subparagraph (4)(b) of this rule:

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-parts (3)(b)4.(v) and (3)(c)5.(ii) of this rule 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 subparagraph (1)(d) of this rule:

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 in 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 subparagraphs 1200–3–16–.01(7)(b) and (d) do not apply to affected facilities subject to this rule.

(l) The Technical Secretary may specify alternate record-keeping requirements if the provisions of paragraph (5) of this rule are availed of.

(8) Reporting requirements:

(a) Each owner or operator subject to the provisions of this rule shall submit semiannual reports to the Technical Secretary beginning six months after the initial start up date.

(b) The initial semiannual report to the Technical Secretary shall include the following information:

1. Process unit identification.

2. Number of valves subject to the requirements of subparagraph (3)(g) of this rule, excluding those valves designated for no detectable emissions under the provisions of part (3)(g)6. of this rule.

3. Number of pumps subject to the requirements of subparagraph (3)(b) of this rule, excluding those pumps designated for no detectable emissions under the provisions of part (3)(b)5. of this rule and those pumps complying with part (3)(b)6. of this rule.

4. Number of compressors subject to the requirements of subparagraph (3)(c) of this rule, excluding those compressors designated for no detectable emissions under the provisions of part (3)(c)9. of this rule and those compressors complying with part (3)(c)8. of this rule.

(c) All semiannual reports to the Technical Secretary shall include the following information, summarized from the information in paragraph (7) of this rule:

1. Process unit identification.

2. For each month during the semiannual reporting period,

(i) Number of valves for which leaks were detected as described in part (3)(g)2. or subparagraph (4)(b) of this rule,

(ii) Number of valves for which leaks were not repaired as required in sub-part (3)(g)4.(i) of this rule,

(iii) Number of pumps for which leaks were detected as described in part (3)(b)2. and item (3)(b)4.(vi)(I) of this rule,

(iv) Number of pumps for which leaks were not repaired as required in sub-part (3)(b)3.(i) and item (3)(b)4.(vi)(II) of this rule,

(v) Number of compressors for which leaks were detected as described in part (3)(c)6. of this rule,

(vi) Number of compressors for which leaks were not repaired as required in sub-part (3)(c)7.(i) of this rule, and

(vii) 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 semiannual reporting period.

4. Revisions to items reported according to subparagraph (b) of this paragaraph 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 subparagraphs (4)(a) and (b) of this rule shall notify the Technical Secretary 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 paragraph1200–3–16–.01(5)(g). The provisions of subparagraph 1200–3–16–.01(5)(d) do not apply to affected facilities subject to the provisions of this rule except that an owner or operator must notify the Technical Secretary of the schedule for the initial performance tests at least 30 days before the initial performance tests.

(f) The Technical Secretary may specify alternate reporting requirements if the provisions of paragraph (5) of this rule are availed of.

(9) Reconstruction

(a) The cost of the following frequently replaced components of the facility shall 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 subparagraph 1200–3–16–.01(9)(b): pump seals, nuts and bolts, rupture disks, and packings.

(b) Under subparagraph 1200–3–16–.01(9)(b), the ''fixed capital cost of new components'' includes the fixed capital cost of all depreciable components (except components specified in subparagraph (a) of this paragraph) which are or will be replaced pursuant to all continuous programs of component replacement which are commenced within any 2-year period following November 6, l988. For purposes of this subparagraph, ''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.

(10) List of chemicals produced by affected facilities:

(a) The chemicals listed in Federal Register, Vol. 48, No. 202, pages 48342-48344, are produced, as intermediates or final products, by process units covered under this rule. The applicability date for process units producing one or more of these chemicals is November 6, l988.

Authority*: T.C.A. §§68–25–105 and 4–5–202.* ***Administrative History****: Original rule filed September 21, 1988; effective November 6, 1988.*

1200–3–16–.44 BULK GASOLINE TERMINALS.

(1) Applicability.

(a) The affected facility to which the provisions of this rule 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 subparagraph (a) of this paragraph, the construction, reconstruction, or modification of which is commenced after November 6, 1988 is subject to the provisions of this rule.

(2) Definitions.

(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 Technical Secretary 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 vapor 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 November 6, 1988 and which was not constructed or refurbished after that date.

(d) ''Gasoline'' means any petroleum distillate or petroleum distillate/alcohol blend having a Reid vapor pressure of 27.6 kilopascals or greater which is used as a fuel for internal combustion engines.

(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 percent of the cost of a comparable entirely new system.

(i) ‘‘Total organic compounds’’ means those compounds measured according to the procedures in paragraph (4) of this rule.

(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 27 (as specified in 1200–3–16–.01(5)(g)27.).

(3) Standard for Volatile Organic Compound (VOC) emissions.

On and after the date on which 1200–3–16–.01(5) requires a performance test to be completed, the owner or operator of each bulk gasoline terminal containing an affected facility shall comply with the requirements of this paragraph.

(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 subparagraph (c) of this paragraph.

(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:

(Rules 1200-3-16-.44, continued)

1. The owner or operator shall obtain the vapor tightness documentation described in subparagraph (5)(b) of this rule 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 part (2) of this subparagraph 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 terminal 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 parts 1 through 5 of this subparagraph for limiting gasoline tank truck loadings may be used upon application to, and approval by, the Technical Secretary.

(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 subparagraph (4)(b) of this rule.

(i) No pressure-vacuum vent in the bulk gasoline terminal's vapor collection system shall 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 subparagraph, 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) 1200–3–16–.01(5)(f) does not apply to the performance test procedures required by this rule.

(b) For the purpose of determining compliance with subparagraph (3)(h) of this rule, the following procedures shall be used:

(Rules 1200-3-16-.44, continued)

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 +2.5 mm of water precision.

2. Connect the pressure measurement device to a pressure tap in the terminal's vapor collection system, 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 subparagraphs (3)(b) and (c) of this rule, the following reference methods shall be used:

1. For the determination of volume at the exhaust vent:

(i) Method 2B (as specified in 1200–3–16–.01(5)(g)) for combustion vapor processing systems.

(ii) Method 2A for all other vapor processing systems.

2. For the determination of total organic compounds concentration at the exhaust vent, Method 25A or 25B. The calibration gas shall be either propane or butane.

(d) Immediately prior to a performance test required for determination of compliance with subparagraph (3)(b), (c) and (h) of this rule, 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 subparagraphs (3)(b) and (c) of this rule 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 criterion is met, or resumed the next day with another complete 6 hours of testing. As much as possible, testing should be conducted during the 6-hour period in which the highest throughput normally occurs.

3. For intermittent vapor processing systems:

(i) 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.

(ii) 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.

(Rules 1200-3-16-.44, continued)

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:

   (i) The reading from each measurement instrument shall be recorded, and

   (ii) 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:

   Mei = 10-6KVesCe

   where:

   Mei = mass of total organic compounds emitted during testing interval i, mg.

   Ves = volume of air-vapor mixture exhausted, m3, at standard conditions.

   Ce = total organic compounds concentration (as measured) at the exhaust vent, ppmv.

   K = density of calibration gas, mg/m3, at standard conditions = 1.83 *x* 106, for propane; = 2.41 *x* 106 for butane.

   s = standard conditions, 200C and 760 mm Hg.

7. The total organic compounds mass emissions shall be calculated as follows:

$$E = \frac{\sum_{i=1}^{n} Mei}{L}$$

   where:

   E = mass of total organic compounds emitted per volume of gasoline loaded, mg/liter.

   Mei = 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 Technical Secretary.

(Rules 1200-3-16-.44, continued)

(5) Reporting and Recordkeeping.

(a) The tank truck vapor tightness documentation required under part (3)(e)1. of this rule shall be kept on file at the terminal in a permanent form available for inspection.

(b) The documentation file for each gasoline tank truck shall be updated at least once per year to reflect current test results as determined by Method 27. 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 subparagraph (3)(j) of this rule 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 part (3)(e)4. of this rule on file at the terminal for at least 2 years.

(e) (Reserved)

(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.

(6) Reconstruction

For purposes of this rule:

(a) The cost of the following frequently replaced components of the affected facility shall 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:’’ pump

seals, loading arm gaskets and swivels, coupler gaskets, overfill sensor couplers and cables, flexible vapor hoses, and grounding cables and connectors.

(b) The ‘‘fixed capital cost of the new components’’ includes the fixed capital of all depreciable components (except components specified in subparagraph (a) of this paragraph) which are or will be replaced pursuant to all continuous programs of component replacement which are commenced within any 2-year period following November 6, l988. For purposes of this subparagraph, ‘‘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.

Authority*: T.C.A. §§68–25–105 and 4–5–202.* ***Administrative History****: Original rule filed September 21, 1988; effective November 6, 1988.*

1200–3–16–.45 SYNTHETIC FIBER PRODUCTION FACILITIES.

(1) Applicability.

(a) Except as provided in subparagraph (b) this paragraph, the affected facility to which the provisions of the rule apply is each solvent-spun synthetic fiber process that produces more than 500 megagrams of fiber per year.

(b) The provisions of this rule 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 rule apply to each facility as identified in subparagraph (a) of this paragraph and that commences construction or reconstruction after November 6, 1988. The provisions of this rule do not apply to facilities that commence modification but not reconstruction after November 6, 1988.

(2) Definitions.

(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 percent 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 that 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 of 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 that causes physical or chemical changes to occur in the extruded solution to result in a semihardened polymer 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 15 percent of the hydrogens of the hydroxyl groups.

(Rules 1200-3-16-.45, continued)

(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 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 absorbers, 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 that 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 percent 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- occuring 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. After ripening, the solution is spun into an acid coagulating bath. This precipitates the cellulose in the form of a regenerate 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 paragraph 1200–3–16–.01(5) is completed, no owner or operator subject to the provisions of this rule shall 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 shall not exceed 10 kg VOC per Mg solvent feed. VOC emissions from affected facilities that produce only nonacrylic fiber types shall 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 paragraph (4) of this rule.

(4) Performance test and compliance provisions.

(a) Subparagraph 1200–3–16–.01(5)(f) does not apply to the performance test procedures required by this rule.

(b) Each owner or operator of an affected facility shall determine compliance with the applicable standard in subparagraph (3)(a) of this rule 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 part (4)(b)2. of this rule. All monitoring devices, meters, and peripheral equipment shall be calibrated and any error recorded. Total compounded error of the flow measuring and recording devices shall not exceed 1 percent accuracy over the operating range. As an alternative to measuring solvent feed, the owner or operator may:

(i) 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.

(ii) 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:

$$E = \frac{M_W}{S_W} N - I \text{ and } M_W = M_V S_P D$$

$$SW = \frac{S_V S_P D}{1000} \quad \text{and } I = \frac{I_E - I_S}{S_W}$$

where all values are for the calendar month only and where

E = Emissions in kg per Mg solvent feed;

Sv = 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/Mg);

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.

(i) N, as used in the equation in this part, equals 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 Technical Secretary that greater nongaseous losses occur at the affected facility. In this case, the greater value may be substituted in the equation.

(5) Reporting requirements.

(a) The owner or operator of an affected facility shall submit a written report to the Technical Secretary 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 paragraph (3) of this rule. 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 subparagraph (1)(a) of this rule (those producing less that 500 megagrams annually) shall report to the Technical Secretary within 30 days whenever extruded fiber for the preceding 12 calendar months exceeds 500 megagrams.

Authority*: T.C.A. §§68–25–105 and 4–5–202.* ***Administrative History****: Original rule filed September 21, 1988; effective November 6, 1988.*

1200–3–16–.46 LEAD ACID BATTERY MANUFACTURING PLANTS.

(1) Applicability.

(a) The provisions of this rule are applicable to the affected facilities listed in subparagraph (b) of this paragraph 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 rule 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 subparagraph (b) of this paragraph the construction or modification of which is commenced after November 6, 1988, is subject to the requirements of this rule.

(2) Definitions.

(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 rule 1200–3–16–.12.

(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, or three-process operation facility, or a furnace affected under rule 1200–3–16–.12.

(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.

(Rules 1200-3-16-.46, continued)

(3) Standards for Lead:

(a) On and after the date on which the performance test required to be conducted by paragraph 1200–3–16–.01(5) is completed, no owner or operator subject to the provisions of this rule shall 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 three-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 of lead 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 0 percent opacity (measured according to Method 9 (as specified in 1200–3–16–.01(5)(g)), and rounded to the nearest whole percentage).

8. From any lead reclamation facility any gases with greater than 5 percent opacity (measured according to Method 9 and rounded to the nearest whole percentage).

(b) When two 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:

$$Se = \sum_{a=1}^{N} Sa\,(Qsda/QsdT)$$

Where:

Se = is the equivalent standard for the total exhaust stream.

Sa = 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.

Qsda = is the dry standard volumetric flow rate of the effluent gas stream from each facility ducted to the control device.

QsdT = 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 rule and controlled by a scrubbing system(s) shall install, calibrate, maintain, and operate a monitoring device(s) that measures and records the pressure drop across the scrubbing system(s) at least once every 15 minutes. The monitoring device shall have an accuracy of + 5 percent over its operating range.

(5) Test methods and procedures:

(a) Reference methods in subparagraph 1200–3–16–.01(5)(g), except as provided under subparagraph 1200–3–16–.01(5)(b), shall be used to determine compliance according to paragraph 1200–3–16–.01(5) 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, the sampling time for each run shall be at least 60 minutes and the sampling rate shall be at least 0.85 dscm/h (0.53 dscf/min.), except that shorter sampling times, when necessitated by process variables or other factors, may be approved by the Technical Secretary.

(c) When different operations in a three-process operation facility are ducted to separate control devices, the lead emission concentration from the facility shall be determined using the equation:

$$CpbT = \sum_{a=1}^{N} (Cpba\ Qsda/QsdT)$$

Where:

CpbT = 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.

Cpba = is the emission concentration from each control device.

Qsda = is the dry standard volumetric flow rate of the effluent gas stream from each control device.

QsdT = 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:

$$Epb = Cpb\ Qsd / F$$

Where:

Epb = is the lead emission rate from the facility in milligrams per kilogram of lead charged.

Cpb = is the concentration of lead in the exhaust stream in milligrams per dry standard cubic meter as determined according to part (a)1. of this paragraph.

Qsd = is the dry standard volumetric flow rate in dry standard cubic meters per hour as determined according to part (a)3. of this paragraph.

F = is the lead feed rate to the facility in kilograms per hour as determined according to subparagraph (d) of this paragraph.

***Authority**: T.C.A. 68–25–105 and 4–5–202.* ***Administrative History**: Original rule filed September 21, 1988; effective November 6, 1988.*

1200–3–16–.47 EQUIPMENT LEAKS OF VOC IN PETROLEUM REFINERIES.

(l) Applicability.

(a) l. The provisions of this rule apply to affected facilities in petroleum refineries.

2. The group of all equipment within a process unit is an affected facility.

3. A compressor is an affected facility.

(b) Any affected facility under subparagraph (a) of this paragraph that commences construction or modification after November 6, 1988, shall be subject to the requirements of this rule.

(c) Addition or replacement of equipment for the purpose of process improvement which is accomplished without a capital expenditure shall not by itself be considered a modification under this rule.

(d) Facilities subject to rule 1200–3–16–.43 are not subject to this rule.

(2) Definitions:

(a) ‘‘Capital expenditure’’ means, in addition to the definition in part 1200–3–16–.01(4)(a)2., 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 *x* A, where

(Rules 1200-3-16-.47, continued)

(i) 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 *x* (B 100);

(ii) 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

(iii) The applicable basic annual asset guideline repair allowance, B, is 7.0.

(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 block valves connected in series with a bleed valve or line that can vent the line between the two block valves.

(g) ‘‘Equipment’’ means each valve, pump, pressure relief device, sampling connection system, open-ended valve or line, valve, and flange or other connector in VOC service. For the purpose of record-keeping and reporting only, compressors are considered equipment.

(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 Hydrogen Service’’ means that a compressor contains a process fluid that meets the conditions specified in subparagraph (9)(b) of this rule.

(l) ‘‘In Light Liquid Service’’ means that the piece of equipment contains a liquid that meets the conditions specified in subparagraph (9)(d) of this rule.

(m) ‘‘Liquids dripping’’ means any visible leakage from the seal including spraying, misting, clouding, and ice formation.

(n) ‘‘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.

(o) ‘‘Petroleum’’ means the crude oil removed from the earth and the oils derived from tar sands, shale, and coal.

(Rules 1200-3-16-.47, continued)

(p) ‘‘Petroleum Refinery’’ means any 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.

(q) ‘‘Pressure release’’ means the emission of materials resulting from system pressure being greater than set pressure of the pressure relief device.

(r) ‘‘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.

(s) ‘‘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.

(t) ‘‘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.

(u) ‘‘Quarter’’ means a 3-month period; the first quarter concludes on the last day of the last full month during the l80 days following initial startup.

(v) ‘‘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 l0,000 ppm or greater, indication of liquids dripping, or indication by a sensor that a seal or barrier fluid system has failed.

(w) ‘‘Replacement cost’’ means the capital needed to purchase all the depreciable components in a facility.

(x) ‘‘Sensor’’ means a device that measures a physical quantity or the change in a physical quantity such as temperature, pressure, flow rate, pH, or liquid level.

(y) ‘‘In-situ sampling systems’’ means nonextractive samplers or in-line samplers.

(z) ‘‘In vacuum service’’ means that equipment is operating at an internal pressure which is at least 5 kilopascals (kPa) below ambient pressure.

(aa) ‘‘In VOC Service’’ means that the piece of equipment contains or contacts a process fluid that is at least l0 percent VOC by weight. (The provisions of subparagraph (6)(d) of this rule 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 rule shall comply with the requirements of subparagraphs (3)(a) to (j) as soon as practicable, but no later than 180 days after initial startup.

2. An owner or operator may elect to comply with the requirements of subparagrphs (4)(a) and (b) of this rule.

3. An owner or operator may apply to the Technical Secretary 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 rule. In doing so, the owner or operator shall comply with requirements of paragraph (5) of this rule.

4. Each owner or operator subject to the provisions of this rule shall comply with the provisions of paragraph (6) of this rule except as provided in paragraph (9) of this rule.

5. Each owner or operator subject to the provisions of this rule shall comply with the provisions of paragraphs (7) and (8) of this rule.

6. Compliance with subparagraphs (3)(a) to (j) of this rule will be determined by review of records and reports, review of performance test results, and inspection using the methods and procedures specified in paragraph (6) of this rule.

7. Equipment that is in vacuum service is excluded from the requirements of subparagraphs (3)(b) to (j) of this rule if it is identified as required in part (7)(e)5 of this rule.

(b) Pumps in light liquid service

l. (i) Each pump in light liquid service shall be monitored monthly to detect leaks by the methods specified in subparagraph (6)(b) of this rule, except as provided in part (3)(a)3. of this rule and parts 4., 5., and 6. of this subparagraph.

(ii) 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. (i) If an instrument reading of l0,000 ppm or greater is measured, a leak is detected.

(ii) If there are indications of liquids dripping from the pump seal, a leak is detected.

3. (i) When a leak is detected, it shall be repaired as soon as practicable, but not later than l5 calendar days after it is detected except as provided in subparagraph (3)(i) of this rule.

(ii) 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 part l. of this rule, provided the following requirements are met:

(i) Each dual mechanical seal system is:

(I) Operated with the barrier fluid at a pressure that is at all times greater than the pump stuffing box pressure; or

(II) 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 subparagraph (3)(j) of this rule; or

(III) Equipped with a system that purges the barrier fluid into a process stream with zero VOC emissions to the atmosphere.

(Rules 1200-3-16-.47, continued)

(ii) The barrier fluid system is in heavy liquid service or is not in VOC service.

(iii) Each barrier fluid system is equipped with a sensor that will detect failure of the seal system, the barrier fluid system, or both.

(iv) Each pump is checked by visual inspection, each calendar week, for indications of liquids dripping from the pump seals.

(v) (I) Each sensor as described in sub-part 4.(iii) of this subparagraph is checked daily or is equipped with an audible alarm, and

(II) 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.

(vi) (I) 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 item 4. (v)(II) of this subparagraph, a leak is detected.

(II) When a leak is detected, it shall be repaired as soon as practicable, but not later than l5 calendar days after it is detected, except as provided in subparagraph (3)(i) of this rule.

(III) 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 parts (7)(e)l. and 2. of this rule, for no detectable emission, as indicated by an instrument reading of less than 500 ppm above background, is exempt from the requirements of parts l., 3., and 4. of this subparagraph, if the pump:

(i) Has no externally actuated shaft penetrating the pump housing.

(ii) 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 subparagraph (6)(c) of this rule, and

(iii) Is tested for compliance with sub-part 5.(ii) of this subparagraph initially upon designation, annually, and at other times requested by the Technical Secretary.

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 subparagraph (3)(j) of this rule, it is exempt from the parts l. through 5. of this subparagraph.

(c) Compressors

l. Each compressor shall be equipped with a seal system that includes a barrier fluid system and that prevents leakage of VOC to the atmosphere, except as provided in parts (3)(a)3. of this rule and parts 8. and 9. of this subparagraph.

2. Each compressor seal system as required in part l. of this subparagraph shall be:

(Rules 1200-3-16-.47, continued)

(i) Operated with the barrier fluid at a pressure that is greater than the compressor stuffing box pressure; or

(ii) Equipped with a barrier fluid system that is connected by a closed vent system to a control device that complies with the requirements of subparagraph (3)(j) of this rule; or

(iii) 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 shall not be in VOC service.

4. Each barrier fluid system as described in part l. of this subparagraph shall be equipped with a sensor that will detect failure of the seal system, barrier fluid system, or both.

5. (i) Each sensor as required in part 4. of this subparagraph shall be checked daily or shall be equipped with an audible alarm.

(ii) 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 sub-part 5.(ii) of this subparagraph, a leak is detected.

7. (i) When a leak is detected, it shall be repaired as soon as practicable, but not later than l5 calendar days after it is detected, except as provided in subparagraph (3)(i) of this rule.

(ii) 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 parts l. and 2. of this subparagraph, 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 subparagraph (3)(j) of this rule, except as provided in part 9. of this subparagraph.

9. Any compressor that is designated, as described in parts (7) (e)l. and 2. of this rule, for no detectable emissions, as indicated by an instrument reading of less than 500 ppm above background, is exempt from the requirements of parts l through 8 of this subparagraph, if the compressor:

(i) 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 subparagraph (6)(c) of this rule; and

(ii) Is tested for compliance with sub-part 9.(i) of this subparagraph initially upon designation, annually, and at other times requested by the Technical Secretary.

10. Any existing reciprocating compressor in a process unit which becomes an affected facility under provisions of subparagraphs 1200–3–l6–.0l(9)(a) or (b) is exempt from parts (3)(c)l., 2., 3., 4., 5., and 8. of this rule, 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 parts l., 2., 3., 4., 5., and 8. of this subparagraph.

(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 subparagraph (6)(c) of this rule.

2. (i) 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, except as provided in subparagraph (3)(i) of this rule.

   (ii) 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 subparagraph (6)(c) of this rule.

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 subparagraph (3)(j) of this rule is exempted from the requirements of parts l. and 2. of this subparagraph.

(e) Sampling connection systems

l. Each sampling connection system shall be equipped with a closed purge system or closed vent system, except as provided in part (3)(a)3. of this rule.

2. Each closed purge system or closed vent system as required in part l. of this subparagraph shall:

   (i) Return the purged process fluid directly to the process line with zero VOC emissions to the atmosphere; or

   (ii) Collect and recycle the purged process fluid with zero VOC emissions to the atmosphere; or

   (iii) Be designed and operated to capture and transport all the purged process fluid to a control device that complies with the requirements of subparagraph (3)(j) of this rule.

3. In-situ sampling systems are exempt from parts l. and 2. of this subparagraph.

(f) Open-ended valves or lines

l. (i) Each open-ended valve or line shall be equipped with a cap, blind flange, plug, or a second valve, except as provided in part (3)(a)3. of this rule.

   (ii) 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 in a manner such that the valve on the process fluid end is closed before the second valve is closed.

(Rules 1200-3-16-.47, continued)

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 part 1. of this subparagraph at all other times.

(g) Valves in gas/vapor service and light liquid service.

l. Each valve shall be monitored monthly to detect leaks by the methods specified in subparagraph (6)(b) of this rule and shall comply with parts 2. through 5. of this subparagraph, except as provided in parts 6., 7., and 8. of this subparagraph, subparagraphs (4)(a), (b) of this rule, and part (3)(a)3. of this rule.

2. If an instrument reading of l0,000 ppm or greater is measured, a leak is detected.

3. (i) Any valve for which a leak is not detected for 2 successive months may begin monitoring the first month of every quarter, beginning with the next quarter, until a leak is detected.

(ii) If a leak is detected, the valve shall be monitored monthly until a leak is not detected for 2 successive months.

4. (i) When a leak is detected, it shall be repaired as soon as practicable, but no later than l5 calendar days after the leak is detected, except as provided in subparagraph (3)(i) of this rule.

(ii) 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:

(i) Tightening of bonnet bolts;

(ii) Replacement of bonnet bolts;

(iii) Tightening of packing gland nuts;

(iv) Injection of lubricant into lubricated packing.

6. Any valve that is designated, as described in part (7)(e)2. of this rule, for no detectable emissions, as indicated by an instrument reading of less than 500 ppm above background, is exempt from the requirements of part l. of this subparagraph if the valve:

(i) Has no external actuating mechanism in contact with the process fluid,

(ii) Is operated with emissions less than 500 ppm above background as determined by the method specified in subparagraph (6)(c) of this rule, and

(iii) Is tested for compliance with subpart 6.(ii) of this subparagraph initially upon designation, annually, and at other times requested by the Technical Secretary.

7. Any valve that is designated, as described in part (7)(f)l. of this rule, as an unsafe-to-monitor valve is exempt from the requirements of part l. of this subparagraph if:

(Rules 1200-3-16-.47, continued)

(i) 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 part l. of this subparagraph, and

(ii) 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 part (7)(f)2. of this rule, as a difficult-to-monitor valve is exempt from the requirements of part l. of this subparagraph if:

(i) 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.

(ii) The process unit within which the valve is located becomes an affected facility through subparagraphs 1200–3–l6–.0l(9)(a) or (b), or the owner or operator designates less than 3.0 percent of the total number of valves as difficult-to-monitor and

(iii) 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.

l. 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 subparagraph (6)(b) of this rule 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. (i) 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 subparagraph (3)(i) of this rule.

(ii) 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 part (3)(g)5. of this rule.

(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:

(Rules 1200-3-16-.47, continued)

(i) 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

(ii) When repair procedures are affected, the purged material is collected and destroyed or recovered in a control device complying with subparagraph (3)(j) of this rule.

4. Delay of repair for pumps will be allowed if:

(i) Repair requires the use of a dual mechanical seal system that includes a barrier fluid system, and

(ii) 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.

l. Owners or operators of closed vent systems and control devices used to comply with provisions of this rule shall comply with the provisions of this subparagraph.

2. Vapor recovery systems (for example, condensers and adsorbers) shall be designed and operated to recover the VOC emissions vented to them with an efficiency of 95 percent or greater.

3. Enclosed combustion devices shall be designed and operated to reduce the VOC emissions vented to them with an efficiency of 95 percent or greater, or to provide a minimum residence time of 0.75 seconds at a minimum temperature of 8l60C.

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

(ii) Flares shall be operated with a flame present at all times, as determined by the methods specified in subparagraph (6)(g) of this rule.

(iii) Flares shall be used only with the net heating value of the gas being combusted being ll.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 or greater if the flare is nonassisted. The net heating value of the gas being combusted shall be determined by the methods specified in subparagraph (6)(g) of this rule.

(iv) Steam-assisted and nonassisted flares shall be designed for and operated with an exit velocity, as determined by the methods specified in part (6)(g)4. of this rule, less than l8m/sec (60 ft/sec).

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

(Rules 1200-3-16-.47, continued)

(vi) Air-assisted flares shall be designed and operated with an exit velocity less than the velocity, Vmax as determined by the methods specified in part (6)(g)5. of this rule.

5. Owners or operators of control devices used to comply with the provisions of this rule shall monitor these control devices to ensure that they are operated and maintained in conformance with their designs.

6. (i) Closed vent systems 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 subparagraph (6)(c) of this rule.

(ii) Closed vent systems shall be monitored to determine compliance with this subparagraph initially in accordance with paragraph 1200–3–l6–.0l(5), annually and at other times requested by the Technical Secretary.

7. Closed vent systems and control devices used to comply with provisions of this rule shall be operated at all times when emissions may be vented to them.

(4) Alternative standards for valves:

(a) Allowable percentage of valves leaking

l. An owner or operator may elect to comply with an allowable percentage of valves leaking of equal to or less than 2.0 percent.

2. The following requirements shall be met if an owner or operator wishes to comply with an allowable percentage of valves leaking:

(i) An owner or operator must notify the Technical Secretary that the owner or operator has elected to comply with the allowable percentage of valves leaking before implementing this alternative standard, as specified in subparagraph (8)(d) of this rule.

(ii) A performance test as specified in part 3. of this subparagraph shall be conducted initially upon designation, annually, and at other times requested by the Technical Secretary.

(iii) If a valve leak is detected, it shall be repaired in accordance with parts (3)(g)4. and 5. of this rule.

3. Performance tests shall be conducted in the following manner:

(i) All valves in gas/vapor and light liquid service within the affected facility shall be monitored within l week by the methods specified in subparagraph (6)(b) of this rule.

(ii) If an instrument reading of l0,000 ppm or greater is measured, a leak is detected.

(iii) 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 shall not have an affected facility with a leak percentage greater than 2.0 percent.

(Rules 1200-3-16-.47, continued)

(b) Skip period leak detection and repair:

l. (i) An owner or operator may elect to comply with one of the alternative work practices specified in sub-parts 2.(ii) and (iii) of this subparagraph.

(ii) An owner or operator must notify the Technical Secretary before implementing one of the alternative work practices, as specified in subparagraph (8)(d) of this rule.

2. (i) 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 subparagraph (3)(g) of this rule.

(ii) 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 l of the quarterly leak detection periods for the valves in gas/vapor and light liquid service.

(iii) 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.

(iv) If the percent of valves leaking is greater than 2.0, the owner or operator shall comply with the requirements of subparagraph (3)(g) of this rule but can again elect to use this subparagraph.

(v) 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 subparagraph (4)(b) of this rule.

(vi) An owner or operator must keep a record of the percent of valves found leaking during each leak detection period.

(5) Equivalence of means of emission limitation:

(a) Each owner or operator subject to the provisions of this rule may apply to the Technical Secretary for determination of equivalance 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 rule.

(b) Determination of equivalence to the equipment, design, and operational requirements of this rule will be evaluated by the following guidelines:

l. Each owner or operator applying for an equivalence determination shall be responsible for collecting and verifying test data to demonstrate equivalence of means of emission limitation.

2. The Technical Secretary will compare test data for the means of emission limitation to test data for the equipment, design, and operational requirements.

3. The Technical Secretary may condition the approval of equivalence on requirements that may be necessary to assure operation and maintenance to achieve the same emission reduction as the equipment, design, and operational requirements.

(c) Determination of equivalence to the required work practices in this rule will be evaluated by the following guidelines:

l. Each owner or operator applying for a determination of equivalence shall be responsible for collecting and verifying test data to demonstrate equivalence of an equivalent means of emission limitation.

2. For each affected facility for which a determination of equivalence is requested, the emission reduction achieved by the required work practice shall be demonstrated.

3. For each affected facility, for which a determination of equivalence is requested, the emission reduction achieved by the equivalent means of emission limitation shall be demonstrated.

4. Each owner or operator applying for a determination of equivalence shall commit in writing to work practices(s) that provide for emission reductions equal to or greater than the emission reductions achieved by the required work practice.

5. The Technical Secretary will compare the demonstrated emission reduction for the equivalent means of emission limitation to the demonstrated emission reduction for the required work practices and will consider the commitment in part (c)4. of this paragraph.

6. The Technical Secretary may condition the approval of equivalence on requirements that may be necessary to assure operation and maintenance to achieve the same emission reduction as the required work practice.

(d) An owner or operator may offer a unique approach to demonstrate the equivalence of any equivalent means of emission limitation.

(6) Test methods and procedures:

(a) Each owner or operator subject to the provisions of this rule shall comply with the test method and procedure requirements provided in this paragraph.

(b) Monitoring, as required in paragraphs (3), (4), and (5) of this rule, shall comply with the following requirements:

l. Monitoring shall comply with Reference Method 2l as specified in 1200–3–16–.01(5)(g)21.

2. The detection instrument shall meet the performance criteria of Reference Method 2l.

3. The instrument shall be calibrated before use on each day of its use by the methods specified in Method 2l.

4. Calibration gases shall be:

(i) Zero air (less than l0 ppm of hydrocarbon in air); and

(ii) A mixture of methane or n-hexane and air at a concentration of approximately, but less than, l0,000 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 2l.

(c) When equipment is tested for compliance with no detectable emissions as required in parts (3)(b)5., (c)9., (g)6., and (j)5. and subparagraph (3)(d) of this rule, the test shall comply with the following requirements:

l. The requirements of parts (b)l. through 4. of this paragraph shall apply.

2. The background level shall be determined, as set forth in Reference Method 2l.

3. The instrument probe shall be traversed around all potential leak interfaces as close to the interface as possible as described in Reference Method 2l.

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) l. 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 l0 percent by weight. For purposes of determining the percent VOC content in the process fluid that is contained in or contacts equipment, procedures that conform to the general methods described in ASTM E-260, E-l68, E-l69 shall be used. (Note: All references to ASTM in this rule refers to the American Society for Testing Materials. Copies of methods are availabe for purchase by writing to ASTM, 1916 Race Street, Philadelphia, PA 19103 or by writing to the Tennessee Division of Air Pollution Control, 701 Broadway, 4th Floor Customs House, Nashville, TN 37219. Be sure and specify which method is desired.)

2. If an owner or operator decides to exclude non-reactive organic compounds from the total quantity of organic compounds in determining the percent VOC content of the process fluid, the exclusion will be allowed if:

(i) Those substances excluded are those considered as having negligible photochemical reactivity by the Technical Secretary; and

(ii) The owner or operator demonstrates that the percent organic content, excluding non-reactive organic compounds, can be reasonably expected never to exceed l0 percent by weight.

3. (i) An owner or operator may use engineering judgment rather than the procedures in parts (d)l. and 2. of this paragraph to demonstrate that the percent VOC content does not exceed l0 percent by weight, provided that the engineering judgment demonstrates that the VOC content clearly does not exceed l0 percent by weight. When an owner or operator and the Technical Secretary do not agree on whether a piece of equipment is not in VOC service, however, the procedures in parts (d)l. and 2. of this paragraph shall be used to resolve the disagreement.

(ii) 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 parts (d)l. and 2. of this paragraph.

(e) Equipment is in light liquid service if the following conditions apply:

l. The vapor pressure of one or more of the components is greater than 0.3 kPa at 200C. Vapor pressures may be obtained from standard reference texts or may be determined by ASTM D-2879. (Note: All references to ASTM in this rule refers to the American Society for Testing Materials. Copies of methods are available for purchase by writing to ASTM, 1916 Race Street, Philadelphia, PA 19103 or by writing to the Tennessee Division of Air Pollution Control, 701 Broadway, 4th Floor Customs House, Nashville, TN 37219. Be sure and specify which method is desired.)

2. The total concentration of the pure components having a vapor pressure greater than 0.3 kPa at 200C is equal to or greater than 20 percent by weight and

3. The fluid is a liquid at operating conditions.

(f) Samples used in conjunction with subparagraphs (d), (e), and (g) of this paragraph shall be representative of the process fluid that is contained in or contacts the equipment or the gas being combusted in the flare.

(g) l. Reference Method 22 as specified in rule 1200–3–16–.01(5)(g) shall be used to determine the compliance of the flares with the visible emission provisions of this rule.

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:

$$H_T = K \sum_{i=l}^{n} CiHi$$

Where:

H_T = Net heating value of the sample, MJ/ scm; where the net enthalpy per mole of offgas is based on combustion at 250C and 760 mm Hg, but the standard temperature for determining the volume corresponding to one mole is 20.

K = Constant, 1.740×10^{-7} $\frac{l}{ppm} \frac{g\ mole}{scm} \frac{MJ}{kcal.}$

Where the standard temperature for $\frac{g\ mole}{scm}$ is 20^0 C

Ci = Concentration of sample component i in ppm, as measured by Reference Method l8 and ASTM D2504 67 (reapproved l977).

Hi = Net heat of combustion of sample component i, kcal/g mole. The heats of combustion may be determined using ASTM D2382-76 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 flowrate (in units of standard temperature and pressure), as determined by Reference Method 2 or 2A, as appropriate; by the unobstructed (free) cross sectional area of the flare tip.

5. The maximum permitted velocity, Vmax for air-assisted flares shall be determined by the following equation:

(Rules 1200-3-16-.47, continued)

Vmax	=	8.706 + 0.7084 (HT)
Vmax	=	Maximum permitted velocity, m/sec.
8.706	=	Constant.
0.7084	=	Constant,
H_T	=	The net heating value as determined in part (g)3. of this paragraph.

(7) Record-keeping requirements:

(a) l. Each owner or operator subject to the provisions of this rule shall comply with the record-keeping requirements of this paragraph.

2. An owner or operator of more than one affected facility subject to the provisions of this rule may comply with the record-keeping requirements for these facilities in one record-keeping system if the system identifies each record by each facility.

(b) When each leak is detected as specified in subparagraphs (3)(b), (c), (g), (h), and (4)(b) of this rule, the following requirements apply:

l. A weatherproof and readily visible identification, marked with the equipment identification number, shall be attached to the leaking equipment.

2. The identification on a valve may be removed after it has been monitored for 2 successive months as specified in part (3)(g)3. of this rule and no leak has been detected during those 2 months.

3. The identification on equipment, except on a valve, may be removed after it has been repaired.

(c) When each leak is detected as specified in subparagraphs (3)(b), (c), (g), (h), and (4)(b) of this rule, the following information shall be recorded in a log and shall be kept for 2 years in a readily accessible location:

l. The instrument and operator identification numbers and the equipment identification number.

2. The date the leak was detected and the dates of each attempt to repair the leak.

3. Repair methods applied in each attempt to repair the leak.

4. ‘‘Above l0,000’’ if the maximum instrument reading measured by the methods specified in subparagraph (6)(a) of this rule after each repair attempt is equal to or greater than l0,000 ppm.

5. ‘‘Repair delayed’’ and the reason for the delay if a leak is not repaired within l5 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 l5 days.

(Rules 1200-3-16-.47, continued)

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 subparagraph (3)(j) of this rule shall be recorded and kept in a readily accessible location:

l. 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 part (3)(j)5. of this rule, to ensure that control devices are operated andmaintained 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 subparagraphs (3)(b), (c), (d), and (e) of this rule 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 subparagraphs (3)(b), (c), (d), and (e) of this rule.

(e) The following information pertaining to all equipment subject to the requirements in subparagraphs (3)(a) to (j) of this rule shall be recorded in a log that is kept in a readily accessible location:

l. A list of identification numbers for equipment subject to the requirements of this rule.

2. (i) A list of identification numbers for equipment that are designated for no detectable emissions under the provisions of parts (3)(b)5., (c)9. and (g)6. of this rule.

(ii) The designation of equipment as subject to the requirements of parts (3)(b)5., (c)9., and (g)6. of this rule shall be signed by the owner or operator.

3. A list of equipment identification numbers for pressure relief devices required to comply with subparagraph (3)(d) of this rule.

4. (i) The dates of each compliance test as required in parts (3)(b)5. and (c)9., subparagraph (3)(d), and part (3)(g)6. of this rule.

(ii) The background level measured during each compliance test.

(iii) 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 parts (3)(g)7. and 8. of this rule shall be recorded in a log that is kept in a readily accessible location:

l. 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 subparagraph (4)(b) of this rule:

l. 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:

l. Design criterion required in sub-parts (3)(b)4.(v) and (3)(c) 5.(ii) of this rule 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 subparagraph (l)(d) of this rule:

l. 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 in 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 subparagraphs 1200–3–l6–.0l(7)(b) and (d) do not apply to affected facilities subject to this rule.

(8) Reporting requirements:

(a) Each owner or operator subject to the provisions of this rule shall submit semiannual reports to the Technical Secretary beginning six months after the initial start up date.

(b) The initial semiannual report to the Technical Secretary shall include the following information:

l. Process unit identification.

2. Number of valves subject to the requirements of subparagraph (3)(g) of this rule, excluding those valves designated for no detectable emissions under the provisions of part (3)(g)6. of this rule.

3. Number of pumps subject to the requirements of subparagraph (3)(b) of this rule, excluding those pumps designated for no detectable emissions under the provisions of part (3)(b)5. of this rule and those pumps complying with part (3)(b)6. of this rule.

4. Number of compressors subject to the requirements of subparagraph (3)(c) of this rule, excluding those compressors designated for no detectable emissions under the provisions of part (3)(c)9. of this rule and those compressors complying with part (3)(c)8. of this rule.

(c) All semiannual reports to the Technical Secretary shall include the following information, summarized from the information in paragraph (7) of this rule:

l. Process unit identification.

2. For each month during the semiannual reporting period,

(i) Number of valves for which leaks were detected as described in part (3)(g)2. or subparagraph (4)(b) of this rule,

(ii) Number of valves for which leaks were not repaired as required in sub-part (3)(g)4.(i) of this rule,

(iii) Number of pumps for which leaks were detected as described in part (3)(b)2. and item (3)(b)4.(vi)(I) of this rule,

(iv) Number of pumps for which leaks were not repaired as required in sub-part (3)(b)3.(i) and item (3)(b)4.(vi)(II) of this rule,

(v) Number of compressors for which leaks were detected as described in part (3)(c)6. of this rule,

(vi) Number of compressors for which leaks were not repaired as required in sub-part (3)(c)7.(i) of this rule, and

(vii) 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 semiannual reporting period.

4. Revisions to items reported according to subparagraph (b) of this paragraph 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 subparagraphs (4)(a) and (b) of this rule shall notify the Technical Secretary 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 paragraph 1200–3–l6–.0l(5). The provisions of subparagraph 1200–3–l6–.0l(5)(d) do not apply to affected facilities subject to the provisions of this rule except that an owner or operator must notify the Technical Secretary of the schedule for the initial performance tests at least 30 days before the initial performance tests.

(9) Exceptions:

(a) Each owner or operator subject to the provisions of this rule may comply with the following exceptions.

(b) 1. Compressors in hydrogen service are exempt from the requirements of paragraph (3) of this rule 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

(Rules 1200-3-16-.47, continued)

content can be reasonably expected always to exceed 50 percent 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 E- 260, E-168, or E-169 shall be used. (Note: All references to ASTM in this rule refers to the American Society for Testing Materials. Copies of methods are available for purchase by writing to ASTM, 1916 Race Street, Philadelphia, PA 19103 or by writing to the Tennessee Division of Air Pollution Control, 701 Broadway, 4th Floor Customs House, Nashville, TN 37219. Be sure and specify which method is desired.)

3. (i) An owner or operator may use engineering judgment rather than procedures in part 2. of this subparagraph to demonstrate that the percent content exceeds 50 percent by volume, provided the engineering judgment demonstrates that the content clearly exceeds 50 percent by volume. When an owner or operator and the Technical Secretary do not agree on whether a piece of equipment is in hydrogen service, however, the procedures in part 2. of this subparagraph shall be used to resolve the disagreement.

(ii) 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 part 2. of this subparagraph.

(c) Any existing reciprocating compressor that becomes an affected facility under provisions of subparagraphs 1200–3–16–.01(9)(a) and (b) is exempt from subparagraphs (3)(a), (b), (c), (d), (e), and (h) of this rule 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 subparagraphs (3)(a), (b), (c), (d), (e), and (h) of this rule.

(d) An owner or operator may use the following provision in addition to subparagraph (6)(e) of this rule: Equipment is in light liquid service if the percent evaporated is greater than 10 percent at 150 C as determined by ASTM Method D-86.

Authority*: T.C.A. §§68–25–105 and 4–5–202.* ***Administrative History****: Original rule filed September 21, 1988; effective November 6, 1988.*

(Rules 1200-3-16-.06, continued)

1200–3–16–.48 FLEXIBLE VINYL AND URETHANE COATING AND PRINTING.

(1) Applicability.

(a) The affected facility to which the provisions of this rule apply is each rotogravure printing line used to print or coat flexible vinyl or urethane products.

(b) This rule applies to any affected facility which begins construction, modification, or reconstruction after November 6, 1988.

(c) For facilities controlled by a solvent recovery emission control device, the provisions of subparagraph (5)(a) of this rule requiring monitoring of operations will not apply until performance specifications for the continuous monitoring system have been promulgated. After the promulgation of performance specifications, these provisions will apply to each affected facility under subparagraph (b) of this paragraph. 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 subparagraph 1200–3–16–.01(8)(b) after performance specifications are promulgated.

(2) Definitions and symbols:

(a) Definitions:

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’’ mean 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 revolved 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 Method 24 (as specified in rule 1200–3–16–.01(5)(g), 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.

(Rules 1200-3-16-.48, continued)

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) Symbols:

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. ‘‘f’’ means the gas stream vents which are not directed to an emission control device.

4. ‘‘Caj’’ 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. ‘‘Cbi’’ 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. ‘‘Cfk’’ 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. ‘‘Mci’’ means the total mass of each ink (i) applied in the time period as determined from plant records, in kilograms.

9. ‘‘Mdj’’ 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. ‘‘Qaj’’ means the volumetric flow rate of each effluent gas stream (j) exiting the emission control device, in standard cubic meters per hour.

11. ‘‘Qbi’’ means the volumetric flow rate of each effluent gas stream (i) entering the emission control device, in standard cubic meters per hour.

12. ‘‘Qfk’’ 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.

(Rules 1200-3-16-.48, continued)

14. ‘‘F’’ means the VOC emission capture efficiency (as a fraction) of the vapor capture system during performance testing.

15. ‘‘Woi’’ means the weight fraction of VOC in each ink (i) used in the time period as determined from Reference Method 24, manufacturer’s formulation data, or plant blending records, in kilograms per kilogram.

16. ‘‘Wsi’’ means the weight fraction of solids in each ink (i) used in the time period as determined from Reference Method 24, manufacturer’s formulation data, or plant blending records, in kilograms per kilogram.

17. ‘‘Woj’’ 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, manufacturer’s formulation data, or plant blending records, in kilograms per kilogram.

18. ‘‘n’’ = the number of different inks (i) used.

19. ‘‘m’’ = the number of different dilution solvents (j) added at the print line.

20. ‘‘p’’ = the number of effluent gas streams (k) not directed to an emissions control device.

(3) Standard:

(a) On and after the date on which the performance test required by paragraph 1200–3–16–.01(5) has been completed, each owner or operator subject to this rule 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 atmosphere by 85 percent from each affected facility.

(4) Test methods and procedures:

(a) Reference Methods as specified in rule 1200–3–16–.01(5)(g), except as provided under subparagraph 1200–3–16–.01(5)(b), shall be used to determine compliance with subparagraph (3)(a) of this rule 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 Reference Method 24 may be adjusted to subtract these solvents from the measured VOC content.

2. Method 25A 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 part (3)(a)1. of this rule, the owner or operator of an affected facility shall determine the weighted average VOC content of the inks according to the following procedures:

(Rules 1200-3-16-.48, continued)

1. Determine and record the VOC content and amount of each ink used at the print head, including the VOC content and amount of diluted solvent, for any time periods when VOC emission control equipment is not used.

2. Compute the weighted average VOC content by the following equation:

$$G = \frac{\sum_{i=1}^{n} (W_{oi}M_{ci}) + \sum_{j=l}^{m} (W_{oj}M_{dj})}{\sum_{i=l}^{n} (M_{ci}W_{si})}$$

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 Technical Secretary. Reference Method 24 or ink manufacturer's formulation data along with plant blending records (if plant blending is done) may be used to determine VOC content. The Technical Secretary 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 periods 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 Referenced Method 24, ink manufacturers' formulation data, or plant blending records.

(c) To demonstrate compliance with part (3)(a)1. of this rule, 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 testing by Reference Method 24.

4. The Technical Secretary 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.

(Rules 1200-3-16-.48, continued)

5. The Technical Secretary shall approve the inventory system of accounting for VOC content prior to the initial performance test.

(d) To demonstrate compliance with part (3)(a)2. of this rule, 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 three 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 for 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 two requirements shall be accomplished using one of the following methods:

(i) Build a permanent enclosure around the affected facility;

(ii) 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

(iii) 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 part (3)(a)2. of this rule has been demonstrated if the average value of the overall control efficiency (EF) for the three runs is equal to or greater than 85 percent. An overall control efficiency is calculated for each run as follows:

(Rules 1200-3-16-.48, continued)

(i) For efficiency of the emission control device:

$$E = \frac{\sum_{i=1}^{n} (QbiCbi) - \sum_{j=l}^{m} (QajCaj)}{\sum_{i=l}^{n} (QbiCbi)}$$

(ii) For efficiency of the vapor capture system.

$$F = \frac{\sum_{i=l}^{n} (QbiCbi)}{\sum_{i=1}^{n} (QbiCbi) + \sum_{k=l}^{p} (QfkCfk)}$$

(5) Monitoring of operations and record keeping 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 percent 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 + 0.75 percent of the temperature being measured or + 2.50C, 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 280C 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 + 0.75 percent of the temperature being measured or + 2.50C, 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 280C below the average temperature demonstrated during the most recent performance 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 paragraph (3) of this rule, the performance test shall be submitted to the Technical Secretary as specified in subparagraph 1200-3-16-.01(5)(a).

(b) The owner or operator of each affected facility shall submit semiannual reports to the Technical Secaretary of occurrences of the following:

1. Exceedances of the weighted average VOC content specified in part (3)(a)1. of this rule;

2. Exceedances of the average value of the exhaust vent VOC concentration as defined under part (5)(a)2. of this rule;

3. Drops in the incinerator temperature as defined under part (5)(b) 2. of this rule; 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 part (5)(c)2. of this rule.

(c) The reports required under subparagraph (b) of this paragraph shall be postmarked within 30 days following the end of the second and fourth calendar quarters.

Authority*: T.C.A. §§68–25–105 and 4–5–202.* ***Administrative History****: Original rule filed September 21, 1988; effective November 6, 1988.*

1200–3–16–.49 PETROLEUM DRY CLEANERS.

(1) Applicability.

(a) The provisions of this rule are applicable to the following affected facilities located at a petroleum dry cleaning plant with a total manufacturers' 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 manufacturers' rated capacity of its petroleum solvent dryer(s), the total manufacturers' 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 manufacturers' rated capacity of its petroleum solvent dryers, the total manufacturers' rated dryer capacity is the summation of the manufacturers' 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 manufacturers' rated dryer capacity is the summation of the manufacturers' rated dryer capacity for each proposed new petroleum solvent dryer.

4. The petroleum solvent dryers considered in the determination of the total manufacturers' 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 subparagraph (a) of this paragraph that commences construction or modification after November 6, 1988 is subject to the requirements of this rule.

(2) Definitions:

(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) ''Manufacturers' 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 petroleum 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.

(Rules 1200-3-16-.49, continued)

(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:

(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 dryer(s) 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 U.S. Environmental Protection Agency recommends that the equipment be inspected every 15 days and all vapor or liquid leaks be repaired within the subsequent 15 day period.

(4) Equivalent Equipment and Procedures:

Upon written application from any person, the Technical Secretary may approve the use of equipment or procedures that have been demonstrated to his satisfaction to be equivalent, in terms of reducing VOC emissions to the atmosphere, to those prescribed for compliance within a specified subparagraph of this rule. The application must contain a complete description of the equipment or procedure, the testing method, the date, time and location of the test, and a description of the test results. Written applications shall be submitted to the Technical Secretary.

(5) Test Methods and Procedures:

Each owner or operator of an affected facility subject to the provisions of subparagraph (3)(a) of this rule 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 percent 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 rule shall maintain a record of the performance test required under paragraph (5) of this rule.

***Authority**: T.C.A. §§68–25–105 and 4–5–202.* ***Administrative History**: Original rule filed September 21, 1988; effective November 6, 1988.*

1200–3–16–.50 PHOSPHATE ROCK PLANTS.

(1) Applicability.

(a) The provisions of this rule 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 subparagraph (a) of this paragraph which commences construction, modification, or reconstruction after November 6, 1988 is subject to the requirements of this rule.

(2) Definitions.

(a) “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.

(b) “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.

(c) “Dryer” means a unit in which the moisture content of phosphate rock is reduced by contact with a heated gas stream.

(d) “Calciner” means a unit in which the moisture and organic matter of phosphate rock is reduced within a combustion chamber.

(e) “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.

(f) “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.

(g) “Beneficiation” means the process of washing the rock to remove impurities or to separate size fractions.

(Rules 1200-3-16-.50, continued)

(3) Standards:

(a) On and after the date on which the performance test required to be conducted by paragraph 1200–3–16–.01(5) is completed, no owner or operator subject to the provisions of this rule shall cause to be discharged into the atmosphere:

1. From any phosphate rock dryer any gases which:

(i) Contain particulate matter in excess of 0.030 kilogram per megagram of phosphate rock feed (0.06 lb/ton), or

(ii) Exhibit greater than 10 percent opacity.

2. From any phosphate rock calciner processing unbeneficiated rock or blends of beneficiated and unbeneficiated rock, any gases which:

(i) Contains particulate matter in excess of 0.12 kilogram per megagram of phosphate rock feed (0.23 lb/ton), or

(ii) Exhibit greater than 10 percent opacity.

3. From any phosphate rock calciner processing beneficiated rock any gases which:

(i) Contain particulate matter in excess of 0.055 kilogram per megagram of phosphate rock feed (0.11 lb/ton), or

(ii) Exhibit greater than 10 percent opacity.

4. From any phosphate rock grinder any gases which:

(i) Contain particulate matter in excess of 0.006 kilogram per megagram of phosphate rock feed (0.012 lb/ton), or

(ii) 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 rule shall install, calibrate, maintain, and operate a continuous monitoring system, except as provided in subparagraphs (b) and (c) of this paragraph, 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 percent 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 shall not be subject to the requirements in subparagraph (a) of this paragraph, but shall install, calibrate, maintain, and operate the following continuous monitoring devices:

(Rules 1200-3-16-.50, continued)

1. A monitoring device for the continuous measurement of the pressure loss of the gas stream through the scrubber. The monitoring device must be certified by the manufacturer to be accurate within +250 pascals (+1 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 must be accurate within $5 percent of design scrubbing liquid supply pressure.

(d) For the purpose of conducting a performance test under paragraph 1200–3–16–.01(5), the owner or operator of any phosphate rock plant subject to the provisions of this rule 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 must be accurate to within +5 percent of the mass rate over its operating range.

(e) For the purpose of reports required under subparagraph 1200–3–16–.01(7)(c), 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 subparagraph (a) of this paragraph exceeds the applicable opacity limit.

(f) Any owner or operator subject to the requirements under subparagraph (c) of this paragraph shall report for each calendar quarter all measurement results that are less than 90 percent of the average levels maintained during the most recent performance test conducted under paragraph 1200–3–16–.01(5) in which the affected facility demonstrated compliance with the standard under paragraph (3) of this rule.

(5) Test methods and procedures:

(a) Reference methods, (as specified in rule 1200–3–16–.01(5)(g)) except as provided under subparagraph 1200–3–16–.01(5)(b), shall be used to determine compliance with paragraph (3) of this rule 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, 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 Technical Secretary.

(c) For each run, the average phosphate rock feed rate in megagrams per hour shall be determined using a device meeting the requirements of subparagraph (4)(d) of this rule.

(d) For each run, emissions expressed in kilograms per megagram of phosphate rock feed shall be determined using the following equation:

$$E = \frac{(Cs\ Qs)\ 10\text{-}6}{M}$$

where:

E= Emissions of particulates in kg/Mg of phosphate rock feed.

Cs= Concentration of particulates in mg/dscm as measured by Method 5.

Qs= Volumetric flow rate in dscm/hr as determined by Method 2.

10-6= Conversion factor for milligrams to kilograms.

M= Average phosphate rock feed rate in Mg/hr.

***Authority**: T.C.A. §§68–25–108 and 4–5–202.* ***Administrative History**: Original rule filed September 21, 1988; effective November 6, 1988.*

1200–3–16–.51 EQUIPMENT LEAKS OF VOC FROM ONSHORE NATURAL GAS PROCESSING PLANTS.

(1) Applicability and designation of affected facility.

(a) 1. The provisions of this rule 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 (defined in paragraph (2) of this rule) within a process unit is an affected facility.

(b) Any affected facility under subparagraph (a) of this paragraph that commences construction, reconstruction, or modification after November 6, 1988 is subject to the requirements of this rule.

(c) Addition or replacement of equipment (defined in paragraph (2) of this rule) for the purpose of process improvement that is accomplished without a capital expenditure shall not by itself be considered a modification under this rule.

(d) Facilities covered by rule 1200–3–16–.43 or rule 1200–3–16–.47 are excluded from this rule.

(e) A compressor station, dehydration unit, sweetening unit, underground storage tank, field gas gathering system, or liquefied natural gas unit is covered by this rule 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 rule.

(2) Definitions.

(a) Terms not defined in this paragraph shall have the meanings given in rule 1200–3–16–.43.

(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 rule.

(c) “Field gas” means feedstock gas entering the natural gas processing plant.

(Rules 1200-3-16-.51, continued)

(d) "In light liquid service" means that the piece of equipment contains a liquid that meets the conditions specified in 1200–3–16–.43(6)(e) or part (4)(h)2. of this rule.

(e) "Natural gas liquids" means the hydrocarbons, such as ethane, propane, butane, and pentane, that are extracted from field gas.

(f) "Natural gas processing plant" (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.

(g) "Nonfractionating plant" means any gas plant that does not fractionate mixed natural gas liquids into natural gas products.

(h) "Onshore" means all facilities exept those that are located in the territorial seas or on the outer continental shelf.

(i) "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.

(j) "Reciprocating compressor" means a piece of equipment that increases the pressure of a process gas by positive displacement, employing linear movement of the driveshaft.

(k) "In wet gas service" means that a piece of equipment contains or contacts the field gas before the extraction step in the process.

(3) Standards

(a) Each owner or operator subject to the provisions of this rule shall comply with the requirements of 1200–3–16–.43(3)(a)1., 2., and 4. and 1200–3–16–.43(3)(b) through (j), except as provided in paragraph (4) of this rule, 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 1200–3–16–.43(4)(a) and (b).

(c) An owner or operator may apply to the Technical Secretary 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 rule. In doing so, the owner or operator shall comply with requirements of paragraph (5) of this rule.

(d) Each owner or operator subject to the provisions of this rule shall comply with the applicable test methods and procedures specified in 1200–3–16–.43(6) except as provided in subparagraph (4)(f) of this rule.

(e) Each owner or operator subject to the provisions of this rule shall comply with the provisions of 1200–3–16–.43(7) and (8) except as provided in paragraphs (4), (6), and (7) of this rule.

(f) An owner or operator shall use the following provision instead of the provisions of 1200–3–16–.43(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 must be determined that the percent VOC content can be reasonably expected never to exceed 10.0 percent by weight. For a piece of equipment to be considered in wet gas service, it must 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, E168, or E260 shall be used. (Note: All references to ASTM in this rule refers to the American Society for Testing Materials. Copies of methods are available for purchase by writing to ASTM, 1916 Race Street, Philadelphia, PA 19103 or by writing to the Tennessee Division of Air Pollution Control, 701 Broadway, 4th Floor Customs House, Nashville, TN 37219. Be sure and specify which method is desired.)

(4) Exceptions

(a) Each owner or operator subject to the provisions of this rule may comply with the following exceptions to the provisions of rule 1200–3–16–.43.

(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 subparagraph 1200–3–16–43(6)(b) except as provided in subparagraph (3)(c) and part (4)(b)4 of this rule and 1200–3– 16–.43(3)(d)1. through 1200–3–16–.43(3)(d)3.

2. If an instrument reading of 10,000 ppm or greater is measured, a leak is detected.

3. (i) 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 1200–3–16– .43(3)(i).

(ii) A first attempt at repair shall be made no later than 5 calendar days after each leak is detected.

4. (i) 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 part (b)1. of this paragraph and rule 1200–3–16– .43(3)(d)2.(ii).

(ii) No pressure relief device described in subpart (b)4(i) of this paragraph shall 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 1200–3–16–.43(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 standard cubic feet per day (scfd)) or more of field gas are exempt from the routine monitoring requirements of 1200–3–16–.43(3)(b)1(i), 1200–3–16–.43(3)(g)1 and part (b)1. of this paragraph.

(e) Reserved

(f) Reciprocating compressors in wet gas service are exempt from the compressor control requirements of 1200–3–16–.43(3)(c).

(g) Flares used to comply with this rule shall comply with the requirements of 1200–3–16–.01(11).

(h) An owner or operator may use the following provisions instead of 1200–3–16–.43(6)(e):

1. Equipment is in heavy liquid service if the weight percent evaporated is 10 percent or less at 150 C as determined by ASTM Method D86. (Note: All references to ASTM in this rule refers to the American Society for Testing Materials. Copies of methods are available for

(Rules 1200-3-16-.51, continued)

purchase by writing to ASTM, 1916 Race Street, Philadelphia, PA 19103 or by writing to the Tennessee Division of Air Pollution Control, 701 Broadway, 4th Floor Customs House, Nashville, TN 37219. Be sure and specify which method is desired.)

2. Equipment is in light liquid service if the weight percent evaporated is greater than 10 percent at 1500C as determined by ASTM Method D86.

(5) Alternative means of emission limitation

(a) If, in the Technical Secretary's judgment, 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, this alternative means may be allowed in lieu of means listed in this rule. The Technical Secretary may condition permission to use alternate means on requirements related to the operation and maintenance of the alternative means.

(b) The method of approving any alternate means by the provisions of this paragraph shall be by revision of the state implementation plan.

(c) The Technical Secretary will consider applications under this paragraph from either owners or operators of affected facilities, or manufactures of control equipment.

(d) The Technical Secretary will treat applications under this paragraph according to the following criteria, except in cases where he concludes that other criteria are appropriate:

1. The applicant must collect, verify and submit test data, covering a period of at least 12 months, necessary to support the finding in subparagraph (a) of this paragraph, and

2. If the applicant is an owner or operator of an affected facility, he must commit in writing to operate and maintain the alternative means so as to acheive 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 rule shall comply with the requirements of subparagraphs (b) and (c) of this paragraph in addition to the requirements of 1200–3–16–.43(7).

(b) The following recordkeeping requirements shall apply to pressure relief devices subject to the requirements of part (4)(b)1. of this rule.

1. When each leak is detected as specified in part (4)(b)2. of this rule, 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 part (4)(b)2. of this rule, the following information shall be kept for 2 years in a readily accessible location:

(i) The instrument and operator identification numbers and the equipment identification number.

(ii) The date the leak was detected and the dates of each attempt to repair the leak.

(Rules 1200-3-16-.51, continued)

(iii) Repair methods applied in each attempt to repair the leak.

(iv) "Above 10,000 ppm" if the maximum instrument reading measured by the methods specified in subparagraph (a) of this paragraph after each repair attempt is 10,000 ppm or greater.

(v) "Repair delayed" and the reason for the delay if a leak is not repaired within 15 calendar days after discovery of the leak.

(vi) The signature of the owner or operator (or designate) whose decision it was that repair could not be effected without a process shutdown.

(vii) The expected date of successful repair of the leak if a leak is not repaired within 15 days.

(viii) Dates of process unit shutdowns that occur while the equipment is unrepaired.

(ix) The date of successful repair of the leak.

(x) A list of identification numbers for equipment that are designated for no detectable emissions under the provisions of 1200–3–16–.43(3)(d)1. The designation of equipment subject to the provisions of 1200–3–16–.43(3)(d)1. shall be signed by the owner or operator.

(c) An owner or operator shall comply with the following requirement in addition to the requirement of 1200–3–16–.43(7)(j): Information and data used to demonstrate that a reciprocating compressor is in wet gas service to apply for the exemption in subparagraph (4)(f) of this rule 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 rule shall comply with the requirements of subparagraphs (b) and (c) of this paragraph in addition to the requirements of 1200–3–16–.43(8).

(b) An owner or operator shall include the following information in the initial semiannual report in addition to the information required in 1200–3–16–.43(8)(b)1 through 1200–3–16–.43(8)(b)4.: number of pressure relief devices subject to the requirements of subparagraph (4)(b) of this rule except for those pressure relief devices designated for no detectable emissions under the provisions of 1200–3–16–.43(3)(d)1. and those pressure relief devices complying with 1200–3–16–.43(3)(d)3.

(c) An owner or operator shall include the following information in all semiannual reports in addition to the information required in 1200–3–16–.43(8)(c)2.(i) through 1200–3–16–.43(8)(c)2.(vi):

1. Number of pressure relief devices for which leaks were detected as required in part (4)(b)2. of this rule, and

2. Number of pressure relief devices for which leaks were not repaired as required in part (4)(b)3. of this rule.

***Authority**: T.C.A. §§68–25–105 and 4–5–202.* ***Administrative History**: Original rule filed September 21, 1988; effective November 6, 1988.*

1200–3–16–.52 ELECTRIC ARC FURNACES AND ARGON-OXYGEN DECARBURIZATION VESSELS.

(1) Applicability and designation of affected facility.

(a) The provisions of this rule are applicable to the following affected 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 rule apply to each affected facility identified in subparagraph (a) of this paragraph that commences construction, modification, or reconstruction after November 6, 1988.

(2) Definitions

(a) As used in this rule, all terms not defined herein shall have the meaning given them in paragraph (4) of rule 1200–3–16–.01.

1. "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.

2. "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.

3. "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.

4. "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.

5. "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.

6. "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 rule. For the purposes of this rule, 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 (from storage to truck), and any secondary control devices used with the dust transfer equipment.

7. "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 rule, 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.

8. "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 AOD vessel and ending when the AOD vessel tap is completed.

(Rules 1200-3-16-.52, continued)

9. “Melting” means that phase of steel production cycle during which the iron and steel scrap is heated to the molten state.

10. “Negative-pressure fabric filter” means a fabric filter with the fans on the downstream side of the filter bags.

11. “Positive-pressure fabric filter” means a fabric filter with the fans on the upstream side of the filter bags.

12. “Refining” means that 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.

13. “Shop” means the building which houses one or more EAF’s or AOD vessels.

14. “Shop opacity” means the arithmetic average of 24 observations of the opacity of emissions from the shop taken in accordance with Method 9.

15. “Tap” means the pouring of molten steel from an EAF or AOD vessel.

(3) Standard for particulate matter

(a) On and after the date of which the performance test required to be conducted by paragraph 1200–3–16–.01(5) is completed, no owner or operator subject to the provisions of this rule shall cause to be discharged into the atmosphere from an EAF or an AOD vessel and 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 percent 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 percent opacity or greater.

(b) On and after the date on which the performance test required to be conducted by paragraph 1200–3–16–.01(5) is completed, no owner or operator subject to the provisions of this rule shall cause to be discharged into the atmosphere from the dust-handling system any gases that exhibit 10 percent opacity or greater.

(4) Emission monitoring

(a) Except as provided under subparagraphs (b) and (c) of this paragraph, 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 rule.

(b) No continuous monitoring system shall be required on any control device serving the dust-handling system.

(c) No continuous monitoring system shall be 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.

(5) Monitoring of operations

(Rules 1200-3-16-.52, continued)

(a) The owner or operator subject to the provisions of this rule shall maintain records of the following information:

1. All data obtained under subparagraph (b) of this paragraph.

2. All monthly operational status inspections performed under subparagraph (c) of this paragraph.

(b) Except as provided under subparagraph (d) of this paragraph, the owner or operator subject to the provisions of this rule shall check and record on a once-per-shift basis the furnace static pressure (if DEC system is in use) and either (1) check and record the control system fan motor amperes and damper position on a once-per-shift basis; or (2) install, calibrate, and maintain a monitoring device that continuously records the volumetric flow rate through each separately ducted hood. The monitoring device(s) may be installed in any appropriate location in the exhaust duct such that reproducible flow rate monitoring will result. The flow rate monitoring device(s) shall have an accuracy of $ 10 percent over its normal operating range and shall be calibrated according to the manufacturer's instructions. The Technical Secretary may require the owner or operator to demonstrate the accuracy of the monitoring device(s) relative to Methods 1 and 2 (as specified in 1200–3–16–.01(5)(g)).

(c) When the owner or operator of an affected facility is required to demonstrate compliance with the standards of paragraph (3)(a)3. of this rule, and at any other time the Technical Secretary 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 the provisions of subparagraph (b) of this paragraph. The owner or operator may petition the Technical Secretary for reestablishment of these parameters whenever the owner or operator can demonstrate to the Technical Secretary's satisfaction that the affected facility operating conditions upon which the parameters were previously established are no longer applicable. The values of these parameters 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 subparagraph 1200–3–16–.52(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.

(e) The owner or operator may petition the Technical Secretary 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, calibrate, and maintain a monitoring device that allows the pressure in the free space inside the 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 instructions.

(g) When the owner or operator of an EAF controlled by a DEC is required to demonstrate compliance with the standard under part rule 1200–3–16–.52(3)(a)3. and at any other time the

(Rules 1200-3-16-.52, continued)

Technical Secretary 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 subparagraph (f) of this paragraph. The owner or operator may petition the Technical Secretary for reestablishment of the 15-minute integrated average of the pressure whenever the owner or operator can demonstrate to the Technical Secretary'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 when the EAF is operating in a meltdown and refining period. Operation at higher pressures may be considered by the Technical Secretary to be unacceptable operation and maintenance of the affected facility.

(h) During any performance test required under paragraph 1200–3–16–.01(5), and for any report thereof required by subparagraph (6)(d) of this rule, or to determine compliance with part (3)(a)3. of this rule, 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 systems are used;

3. Control device operation log; and

4. Continuous monitor or Reference Method 9 (as specified in 1200–3–16–.01(5)(g)) data.

(6) Test methods and procedures.

(a) Reference methods in 1200–3–16–.01(5)(g), except as provided under 1200–3–16–.01(5)(b), shall be used to determine compliance with the standards prescribed under paragraph 1200–3–16–.52(3) as follows:

1. Method 1 for sample and velocity traverses;

2. Method 2 for velocity and volumetric flow rate;

3. Method 3 (as specified in 1200–3–16–.01(5)(g)) for gas analysis;

4. Either Method 5 (as specified in 1200–3–16–.01(5)(g)) for negative-pressure fabric filters and other types of control devices or Method 5D for positive-pressure fabric filters for concentration of particulate matter and associated moisture content; and

5. Method 9 (as specified in 1200–3–16–.01(5)(g)) 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 Technical Secretary. 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.

(Rules 1200-3-16-.52, continued)

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 subparagraph 1200–3–16–.52(3)(a).

(d) For the purpose of this rule, the owner or operator shall conduct the demonstration of compliance with subparagraph 1200–3–16–.52(3)(a) and furnish the Technical Secretary 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 subparagraph (h) of this rule;

   (i) List of charge and tap weights and materials;

   (ii) Heat times and process log;

   (iii) Control device operation log; and

   (iv) 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;

(Rules 1200-3-16-.52, continued)

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 1200–3–16–.01(5), 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.

(f) When more than one control device serves the EAF(s) or AOD vessel(s) 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/h (dscf/h) 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 rule shall be designed and constructed to allow measurement of emissions using applicable test methods and procedures.

(h) Where emissions from any EAF(s) or AOD vessel(s) are combined with emissions from facilities not subject to the provisions of this rule 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 Technical Secretary that compensates for the emissions from the facilities not subject to the provisions of this rule or;

3. Any combination of the criteria of subparagraphs (h)1. and (h)2. of this paragraph.

(Rules 1200-3-16-.52, continued)

(i) Where emissions from any EAF(s) or AOD vessel(s) are combined with emissions from facilities not subject to the provisions of this rule, determinations of compliance with 1200-3-16-.52(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 1200–3–16–.01(5) to demonstrate compliance with 1200–3–16–.52(3)(a)1., 2. and 3.

(7) Recordkeeping and reporting requirements.

(a) Records of the measurements required in paragraph (5) of this rule 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 Technical Secretary semi- annually. For the purposes of these reports exceedances are defined as all 6-minute periods during which the average opacity is 3 percent or greater.

(c) Operation at a furnace static pressure that exceeds the value established under subparagraph (5)(g) of this rule and either operation of control system fan motor amperes at values exceeding $ 15 percent of the value established under paragraph (5)(c) of this rule or operation at flow rates lower than those established under paragraph (5)(c) of this rule may be considered by the Technical Secretary to be unacceptable operation and maintenance of the affected facility. Operation at such values shall be reported to the Technical Secretary semi-annually.

(d) When the owner or operator of an EAF or AOD is required to demonstrate compliance under parts 1200–3–16–.52(6)(h)2. or 3., the owner or operator shall obtain approval from the Technical Secretary of the procedure(s) that will be used to determine compliance. Notification of the procedure(s) to be used must be postmarked 30 days prior to the performance test.

Authority*: T.C.A. §§68–25–105 and 4–5–202.* ***Administrative History****: Original rule filed September 21, 1988; effective November 6, 1988.*

1200–3–16–.53 NONMETALLIC MINERAL PROCESSING PLANTS.

(1) Applicability and designation of affected facility.

(a) 1. Except as provided in subparagraphs (a)2, (b), (c), and (d) of this paragraph, the provisions of this rule 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. Also, crushers and grinding mills at hot mix asphalt facilities that reduce the size of nonmetallic minerals embedded in recycled asphalt pavement and subsequent affected facilities up to, but not including, the first storage silo or bin are subject to the provisions of this subpart.

2. The provisions of this rule do not apply to the following operations: All facilities located in underground mines; and stand- alone screening operations at plants without crushers or grinding mills.

(b) An affected facility that is subject to the provisions of rules 1200–3–16–.05 or .08 or that follows in the plant process any facility subject to the provisions of rules 1200–3–16–.05 or .08 is not subject to the provisions of this rule.

(c) Facilities at the following plants are not subject to the provisions of this rule:

(Rules 1200-3-16-.53, continued)

1. Fixed sand and gravel plants and crushed stone plants with capacities, as defined in paragraph (2) of this rule, 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 paragraph (2) of this rule, of 136 megagrams per hour (150 tons per hour) or less; and

3. Common clay plants and pumice plants with capacities, as defined in paragraph (2) of this rule, 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 paragraph (2) of this rule, having the same function as the existing facility, the new facility is exempt from the provisions of paragraphs (3), (5) and (6) of this rule, except as provided for in part (d) 3 of this paragraph.

2. An owner or operator complying with subparagraph (d)1 of this paragraph shall submit the information required in paragraph (7)(a).

3. An owner or operator replacing all existing facilities in a production line with new facilities does not qualify for the exemption described in part (d)1 of this paragraph and must comply with the provisions of paragraphs (3), (5) and (6) of this rule.

(e) An affected facility under subparagraph (a) of this paragraph that commences construction, reconstruction, or modification after November 6, 1988, is subject to the requirements of this rule.

(2) Definitions

(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 device of nonmetallic minerals consisting of a head and foot assembly which supports and drives an endless 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.

(Rules 1200-3-16-.53, continued)

(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 where 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 subparagraph (1)(a) of this rule is attached by a cable, chain, turnbuckle, belt 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 Borox, Kernite, and Colemanite.

11. Barite.

12. Fluorospar.

13. Feldspar.

14. Diatomite.

(Rules 1200-3-16-.53, continued)

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 subparagraphs (1)(b) and (c) of this rule.

(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 shall 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 moved 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 by a conveying system.

(s) "Screening operations" 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 emission" 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) or 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.

(z) "Wet mining operation" means a mining or dredging operation designed and operated to extract any nonmetallic mineral regulated under this subpart from deposits existing at or below the water table, where the nonmetallic mineral is saturated with water.

(Rules 1200-3-16-.53, continued)

(aa) "Wet screening operation" means a screening operation at a nonmetallic mineral processing plant which removes unwanted material or which separates marketable fines from the product by a washing process which is designed and operated at all times such that the product is saturated with water.

(3) Standard for particulate matter.

(a) On and after the date on which the performance test required to be conducted by paragraph 1200–3–16–.01(5)(g) is completed, no owner or operator subject to the provisions of this rule shall 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; and

2. Exhibit greater than 7 percent opacity, unless the stack emissions are discharged from an affected facility using a wet scrubbing control device. Facilities using a wet scrubber must comply with the reporting provisions of subparagraphs (7)(c), (d), and (e) of this rule.

(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 as required under paragraph (6) of rule .01 of this chapter, no owner or operator subject to the provisions of this rule shall 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 percent opacity, except as provided in subparagraphs (c), (d), and (e) of this paragraph.

(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 as required under paragraph (6) of rule .01 of this chapter, no owner or operator shall 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 percent opacity.

(d) Truck dumping of nonmetallic minerals into any screening operation, feed hopper, or crusher is exempt from the requirements of this paragraph.

(e) If any transfer point on a conveyor belt or any other affected facility is enclosed in a building then each enclosed affected facility must comply with the emissions limits in subparagraphs (a), (b) and (c) of this paragraph, or the building enclosing the affected facility or facilities must comply with the following emission limits:

1. No owner or operator shall 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 paragraph (2) of this rule.

2. No owner or operator shall 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 subparagraph (a) of this paragraph.

(f) 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 as required under paragraph (6) of rule .01 of this chapter, no owner or operator shall cause to be discharged into the atmosphere from any baghouse that controls emissions from only an individual, enclosed storage bin, stack emissions which exhibit greater than 7 percent opacity.

(g) Owners or operators of multiple storage bins with combined stack emissions shall comply with the emission limits in subparagraph (a)1 and (a)2 of this paragraph.

(h) 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 shall cause to be discharged into the atmosphere any visible emissions from:

1. Wet screening operations and subsequent screening operations, bucket elevators, and belt conveyors that process saturated material in the production line up to the next crusher, grinding mill or storage bin.

2. Screening operations, bucket elevators, and belt conveyors in the production line downstream of wet mining operations, where such screening operations, bucket elevators, and belt conveyors process saturated materials up to the first crusher, grinding mill, or storage bin in the production line.

(4) Reconstruction

(a) The cost of replacement of ore-contact surfaces on processing equipment shall 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 subparagraph 1200–3–16–.01(9)(b). Ore-contact surfaces are crushing surfaces; screen meshes, bars, and plates; conveyor belts; and elevator buckets.

(b) Under subparagraph 1200–3–16–.01(9)(b), the "fixed capital cost of new components" includes the fixed capital cost of all depreciable components (except components specified in subparagraph (a) of this paragraph) which are or will be replaced pursuant to all continuous programs of component replacement commenced within any 2-year period following November 6, l988.

(5) Monitoring of Operations.

The owner or operator of any affected facility subject to the provisions of this rule 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 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) A device for the continuous measurement of the scrubbing liquid flow rate to the wet scrubber. The monitoring device must be certified by New Source Performance Standards Chapter 1200–3–16 the manufacturer to be accurate within ± 5 percent of design scrubbing liquid flow rate and must be calibrated on an annual basis in accordance with manufacturer's instructions.

(6) Test methods and procedures.

(a) Reference methods in subparagraph 1200–3–16–.01(5)(g), except as provided under subparagraph 1200–3–16–.01(5)(b), shall be used to determine compliance with the standards perscribed in paragraph (3) of this rule 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;

(Rules 1200-3-16-.53, continued)

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 subparagraph (3)(e) of this rule.

(b) The owner or operator shall determine compliance with the particulate matter standards in paragraph (3)(a) as follows:

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 high enough to prevent water condensation on the filter but no 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 subparagraphs (3)(b) and (c) of this rule, the Technical Secretary shall adhere to the following stipulations in addition to these listed in Method 9 (the method specified in part (a)5 of this paragraph):

1. The minimum distance between the observer and the emission source shall be 4.57 meters (15 feet).

(i) 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 must be followed.

(ii) 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.

(iii) If emissions from two 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 subparagraph (3)(b) and (c) of this rule by –

(I) 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;

(II) 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 subparagraphs (3)(b) and (c) of this rule.

2. In determining compliance with the opacity of stack emissions from any baghouse that controls emissions only from an individual enclosed storage bin under paragraph (3)(f) of

this rule, using Method 9 of this paragraph, the duration of the observations shall be 1 hour (ten 6- minute averages).

3. When determining compliance with the fugitive emissions standard for any affected facility described under paragraph (3)(b) of this rule, the duration of the observations by Method 9 of this paragraph may be reduced from 3 hours (thirty 6-minute averages) to 1 hour (ten 6-minute averages) only if the following conditions apply:

   (i) There are no individual readings greater than 10 percent opacity; and

   (ii) There are no more than 3 readings of 10 percent for the 1-hour period.

4. When determining compliance with the fugitive emissions standard for any crusher at which a capture system is not used as described under paragraph (3)(c) of this rule, the duration of the observations by Method 9 of this paragraph may be reduced from 3 hours (thirty 6-minute averages) to 1 hour (ten 6-minute averages) only if the following conditions apply:

   (i) There are no individual readings greater than 15 percent opacity; and

   (ii) There are no more than 3 readings of 15 percent for the 1-hour period.

(d) Reserved.

(e) When determining compliance with the standard prescribed under subparagraph (3)(e) of this rule using Method 22, the minimum total observation period for each building shall be 75 minutes and each side of the building shall be observed for a minimum of 15 minutes. Performance tests shall be conducted while all affected facilities inside the building are operating.

(f) Reserved.

(g) If, after 30 days notice for an initially scheduled performance test, there is a delay (due to operational problems, etc.) in conducting any rescheduled performance test required in this paragraph, the owner or operator of an affected facility shall submit a notice to the Technical Secretary at least 7 days prior to any rescheduled performance test.

(h) Initial performance tests by Method 9 of this paragraph under rule .01 of this Chapter and paragraph (6) of this rule are not required for:

1. Wet screening operations and subsequent screening operations, bucket elevators, and belt conveyors that process saturated material in the production line up to, but not including the next crusher, grinding mill or storage bin.

2. Screening operations, bucket elevators, and belt conveyors in the production line downstream of wet mining operations, that process saturated materials up to the first crusher, grinding mill, or storage bin in the production line.

(7) Reporting and recordkeeping

(a) Each owner or operator seeking to comply with subparagraph (1)(d) of this rule shall submit to the Technical Secretary the following information about the existing facility being replaced and the replacement piece of equipment.

(Rules 1200-3-16-.53, continued)

1. For a crusher, grinding mill, bucket elevator, bagging operation, or enclosed truck or railcar loading station:

   (i) The rated capacity in tons per hour of the existing facility being replaced, and

   (ii) The rated capacity in tons per hour of the replacement equipment.

2. For a screening operation:

   (i) The total surface area of the top screen of the existing screening operation being replaced, and

   (ii) The total surface area of the top screen of the replacement screening operation.

3. For a conveyor belt:

   (i) The width of the existing belt being replaced, and

   (ii) The width of the replacement conveyor belt.

4. For a storage bin:

   (i) The rated capacity in tons of the existing storage bin being replaced, and

   (ii) The rated capacity in tons of replacement storage bins.

(b) Reserved.

(c) During the initial performance test of a wet scrubber, and daily 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.

(d) After the initial performance test of a wet scrubber, the owner or operator shall submit semiannual reports to the Technical Secretary of occurrences when the measurements of the scrubber pressure loss (or gain) and liquid flow rate differ by more than ± 30 percent from those measurements recording during the most recent performance test.

(e) The reports required under subparagraph (d) of this paragraph shall be postmarked within 30 days following the 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 tests conducted to demonstrate compliance with the standards set forth in paragraph (3) of this rule including reports of opacity observations made using Method 9 to demonstrate compliance with subparagraphs (3)(b), (c), and (f) and reports of observations using Method 22 to demonstrate compliance with subparagraph (3)(e).

(g) The owner or operator of any screening operation, bucket elevator, or belt conveyor that processes saturated material and is subject to paragraph (3)(h) and subsequently processes unsaturated materials, shall submit a report of this change within 30 days following such change. This screening operation, bucket elevator, or belt conveyor is then subject to the 10 percent opacity limit in paragraph(3)(b) and the emission test requirements of rule .01(6) and this rule. Likewise a screening operation, bucket elevator, or belt conveyor that processes unsaturated material but subsequently processes saturated material shall submit a report of this change within 30 days following such change. This screening operation, bucket elevator, or belt conveyor is then subject to the no visible emission limit in paragraph (3)(h).

(h) The general provisions requirement under rule .01(7)(a)2. for notification of the anticipated date of initial startup of an affected facility shall be waived for owners or operators of affected facilities regulated under this rule.

(i) A notification of the actual date of initial startup of each affected facility shall be submitted to the Technical Secretary.

1. For a combination of affected facilities in a production line that begin actual initial startup on the same day, a single notification of startup may be submitted by the owner or operator to the Technical Secretary. The notification shall be postmarked within 15 days after such date and shall include a description of each affected facility, equipment manufacturer, and serial number of the equipment, if available.

2. For portable aggregate processing plants, the notification of the actual date of initial startup shall include both the home office and the current address or location of the portable plant.

Authority: *TCA §§68-201-105 and 4-5-201 et seq.* ***Administrative History:*** *Original rule filed September 21, 1988; effective November 6, 1988. Amendment filed May 18, 2000; effective August 1, 2000.*

1200–3–16–.54 ONSHORE NATURAL GAS PROCESSING: SO2 EMISSIONS.

(1) Applicability and designation of affected facilities.

(a) The provisions of this rule 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 (H2S) in the acid gas (expressed as sulfur) are required to comply with subparagraph (8) (c) of this rule but are not required to comply with paragraphs (3) through (7) of this rule.

(c) The provisions of this rule 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 rule apply to each affected facility identified in subparagraph (a) of this paragraph which commences construction or modification after November 6, 1988.

(e) The provisions of this rule 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 into the atmosphere.

(2) Definitions.

(a) “Acid gas” means a gas stream of hydrogen sulfide (H2S) and carbon dioxide (CO2) that has been separated from sour natural gas by a sweetening unit.

(b) “Natural gas” means a naturally occurring mixture of hydrocarbon and nonhydrocarbon gases found in geologic formations beneath the earth’s surface. The principal hydrocarbon constituent is methane.

(c) “Onshore” means all facilities except those that are located in the territorial seas or on the outercontinental shelf.

(d) “Reduced sulfur compounds” means H2S, carbonyl sulfide (COS), and carbondisulfide (CS2).

(Rules 1200-3-16-.54, continued)

(e) "Sulfur production rate" means the rate of liquid sulfur accumulation from the sulfur recovery unit.

(f) "Sulfur recovery unit" means a process device that recovers element sulfur from acid gas.

(g) "Sweetening unit" means a process device that separates the H2S and CO2 contents from the sour natural gas stream.

(h) "Total SO2 equivalents" means the sum of volumetric or mass concentrations of the sulfur compounds obtained by adding the quantity existing as SO2 to the quantity of SO2 that would be obtained if all reduced sulfur compounds were converted to SO2 (ppmv or kg/DSCM).

(i) "E" = the sulfur emission rate expressed as elemental sulfur, kilograms per hour (kg/hr) rounded to one decimal place.

(j) "R" = the sulfur emission reduction efficiency achieved in percent, carried to one decimal place.

(k) "S" = the sulfur production rate in kilograms per hour (kg/hr) rounded to one decimal place.

(l) "X" = the sulfur feed rate, i.e., the H2S 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.

(m) "Y" = the sulfur content of the acid gas from the sweetening unit, expressed as mole percent H2S (dry basis) rounded to one decimal place.

(n) "Z" = the minimum required sulfur dioxide (SO2) emission reduction efficiency, expressed as percent carried to one decimal place. Zi refers to the reduction efficiency required at the initial performance test. Zc refers to the reduction efficiency required on a continuous basis after compliance with Zi has been demonstrated.

(3) Standards for sulfur dioxide.

(a) During the initial performance test required by paragraph 1200–3–16–.01(5)(g), each owner or operator shall achieve at a minimum, an SO2 emission reduction efficiency (Zi) 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 subparagraph (a) of this paragraph, the owner or operator shall achieve at a minimum, an SO2 emission reduction efficiency (Zc) 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.

(Rules 1200-3-16-.54, continued)

Table 1. Required Minimum Intial SO_2 Emmision Reduction Efficiency (Z_i)

H_2S, content of acid gas (Y), %	Sulfur feed rate (X), LT/D 2.0=X=5.0	5.0<X=15.0	15.0<X=300.0	X>300.0
Y≥50	79.0	.....$88.51X^{0.0101}Y^{0.0125}$..... or 99.8, whichever is smaller		
20≤Y<50	79.0	.....$88.51X^{0.0101}Y^{0.0125}$..... 97.9 or 97.9, whichever is smaller		
10≤Y<20	79.0	$88.51X^{0.0101}Y^{0.0125}$ or 93.5, whichever is smaller	93.5	93.5
Y <10	79.0	79.0	79.0	79.0

Table 2. Required Minimum SO_2 Emmision Reduction Efficiency (Z_c)

H_2S, content of acid gas (Y), %	Sulfur feed rate (X), LT/D 2.0=X=5.0	5.0<X=15.0	15.0<X=300.0	X>300.0
Y≥50	74.0	.....$85.35X^{0.0144}Y^{0.0128}$..... or 99.8, whichever is smaller		
20≤Y<50	74.0	.....$85.35X^{0.0144}Y^{0.0128}$.....97.5 or 97.5, whichever is smaller		
10<Y<20	74.0	$85.35X^{0.0144}Y^{0.0128}$ or 90.3hichever is smaller	90.8	90.8
Y <10	74.0	74.0	74.0	74.0

(4) Compliance Provision.

(a) 1. To determine compliance with the standards for sulfur dioxide specified in subparagraph (3)(a) of this rule during the initial performance test as required by paragraph 1200–3–16–.01(5), the minimum required sulfur dioxide emission reduction efficiency (Z) is compared to the emission reduction efficiency (R) achieved by the sulfur recovery technology.

(Rules 1200-3-16-.54, continued)

(i) If R is greater than or equal to Zi, the affected facility is in compliance.

(ii) If R is less than Zi, the affected facility is not in compliance.

2. Following the initial determination of compliance as required by paragraph 1200–3–16–.01(5), any subsequent compliance determinations that may be required by the Technical Secretary would compare to R to Zc.

(b) The emission reduction efficiency (R) achieved by the sulfur recovery technology is calculated by using the equation:

$$R = \frac{S}{S + E} \quad x \quad 100$$

"S" and "E" are determined using the procedures and the test methods specified in paragraphs (5) and (6) of this rule.

(5) Performance test procedures.

(a) During a performance test required by paragraph 1200–3–16–.01(5) the minimum required sulfur dioxide emission reduction efficiency (Zi) required by subparagraph (3) (a) of this rule, and the minimum required SO2 emission reduction efficiency (Zc) required by subparagraph (3)(b) of this rule are 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 part 1200–3–16–.54(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 x 10-3) x (grains/100 scf)

   Where:

   Y = H2S concentration, volume percent

   1.62 x 10-3 = volume percent per grains/100 scf; and grains/100 scf = Tutwiler result basis.

2. Calculate the arithmetic mean of all samples to determine the average H2S 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 H2S content by the equation:

(Rules 1200-3-16-.54, continued)

$$X = \frac{\text{(average volumetric acid gas flow, dscf/day) (Y/100) (32 lb/lb mole)}}{\text{(385.36 standard cubic feet/lb mole) (2,240 lbs/long ton)}}$$

5. Determine the minimum required SO2 removal efficiency (Zi or Zc) in accordance with the provisions of the standards in subparagraph (3) (a) or (b) of this rule as appropriate.

(b) The actual sulfur emission reduction efficiency (R) achieved by the control technology during the performance test is 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 mean of the rate for each run to determine the average sulfur production rate (S) to use in subparagraph (4) (b) of this rule.

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 parts (6)(a)5. through 7. of this rule. The minimum sampling time for each run shall be 4 hours. For each run the SO2 and TRS concentrations shall be combined to calculate the total SO2 equivalent concentration as follows:

   Total SO2 equivalent, (kg/dscm)

   = 0.001 (SO2 concentration mg/dscm from Method 6)

   - 2.704 x 10-6 (SO2 equivalents in ppmv, dry from Method 15 or from Method 16A)

4. Measure the incinerator (or other final processing unit) exhaust gas velocity, molecular weight, and moisture content using the methods specified in parts (6) (a) 1. through 4. of this rule. Calculate the volumetric flow rate of the exhaust gas at dry standard conditions using equation 2-10 in Method 2.

5. Calculate the equivalent sulfur emission rate as elemental sulfur for each run as follows:

   Sulfur emission rate

   = (total SO2 equivalent kg/dscm) (gas flow rate, dscm/hr) (0.50)

   Calculate the arithmetic mean of the sulfur emission rate for each run to determine the average sulfur emission rate (E) to use in subparagraph (4)(b) of this rule.

(6) Performance Test Methods.

(a) For the purpose of determining compliance with subparagraphs (3)(a) or (b) of this rule, the following reference methods shall be used:

(Rules 1200-3-16-.54, continued)

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 SO2 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 percent 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 percent by volume.

8. The Tutwiler procedure, as specified in *Federal Register*, Vol. 50, No.190, October 1, 1985, pp. 40165 and 40166, or a chromatographic procedure following ASTM E-260, for determination of the H2S 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 m2 (54 ft2) or at a point no closer to the walls than 1 m (39 inches) if the cross-sectional area is 5 m2 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 ft3/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:

$$C_S = \underset{i=1}{\overset{n}{SUM}} \left(C_{si}\right) \left(\frac{t_{si}}{T}\right)$$

Where:

Cs = time-weighted average SO2 or TRS concentration for the run, (mg/dscm or ppmv, dry).

n = number of samples collected during the run.

Csi = SO2 or TRS concentration for sample i, (mg/dscm or ppmv, dry).

tsi = sampling time for sample i, (minutes).

T = total sampling time for all samples in the run (minutes).

(Rules 1200-3-16-.54, continued)

(d) For Method 15, each run shall consist of 16 samples taken over a minimum of 4 hours. The equivalent SO2 concentration for each run shall be calculated as the arithmetic average of the SO2 equivalent concentration 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 measurements shall be used to calculate the volumetric flow rate for each run.

(f) For Method 3, a single sample may be integrated over the 4-hour run interval and analysis, or grab samples at 1-hour intervals may be collected, 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 subparagraphs (3) (a) or (b) of this rule shall install, calibrate, maintain, and operate monitoring devices or perform measurements 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 within $ 2 percent of the 24 hour sulfur accumulation.

2. The H2S 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 part (6)(a)8. of this rule. The Technical Secretary may require the owner or operator to demonstrate that the H2S concentration obtained from one or more samples over a 24-hour period is within + 20 percent of the average of 12 samples collected at equally spaced intervals during the 24-hour period. In instances where H2S concentration of a single sample is not within + 20 percent of the average of the 12 equally spaced samples, the Technical Secretary 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 part (5)(a)4. of this rule.

5. The required sulfur dioxide emission reduction efficiency for the 24-hour period: the sulfur feed rate and the H2S concentration in the acid gas for the 24-hour period as applicable, shall be used to determine the required reduction efficiency in accordance with the provisions of subparagraph (3)(b) of this rule.

(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 SO2 in the gases discharged to the atmosphere. The SO2 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 subparagraph (3)(b) of this rule will be between 30 percent and 70 percent of the measurement range of the instrument system.

2. Except as provided part 3. of this subparagraph: a monitoring device to measure the temperature of the gas leaving the combustion zone of the incinerator, if compliance with subparagraph (3)(a) of this rule 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 percent of the termperature being measured. When performance tests are conducted under the provision of paragraph 1200–3–16–.01(5) to demonstrate compliance with the standards under paragraph (3) of this rule, 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 SO2) in the gas leaving the incinerator is greater than or equal to 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 Technical Secretary 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 paragraph 1200–3–16–.01(5).

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 part 2. of this subparagraph, install, calibrate, maintain, and operate a continuous emission monitoring system for total reduced sulfur compounds as required in subparagraph (d) of this paragraph in addition to a sulfur dioxide emission monitoring system. The sum of the equivalent sulfur mass emission rates from the two 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 SO2 equivalent in the gases discharged to the atmosphere. The SO2 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 subparagraph (3)(b) of this rule will be between 30 and 70 percent 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 subparagraphs (b) or (c) of this paragraph, 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 must be consistent. The 24-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 subparagraph (4)(b) of this rule.

1. Data obtained from the sulfur production rate monitoring device specified in subparagraph (a) of this paragraph shall be used to determine S.

2. Data obtained from the sulfur emission rate monitoring systems specified in subparagraphs (b) or (c) of this paragraph shall be used to calculate a 24-hour average for the sulfur emission rate (E): the monitoring system must provide at least one data point in each successive 15-minute interval. At least two data points must be used to calculate each 1-hour average. A minimum of 18 1-hour averages must be used to compute each 24-hour average.

(e) In lieu of complying with subparagraphs (b) or (c) of this paragraph, those sources with a design capacity less than 150 LT/D of H2S expressed as sulfur may calculate the sulfur emission reduction efficiency achieved for each 24-hour period by:

$$R = \frac{0.0236\ S}{X}\ (100 \text{ percent})$$

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; and 0.0236 = conversion factor, LT/D per kg/hr.

(f) The monitoring devices required in (7)(b)1., (7)(b)3., and (7)(c) of this rule shall be calibrated at least annually according to the manufacturer's specifications, as required by 1200–3–16–.01(8)(b). For conducting the continuous emission monitoring system performance evaluation required by subparagraph 1200–3–16–.01(8)(c), Performance Specification 2 shall apply, and Method 6 (as referenced in 1200–3–16–.01(5)(g)) shall be used for systems required by subparagraph (b) of this paragraph.

(8) Recordkeeping and reporting requirements.

(a) Records of the calculations and measurements required in subparagraphs (3)(a) and (b) and subparagraphs (7)(a) through (f) of this rule must be retained for at least 2 years following the date of the measurements by owners and operators subject to this rule.

(b) Each owner or operator shall submit a written report of excess emissions to the Technical Secretary 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 minimum required efficiency (Z).

2. For any affected facility electing to comply with the provisions of part (7)(b)2. of this rule, any 24-hour period during which the average temperature of the gases leaving the cumbustion zone of an incinerator is less than the appropriate operating temperature as determined during the most recent performance test in accordance with the provisions of part (7)(b)2. of this rule. Each 24-hour period must 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 that 2 LT/D of H2S in the acid gas

(Rules 1200-3-16-.54, continued)

(expressed as sulfur) shall keep, for the life of the facility, an analysis demonstrating that the facility's design capacity is less than 2 LT/D of H2S expressed as sulfur.

(d) Each owner or operator who elects to comply with subparagraph (7)(e) of this rule shall keep, for the life of the facility, a record demonstrating that the facility's design capacity is less than 150 LT/D of H2S expressed sulfur.

***Authority**: T.C.A. §§68–25–105 and 4–5–202.* ***Administrative History**: Original rule filed September 21, 1988; effective November 6, 1988.*

1200–3–16–.55 SECONDARY EMISSIONS FROM BASIC OXYGEN PROCESS STEELMAKING FACILITIES FOR WHICH CONSTRUCTION IS COMMENCED AFTER NOVEMBER 6, 1988.

(1) Applicability and Designation of Affected Facilities

(a) The provisions of this rule apply to the following affected facilities in an iron and steel plant: top-blown BOPF's and hot metal transfer stations and skimming stations used with bottom-blown or top-blown BOPF's.

(b) This rule applies to any facility identified in subparagraph (a) of this paragraph that commences construction, modification, or reconstruction after November 6, 1988.

(c) Any BOPF subject to the provisions of this rule is subject to those provisions of rule 1200–3–16–.14 applicable to affected facilities commencing construction, modification or reconstruction after November 6, 1988.

(2) Definitions

(a) "Basic Oxygen Process Furnace" (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 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.

(f) "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 particulate matter 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).

(g) "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.

(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 primaryand 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 a 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 bath of 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 for 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 subparagraphs (b) and (c) of this paragraph, on and after the date on which the performance test under paragraph 1200–3–16–.01(5) is required to be completed, no owner or operator subject to the provisions of this rule shall 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 percent 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 percent but less than 20 percent may occur once per steel production cycle.

(Rules 1200-3-16-.55, continued)

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 for a top-blown or a bottom-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 for a top-blown or a bottom-blown BOPF and exhibit more than 5 percent opacity.

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

(c) A control device used to collect both primary and secondary emissions from a BOPF is not subjected to parts (a)2. and (a)3. of this paragraph.

(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 Technical Secretary.

(b) If a chart recorder is used, the owner or operator shall use chart recorders that are operated at a 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 percent compared to Method 2 as specified in 1200–3–16.01(5)(g)2. The owner or operator shall recalibrate and check the device(s) annually and at other times as the Technical Secretary may require, in accordance with the written instructions of the manufacturer and by comparing the device against Method 2 specified in 1200–3–16–.01(5)(g)2.

(d) Each owner or operator subject to the requirements of subparagraph (a) of this paragraph shall report on a semiannual basis all measurements of exhaust ventilation rates or levels over any 3-hour period that average more than 10 percent below the average rates or levels of exhaust ventilation maintained during the most recent performance test conducted under paragraph 1200–3–16–.01(5) in which the affected facility demonstrated compliance with the standard under part (3)(a)2. of this rule. The accuracy of the respective measurements, not to exceed the values specified in subparagraph (c) of this paragraph, may be considered when determining the measurement results that must 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 percent below the average levels maintained during the most recent performance test specified in paragraph 1200–3–16–.01(5) in which the affected facility demonstrated compliance with the standard under part (3)(a)1. of this rule.

(5) Test Methods and Procedures

(a) The reference methods contained in subparagraph 1200–3–16–.01(5)(g), except as provided in subparagraph 1200–3–16–.01(5)(b) and as noted below, shall be used to determine compliance with paragraph (3) of this rule. Applicable methods are as follows:

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 subparagraph (b) of this paragraph.

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

1. Section 2.4. Opacity observations shall be recorded to the nearest 5 percent at 15-second intervals. During the initial performance test conducted pursuant to paragraph 1200–3–16–.01(5), observations shall be made and recorded in this manner for a minimum of three 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 three steel production cycles.

2. 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 shall two 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, the sampling for 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 Technical Secretary. 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 subparagraph (4)(a) of this rule, the following instructions for Reference Method 2 shall apply:

1. For devices that monitor and record the exhaust ventilaton 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 two sets to determine whether the monitoring device velocity is within + 10 percent 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 of sufficient intervals to obtain 12 pairs of readings for each duct of the secondary emission capture system. Compare the averages of the two sets to determine whether the monitoring device step change is within $ 10 percent of setpoint rate.

(Rules 1200-3-16-.55, continued)

(6) Compliance Provisions

(a) When determining compliance with mass and visible emission limits specified in parts (3)(a)2. and 3. of this rule, the owner or operator of a BOPF shop that normally operates two furnaces with overlapping cycles may elect to operate only one furnace. If an owner or operator chooses to shut down one furnace, he shall be allowed a reasonable time period to adjust his 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 rule 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 two 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 operation. 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 percent 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 parts (3)(a)1. and 3. of this rule, 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 part (3)(a)1. of this rule, 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 percent and the second highest 3-minute average is 10 percent or less.

(f) To determine compliance with part (3)(a)2. of this rule, determine the concentration of particulate matter in exhaust gases exiting the secondary emission collection device with Method 5. Compliance is achieved if the concentration of particulate matter does not exceed 23 mg/dscm (0.010 gr/dscf).

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

***Authority**: T.C.A. §§68–25–105 and 4–5–202.* ***Administrative History**: Original rule filed September 21, 1988; effective November 6, 1988.*

1200–3–16–.56 WOOL FIBERGLASS INSULATION MANUFACTURING PLANTS.

(1) Applicability and Designation of Affected Facility

(a) The affected facility to which the provisions of this rule apply is each rotary spin wool fiberglass insulation manufacturing line.

(b) The owner or operator of any facility under subparagraph (a) of this paragraph that commences construction, modification, or reconstruction after November 6, 1988, is subject to the requirements of this rule.

(2) Definitions

(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 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

(a) On and after the date on which the performance test required to be conducted by 1200–3–16–.01(5) is completed, no owner or operator subject to the provisions of this rule shall cause to be discharged into the atmosphere from any affected facility any gases which contain particulate matter in excess of 5.5 kg/Mg (11.0 lb/ton) of glass pulled.

(4) Monitoring of Operations

(a) An owner or operator subject to the provisions of this rule 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 scrubbing liquid flow rate to each scrubber. The pressure drop monitor is to be certified by its manufacturer to be accurate within + 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 + 5 percent over its operating range.

(b) An owner or operator subject to the provisions of this rule 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 1030-1050C," in Standard Methods for the Examination of Water and Wastewater, 15th Edition, 1980. Total residue shall be reported as percent by weight. All monitoring devices required under this subparagraph are to be certified by their manufacturers to be accurate within + 5 percent over their operating range.

(Rule 1200-3-16-.56, continued)

(c) All monitoring devices required under this paragraph are to be recalibrated quarterly in accordance with procedures under 1200–3– 16–.01(8)(b).

(5) Record Keeping 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 subparagraph (4)(a) of this rule.

(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 subparagraph (4)(b) of this rule, 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 subparagraphs (a) and (b) of this paragraph must be retained for at least 2 years.

(d) Each owner or operator shall submit written semiannual reports of exceedances of control device operating parameters required to be monitored by subparagraphs (a) and (b) of this paragraph and written documentation of, and a report of corrective maintenance required as a result of, quarterly calibrations of the monitoring devices required in subparagraph (4)(c) of this rule. For the purpose of these reports, exceedances are defined as any monitoring data that are less than 70 percent of the lowest value of each operating parameter recorded during the most recent performance test.

(e) Reserved.

(6) Test Methods and Procedures

(a) The reference methods contained in subparagraph (5)(g) of rule 1200–3–16–.01 except as provided in subparagraph (5)(b) of rule 1200–3–16–.01, shall be used to determine compliance with paragraph (3) of this rule. Applicable methods are 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:

(Rule 1200-3-16-.56, continued)

$$R = Ct \times Qstd \times \frac{6 \times 10\text{-}5 \text{ min - Kg}}{\text{h - mg}}$$

Where:

R = mass emission rate (kg/h)

Ct = particulate concentration as determined by Reference Method 5E (mg/dscm)

Qstd = stack gas volumetric flow rate as determined by Reference Method 2 (dscm/min)

(e) The glass pull rate, P, for the manufacturing line shall be computed as follows:

$$P = L_s \times W_m \times M \times \frac{100 - LOI}{100} \times \frac{6 \times 10^{-5} \text{ min - Mg}}{\text{h - g}}$$

Where:

P = glass pull rate (Mg/h)

L_s = line speed (m/min)

W_m = trimmed mat width (m)

min = minutes

Mg = megagrams

h = hour

g = grams

M = mat gram weight (g/m2)

LOI = loss on ignition (weight percent), as determined by ASTM Standard Test Method D2584-68 (Reapproved 1979), “Ignition Loss of Cured Reinforced Resins”

(Note: All references to ASTM in this rule refers to the American Society for Testing Materials. Copies of methods are available for purchase by writing to ASTM, 1916 Race Street, Philadelphia, PA 19103 or by writing to the Tennessee Division of Air Pollution Control, 701 Broadway, 4th Floor Customs House, Nashville, TN 37219. Be sure and specify which method is desired.)

For each 2-hour test run, the average glass pull rate shall be computed from at least three 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:

$$E = \frac{R}{Pavg}$$

Where:

E = mass emission level (kg/Mg)

(Rule 1200-3-16-.56, continued)

R = mass emission rate (kg/h)

Pavg = average glass pull rate (Mg/h)

***Authority**: T.C.A. §§68–25–105 and 4–5–202. **Administrative History**: Original rule filed September 21, 1988; effective November 6, 1988.*

1200–3–16–.57 INDUSTRIAL SURFACE COATING: SURFACE COATING OF PLASTIC PARTS FOR BUSINESS MACHINES.

(1) Applicability and Designation of Affected Facility

(a) The provisions of this rule 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 rule applies to any affected facility for which construction, modification, or reconstruction begins after November 6, 1988.

(2) Definitions and Symbols

(a) Definitions

1. "Business machine" means a device that uses electronic or mechanical methods to process information, perform calculations, print or copy information, or convert sound into electrical impulses for transmission, such as:

(i) Products classified as typewriters under SIC Code 3572;

(ii) Products classified as electronic computing devices under SIC Code 3573;

(iii) Products classified as calculating and accounting machines under SIC Code 3574;

(iv) Products classified as telephone and telegraph equipment under SIC Code 3661;

(v) Products classified as office machines, not elsewhere classified, under SIC Code 3579; and

(vi) Photocopy machines, a subcategory of products classified 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.

(Rules 1200-3-16-.57, continued)

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 part 1200–3–16–.01– (7)(a)2).

8. "Plastic parts" means panels, housing, 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" means 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 VOC's emitted from the surface coating of plastic parts for business machines expressed as kilograms of VOC's per liter of coating applied, (i.e., deposited on the surface).

(b) Symbols:

1. Dc = density of each coating as received (kilograms per liter)

2. Dd = density of each diluent VOC (kilograms per liter)

3. Lc = the volume of each coating consumed, as received (liters)

4. Ld = the volume of each diluent VOC added to coatings (liters)

5. Ls = the volume of coating solids consumed (liters)

6. Md = the mass of diluent VOC's consumed (kilograms)

7. Mo = the mass of VOC's in coatings consumed, as received (kilograms)

8. N = the volume-weighted average mass of VOC emissions to the atmosphere per unit volume of coating solids applied (kilograms per liter)

(Rules 1200-3-16-.57, continued)

9. T = the transfer efficiency for each type of application equipment used at a coating operation (fraction)

10. Tavg = the volume-weighted average transfer efficiency for a coating operation (fraction)

11. Vs = the proportion of solids in each coating, as received (fraction by volume)

12. Wo = the proportion of VOC's in each coating, as received (fraction by weight)

(3) Standards for Volatile Organic Compounds (VOC's)

(a) Each owner or operator of any affected facility which is subject to the requirements of this rule shall comply with the emission limitations set forth in this paragraph on and after the date on which the initial performance test, required by paragraph 1200–3–16–.01(5)(g) and paragraph (4) of this rule 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, whichever date comes first. No affected facility shall cause the discharge into the atmosphere in excess of:

1. 1.5 kilograms of VOC's per liter of coating solids applied from prime coating of plastic parts for business machines.

2. 1.5 kilograms of VOC's per liter of coating solids applied from color coating of plastic parts for business machines.

3. 2.3 kilograms of VOC's per liter of coating solids applied from texture coating of plastic parts for business machines.

4. 2.3 kilograms of VOC's per liter of coatings solids applied from touch-up coating of plastic parts for business machines.

(b) All VOC emissions that are caused by coatings 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 subparagraph (a) of this paragraph.

(4) Performance Tests and Compliance Provisions

(a) Subparagraphs 1200–3–16–.01(5)(d) and (f) do not apply to the performance test procedures required by this paragraph.

(b) The owner or operator of an affected facility shall conduct an initial performance test as required under 1200–3–16–.01(5) and thereafter a performance test each nominal one (1) month period for each affected facility according to the procedures in this paragraph.

1. The owner or operator shall determine the composition of coatings by analysis of each coating, as received, using Reference Method 24 (as specified in rule 1200–3–16–.01(5)(g)24.), from data that have been determined by the coating manufacturer using Reference Method 24, or by other methods approved by the Technical Secretary.

2. The owner or operator shall determine the volume of coating and the mass of VOC used for dilution of coatings from company 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 Technical Secretary.

(Rules 1200-3-16-.57, continued)

(i) The owner or operator shall calculate the volume-weighted average mass of VOC's in coatings emitted per unit volume of coating solids applied (N) at each coating operation during each nominal 1-month period for each affected facility. Each 1-month calculation is considered a performance test. Except as provided in subpart (iii) of this part, N will be determined by the following procedures:

(I) Calculate the mass of VOC's used (Mo + Md) for each coating operation during each nominal 1-month period for each affected facility by the following equation:

$$Mo + Md = \sum_{i=1}^{n} Lci\ Dci\ Woi + \sum_{j=1}^{m} Ldj\ Ddj$$

where n is the number of different coatings used during each nominal 1-month period and m is the number of different diluent VOC's used during each nominal 1-month period. (sum LdjDdj will be "0" if no VOC's are added to the coatings, as received.)

(II) Calculate the total volume of coating solids consumed (Ls) in each nominal 1-month period for each coating operation for each affected facility by the following equation:

$$L = \sum_{i=1}^{n} LciVsi$$

where n is the number of different coatings used during each nominal 1-month period.

(III) 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 Technical Secretary that transfer efficiencies other than those shown are appropriate, the Technical Secretary will approve their use on a case-by-case basis. Transfer efficiency values for application methods not listed below shall be approved by the Technical Secretary on a case-by-case basis. An owner or operator must submit sufficient data for the Technical Secretary to judge the accuracy of the transfer efficiency claims.

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.

(IV) 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 Technical Secretary and compute the volume-weighted average transfer efficiency by the following equation:

(Rules 1200-3-16-.57, continued)

$$Tavg = \frac{\sum_{i=1}^{n} \sum_{k=1}^{p} Lcik\ Vsik\ Tk}{Ls}$$

where n is the number of coatings of each type used and p is the number of application methods used. Where Lcik is the volume of each coating consumed, as received (liters); Vsik is the proportion of solids in each coating, as received (fraction by weight); and Tk is the transfer efficiency for each type of application equipment used at a coating operation (fraction, see Table 1).

(V) Calculate the volume-weighted average mass of VOC's 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:

$$N = \frac{Mo + Md}{Ls\ Tavg}$$

(Tavg = T when only one type of coating operation occurs)

(ii) Where the volume-weighted average mass of VOC's 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.

(iii) If each individual coating used by an affected facility has a VOC content (kg VOC/1 of solids), 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 1.5 kilograms per liter for prime and color coats and equal to less than 2.3 kilograms per liter for texture and touch-up coats, the affected facility is in compliance provided that no VOC's are added to the coatings during distribution or application.

(iv) If an affected facility uses add-on controls to control VOC emissions and if the owner or operator can demonstrate to the Technical Secretary that the volume-weighted average mass of VOC's emitted to the atmosphere per unit volume of coating solids applied (N) is within limits expressed in subpart (b)2.(ii) of this paragraph because of this equipment, the affected facility is in compliance. In such cases, compliance will be determined by the Technical Secretary on a case-by- case basis.

(5) Reporting and Record Keeping Requirements

(a) The reporting requirements of subparagraph 1200–3–16–.01(5)(a) apply only to the initial performance test. Each owner or operator subject to the provisions of this rule shall include the following data in the report of the initial performance test required under subparagraph 1200–3–16–.01(5)(a):

1. Except as provided for in part 2 of this subparagraph, the volume-weighted average mass of VOC's emitted to the atmosphere per volume of applied coating solids (N) for the initial nominal 1- month period from each affected facility.

2. For each affected facility where compliance is determined under the provisions of subpart (4)(b)2.(iii) of this rule, a list of the coatings used during the initial nominal 1-month

(Rules 1200-3-16-.57, continued)

period, the VOC content of each coating calculated from data determined using Reference Method 24, and the lowest transfer efficiency of any coating application equipment used 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 VOC's per unit volume of coating solids applied for each affected facility during each nominal 1-month period in which the facility is not in compliance with the applicable emission limit specified in paragraph (3) of this rule. 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 limit specified in paragraph (3) of this rule 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 parts (b) 1. and 2. of this paragraph.

(d) Each owner or operator subject to the provisions of this rule 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 as specified in subparagraph 1200–3–16–.01(7)(d).

(e) Reporting and record keeping requirements for facilities using add-on controls will be determined by the Technical Secretary on a case-by-case basis.

(6) Test Methods and Procedures

(a) The reference methods contained in subparagraph 1200–3–16–.01(5)(g) except as provided in subparagraph 1200–3–16–.01(5)(b) shall be used to determine compliance with paragraph (3) of this rule. Applicable methods are as follows:

1. Method 24 for determination of VOC content of each coating as received.

2. For Method 24, the sample must be at least a 1-liter sample in at least a 1-liter container.

(b) Other methods may be used to determine the VOC content of each coating if approved by the Technical Secretary before testing.

***Authority**: T.C.A. §§68–25–105 and 4–5–202.* ***Administrative History**: Original rule filed September 21, 1988; effective November 6, 1988.*

1200–3–16–.58 RESERVED.

1200–3–16–.59 INDUSTRIAL-COMMERCIAL-INSTITUTIONAL STEAM GENERATING UNITS.

(1) Applicability and Definition of Affected Facility

(a) The affected facility to which this rule applies is each industrial-commercial-institutional steam generating unit for which construction, modification, or reconstruction is commenced after November 6, 1988 and which has a heat input capacity from fuels combusted in the steam generating unit of more than 29 MW (100 million Btu/hour), except as provided under subparagraph (b) through (f) of this paragraph.

(Rules 1200-3-16-.59, continued)

(b) Coal-fired steam generating units meeting both the applicability requirements under this rule and the applicability requirements for rule 1200–3–16–.02 are subject to the particulate matter and nitrogen oxides standards under this rule and the sulfur dioxide standards under 1200–3–16–.02(4).

(c) Oil-fired steam generating units meeting both the applicability requirements under this rule and the applicability requirements for rule 1200–3–16–.02 are subject to the nitrogen oxides standards under this rule and the sulfur dioxide and particulate matter standards under rule 1200–3–16–.02.

(d) Steam generating units meeting the applicability requirements under this rule and the applicability requirements under rule 1200–3–16–.09 are subject to the particulate matter and nitrogen oxides standards under this rule and the sulfur dioxide standards under rule 1200–3–16–.09.

(e) Steam generating units meeting both the applicability requirements under this rule and the applicability requirements under rule 1200–3–16–.04 are subject to the nitrogen oxides and particulate matter standards under this rule.

(f) Steam generating units meeting the applicability requirements under rule 1200–3–16–.03 are not subject to this rule.

(2) Definitions. As used in this rule, all terms not defined herein shall have the meaning given them in 1200–3–16–.01(4).

(a) “Annual capacity factor” means the ratio between the actual heat input to a steam generating unit from the fuels listed in subparagraph (4)(a) or (5)(a) of this rule, as applicable, during a calendar year and the potential heat input to the steam generating unit from all fuels had it been operated for 8,760 hours at the maximum design heat input capacity.

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

(c) “Chemical manufacturing plants” means industrial plants which are classified by the Department of Commerce under Standard Industrial Classification (SIC) Code 28.

(d) “Coal” means all solid fuels classified as anthracite, bituminous, subbituminous, or lignite by the American Society of Testing and Materials in ASTM D388-77, Standard Specification for Classification of Coals by Rank. Coal-derived synthetic fuels, including but not limited to solvent refined coal, gasified coal, coal-oil mixtures and coal-water mixtures, are included in this definition for the purposes of this rule.

(Note: All references to ASTM in this rule refers to the American Society for Testing Materials. Copies of methods are available for purchase by writing to ASTM, 1916 Race Street, Philadelphia, PA 19103 or by writing to the Tennessee Division of Air Pollution Control, 701 Broadway, 4th Floor Customs House, Nashville, TN 37219. Be sure and specify which method is desired).

(e) “Cogeneration system” means a power system which simultaneously produces both electrical (or mechanical) and thermal energy from the same energy source.

(f) “Combined cycle system” means a system where a gas turbine provides exhaust gas to a heat recovery steam generating unit.

(Rules 1200-3-16-.59, continued)

(g) "Distillate oil" means fuel oils which contain 0.05 weight percent nitrogen or less and comply with the specifications for fuel oils number 1 and 2, as defined by the American Society of Testing and Materials in ASTM D396-78, Standard Specifications for Fuel Oils.

(h) "Duct burner" means a device which combusts fuel and which is placed in the exhaust duct of a stationary gas turbine to allow the firing of additional fuel before the exhaust gas enters a heat recovery steam generating unit.

(i) "Legally enforceable" means all limitations and conditions which are enforceable by the Technical Secretary and the EPA administrator, including those under this Division 1200–3 and the State Implementation Plan, and any permit requirements established pursuant to this rule.

(j) "Fluidized bed combustion steam generating unit" means a device wherein fuel and solid sorbent are distributed onto or into a bed, or series of beds, of aggregate for combustion and these materials together with solid products of combustion are forced upward in the device by the flow of combustion air and the gaseous products of combustion.

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

(l) "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 gas turbine exhaust gases.

(m) "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.

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

(o) "High heat release rate" means a heat release rate greater than 730,000 J/sec-m3 (70,000 Btu/hour-ft3).

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

(q) "Low heat release rate" means a heat release rate of 730,000 J/sec m3(70,000 Btu/hour-ft3) or less.

(r) "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.

(s) "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.

(t) "Municipal-type solid waste" means refuse, more than 50 percent of which is municipal-type 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.

(Rules 1200-3-16-.59, continued)

(u) "Natural gas" means 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.

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

(w) "Petroleum refinery" means industrial plants which are classified by the Department of Commerce under Standard Industrial Classification (SIC) Code 29.

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

(y) "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.

(z) "Residual oil" means crude oil, fuel oils number 1 and 2 which have a nitrogen content of greater than 0.05 weight percent, and all fuel oils number 4, 5 and 6 as defined by the American Society of Testing and Materials in ASTM D396-78, Standard Specifications for Fuel Oils.

(aa) "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. Combustion takes place both in suspension and on the grate.

(bb) "Steam generating unit" means a device which 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 waste incinerator with a heat recovery steam generating unit or any steam generating unit which combusts fuel and is part of a cogeneration system or a combined cycle system. This term does not include process heaters.

(cc) "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 any time in the steam generating unit. It is not necessary for fuel to be combusted continuously for the entire 24- hour period.

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

(ee) "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) Reserved

(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 1200–3–16–.01(5), whichever date comes first, no owner or operator of an affected facility which combusts coal or combusts mixtures of coal with other fuels, shall 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 nanograms per joule (0.05 lb/million Btu) heat input:

(i) If the affected facility combusts only coal, or

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

2. 43 nanograms per joule (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 percent (0.10) and is subject to a legally enforceable requirement limiting operation of the affected facility to an annual capacity factor greater than 10 percent (0.10) for fuels other than coal.

3. 86 nanograms per joule (0.20 lb/million Btu) heat input if the affected facility combusts coal or coal and other fuels and

(i) Has an annual capacity factor for coal or coal and other fuels of 30 percent (0.30) or less,

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

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

(iv) Construction of the affected facility commenced after June 19, 1984 and before November 6, 1988.

(b) On or after the date on which the initial performance test is completed or is required to be completed under 1200–3–16–.01(5), whichever date comes first, no owner or operator of an affected facility which combusts wood, or wood with other fuels, except coal, shall cause to be discharged from that affected facility any gases which contain particulate matter in excess of the following emission limits:

1. 43 nanograms per joule (0.10 lb/million Btu) heat input if the affected facility has an annual capacity factor greater than 30 percent (0.30) for wood.

2. 86 nanograms per joule (0.20 lb/million Btu) heat input if

(i) The affected facility has an annual capacity factor of 30 percent (0.30) or less for wood,

(ii) Is subject to a legally enforceable requirement limiting operation of the affected facility to an annual capacity factor 30 percent (0.30) or less for wood, and

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

(c) On and after the date on which the initial performance test is completed or is required to be completed under 1200–3–16–.01(5), whichever date comes first, no owner or operator of an affected facility which combusts municipal-type solid waste or mixtures of municipal-type solid waste with other fuels, shall 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. 43 nanograms per joule (0.10 lb/million Btu) heat input:

(i) If the affected facility combusts only municipal-type solid waste, or

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

2. 86 nanograms per joule (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

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

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

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

(iv) Construction of the affected facility commenced after June 19, 1984 but before November 6, 1988.

(d) For the purposes of this paragraph, 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.

(e) On and after the date on which the initial performance test is completed or is required to be completed under 1200–3–16–.01(5), whichever date comes first, no owner or operator of an affected facility subject to the particulate matter emission limits under subparagraphs (a), (b), or (c) of this paragraph shall cause to be discharged into the atmosphere any gases which exhibit greater than 20 percent opacity (6-minute average), except for one 6-minute period per hour of not more than 27 percent opacity.

(5) Standard for Nitrogen Oxides

(a) On and after the date on which the initial performance test is completed or is required to be completed under 1200–3–16–.01(5), whichever date comes first, no owner or operator of an affected facility subject to the provisions of this paragraph which combusts only coal, oil, or natural gas shall cause to be discharged into the atmosphere from that affected facility any gases which contain nitrogen oxides in excess of the following emission limits:

(Figures in parentheses represent lb/million Btu heat input)

Fuel/Steam generating unit type			Nitrogen Oxide1
(1)	Natural–gas and distillate oil, except (4):		
	(i)	Low heat release rate	43(0.10)
	(ii)	High heat release rate	86(0.20)
(2)	Residual oil:		
	(i)	Low heat release rate	130(0.30)
	(ii)	High heat release rate	170(0.40)
(3)	Coal:		
	(i)	Mass-feed stoker	210(0.50)

(Rules 1200-3-16-.59, continued)

	(ii)	Spreader stoker and fluidized bed combustion	260(0.60)
	(iii)	Pulverized coal	300(0.70)
	(iv)	Lignite, except (v)	260(0.60)
	(v)	Lignite mined in North Dakota, South Dakota, or Montana and combusted in a slag tap furnace	340(0.80)
	(vi)	Coal-derived synthetic fuels	210(0.50)
(4)	Duct burner used in a combined cycle system:		
	(i)	Natural gas and distillate oil	86(0.20)
	(ii)	Residual oil	170(0.40)

1Emission limits nanograms per joule heat input.

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

2. 130 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.

(b) On and after the date on which the initial performance test is completed or is required to be completed under 1200–3–16–.01(5), whichever date comes first, no owner or operator of an affected facility which simultaneously combusts mixtures of coal, oil, or natural gas shall cause to be discharged into the atmosphere from that affected facility any gases which contain nitrogen oxides in excess of a limit determined by use of the following formula:

ENOx = (ELgo x Hgo) + (ELro x Hro) + (ELc x Hc) /Ht

Where:

ENOx is the nitrogen oxides emission limit,

ELgo is the appropriate emission limit from subparagraph (a)(1) of this paragraph for combustion of natural gas or distillate oil,

Hgo is the heat input from combustion of natural gas or distillate oil,

ELro is the appropriate emission limit from subparagraph (a)(2) of this paragraph for combustion of residual oil,

Hro is the heat input from combustion of residual oil,

ELc is the appropriate emission limit from subparagraph (a)(3) of this paragraph for combustion of coal,

Hc is the heat input from combustion of coal, and

Ht is the total heat input to the steam generating unit from combustion of coal, oil, and natural gas.

(c) On and after the date on which the initial performance test is completed or is required to be completed under 1200–3–16–.01(5), whichever comes first, no owner or operator of an effected facility which simultaneously combusts coal or oil, or a mixture of these fuels with natural gas, and wood, municipal-type solid waste, or any other fuel shall cause to be discharged into the atmosphere any gases which 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 subparagraph (a) or (b) of this paragraph, unless the affected facility has an annual capacity factor for coal or oil, or mixture of these fuels with natural gas of 10 percent (0.10) or less and is subject to a legally enforceable requirement which limits operation of the facility to an annual capacity factor of 10 percent (0.10) or less of 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 1200–3–16–.01(5), whichever date comes first, no owner or operator of an affected facility which simultaneously combusts natural gas with wood, municipal-type solid waste, or other solid fuel, except coal, shall cause to be discharged into the atmosphere from that affected facility any gases which contain nitrogen oxides in excess of 130 nanograms per joule (0.30 lb/million Btu) heat input unless the affected facility has an annual capacity factor for natural gas of 10 percent or less and is subject to a legally enforceable requirement which limits operation of the affected facility to an annual capacity factor of 10 percent (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 1200–3–16–.01(5), whichever date comes first, no owner or operator of an affected facility which simultaneously combusts coal, oil, or natural gas with byproduct/wastes shall cause to be discharged into the atmosphere from that affected facility any gases which 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 percent (0.10) or less and is subject to a legally enforceable requirement which limits operation of the affected facility to an annual capacity factor of 10 percent (0.10) or less:

$$ENOx = (ELgo \times Hgo) + (ELro \times Hro) + (ELc \times Hc) / Ht$$

Where:

ENOx is the nitrogen oxides emission limit,

ELgo is the appropriate emission limit from subparagraph (a)(1) of this paragraph for combustion of natural gas or distillate oil,

Hgo is the heat input from combustion of natural gas, distillate oil and gaseous byproduct/waste.

ELro is the appropriate emission limit from subparagraph (a)(2) of this paragraph for combustion of residual oil,

Hro is the heat input from combustion of residual oil and/or liquid byproduct/waste.

ELc is the appropriate emission limit from subparagraph (a)(3) of this paragraph for combustion of coal.

Hc is the heat input from combustion of coal, and

Ht is the total heat input to the steam generating unit from combustion of natural gas, oil, coal, and byproduct/waste.

(f) Any owner or operator of an affected facility which combusts byproduct/waste with either natural gas or oil may petition the Technical Secretary within 180 days of the initial startup of the affected facility to establish a nitrogen oxides 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 Technical Secretary, such as nitrogen oxides emissions from the affected facility, waste composition (including nitrogen content), and combustion conditions to allow the Technical Secretary to confirm that the affected facility is unable to comply with the emission limits in subparagraph (e) of this paragraph 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 pursuant to this section shall:

   (i) Demonstrate compliance with the emission limits for natural gas and distillate oil in subparagraph (a)1 or for residual oil in subparagraph (a)2 of this paragraph, as appropriate, by conducting a 30-day performance test as provided in subparagraph (6)(e) of this rule. During the performance test only natural gas, distillate oil, or residual oil shall be combusted in the affected facility; and

   (ii) Demonstrate that the affected facility is unable to comply with the emission limits for natural gas and distillate oil in subparagraph (a)1 or for residual oil in subparagraph (a)2 of this paragraph, 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 subpart (i) of this part.

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

(6) Reserved

(7) Compliance and Performance Testing for Particulate Matter and Nitrogen Oxides

(a) The particulate matter emission standards and opacity limits under paragraph (4) of this rule apply at all times except during periods of startup, shutdown, or malfunction. The nitrogen oxides emission standards under paragraph (5) of this rule apply at all times.

(b) Compliance with the particulate matter emission standards under paragraph (4) of this rule shall be determined through performance testing as described in subparagraph (d) of this paragraph.

(c) Compliance with the nitrogen oxides emission standards under paragraph (5) of this rule shall be determined through performance testing as described in subparagraph (e) or (f) of this paragraph.

(d) The following procedures and reference methods are used to determine compliance with the standards for particulate matter emissions under paragraph (4) of this rule.

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

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

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

(ii) Method 17 may be used at facilities with or without wet scrubber systems provided that the stack gas temperature does not exceed a temperature of 160oC (320oF). The procedures of sections 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.

(iii) Method 5B is to be used only after wet FGD systems.

3. Reference Method 1 is used to select the sampling site and the number of traverse sampling points. The sampling time for each run is 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 Technical Secretary or when necessitated by process variables or other factors.

4. For Reference Method 5, the temperature of the sample gas in the probe and filter holder is monitored and is maintained at 1600C (3200F).

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:

(i) The oxygen or carbon dioxide measurements and particulate matter measurements obtained under this section,

(ii) The dry basis Fc factor, and

(iii) The dry basis emission rate calculation procedure contained in Reference Method 19 (as specified in 1200–3–16–.01(5)(g)19).

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

(e) To determine compliance with the emission limits for nitrogen oxides required under paragraph (5) of this rule, the owner or operator of an affected facility shall conduct the performance test as required under 1200–3–16–.01(5) using the continuous system for monitoring nitrogen oxides under paragraph (9) of this rule.

1. For the initial compliance test, nitrogen oxides from the steam generating unit are 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 paragraph (5) of this rule. 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 1200–3–16–.01(5), whichever date comes first, the owner or operator of an affected facility which fires coal or which fires residual oil having a nitrogen content greater than 0.30 weight percent shall determine compliance with the nitrogen oxides emission standards under paragraph (5) of this rule 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.

(Rules 1200-3-16-.59, continued)

3. Following the date on which the initial performance test is completed or is required to be completed under 1200–3–16–.01(5), 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 fires natural gas, distillate oil, or residual oil having a nitrogen content of 0.30 weight percent or less shall determine compliance with the nitrogen oxides standards under paragraph (5) of this rule 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 oxide 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 1200–3–16–.01(5), 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 fires natural gas, distillate oil, or residual oil having a nitrogen content of 0.30 weight percent or less shall determine compliance with the nitrogen oxides standards under paragraph (5) of this rule through the use of a 30-day performance test when requested by EPA. During periods when performance tests are not requested by EPA, nitrogen oxides emissions data collected pursuant to parts 1 or 2 of subparagraph (9)(g) of this rule are used to calculate a 30-day rolling average emission rate on a daily basis and 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 fires residual oil does not sample and analyze the residual oil for nitrogen content, as specified in subparagraph (10)(e) of this rule, the requirements of part (e)3. of this paragraph apply and the provisions of part (e)4. of this paragraph are inapplicable.

(f) To determine compliance with the emission limit for nitrogen oxides required by part (5)(a)4. of this rule for duct burners used in combined cycle systems, the owner or operator of an affected facility shall conduct the performance test required under 1200–3–16–.01(5) using the nitrogen oxides and oxygen measurement procedures in Reference Method 20. During the performance test, one sampling site shall be located as close as practical to the exhaust of the turbine, as provided by in Reference Method 20. 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 these two 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) Reserved

(9) Emission Monitoring for Particulate Matter and Nitrogen Oxides

(a) The owner or operator of an affected facility subject to the opacity standard under paragraph (4) of this rule 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 subparagraphs (g) and (h) of this paragraph, the owner or operator of an affected facility subject to the nitrogen oxides standard of subparagraph (5)(a) of this rule 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.

(Rules 1200-3-16-.59, continued)

(c) The continuous monitoring systems required under subparagraph (b) of this paragraph shall be operated and data recorded during all periods of operation of the affected facility except for continuous monitoring system breakdowns, repairs, 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 subparagraph (b) of this paragraph and required under 1200–3–16–.01(8)(h) shall be expressed in nanograms per joule or lb/million Btu heat input and shall be used to calculate the average emission rates under paragraph (5) of this rule. The 1-hour averages shall be calculated using the data points required under 1200–3–16–.01(5)(8). At least 2 data points must be used to calculate each 1-hour average.

(e) The procedures under rule 1200–3–16–.01(8) shall be followed for installation, evaluation, and operation of the continuous monitoring systems.

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

2. For affected facilities burning 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, and

z is the fraction of total heat input derived from coal.

3. All span values computed under subparagraph (e)(2) of this paragraph for burning combinations of regulated fuels are 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, Reference Method 7, Reference Method 7A, or other approved reference methods to provide emission data for a minimum of 75 percent 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 which 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 percent or less, natural gas, distillate oil, or any mixture of these fuels, greater than 10 percent (0.10) shall:

1. Comply with the provisions of subparagraphs (b), (c), (d), and (f) and parts (e)2., (e)3., of this paragraph, or
2. Monitor steam generating unit operating conditions and predict nitrogen oxides emission rates as specified in a plan submitted pursuant to subparagraph (10)(c) of this rule.

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

(10) Reporting and Record Keeping Requirements

(a) The owner or operator of each affected facility shall submit notification of the date of initial startup. This notification shall include:

1. Identification of the fuels to be combusted in the affected facility, and

2. The design heat input capacity and, if applicable, a copy of any legally enforceable requirement which limits the annual capacity factor for any fuel or mixture of fuels listed in paragraph (4), or for any fuel or mixture of fuels listed in paragraph (5) of this rule.

3. (Reserved)

4. (Reserved)

(b) For facilities subject to the particulate matter and nitrogen oxides emission limits under paragraph (4) and (5) of this rule, the performance test data from the initial performance test and the performance evaluation of the continuous emission monitors shall be submitted to the Technical Secretary by the owner or operator of the affected facility.

(c) The owner or operator of each affected facility subject to the nitrogen oxides standard of paragraph(5) of this rule who seeks to demonstrate compliance with those standards through the monitoring of steam generating until operating conditions pursuant to the provisions of part (9)(g)2. of this rule shall submit to the Technical Secretary for approval a plan which identifies the operating conditions to be monitored under part (9)(g)2. of this rule and the records to be maintained under subparagraph (j) of this paragraph. This plan shall be submitted to the Technical Secretary 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., nanograms per joule or pounds per million Btu heat input). Steam generating unit operating conditions include, but are not limited to, 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 which 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 subparagraph (9)(g) of this rule 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 subparagraph (10)(j) of this rule. 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 fired during each day and calculate the annual capacity factor for coal, oil, natural gas, wood, and municipal-type solid waste for each calendar quarter.

(e) For affected facilities which fire residual oil having a nitrogen content of 0.3 weight percent or less; have heat input capacities of 73 MW (250 million Btu/hour) or less; and monitor nitrogen oxides emissions or steam generating unit operating conditions pursuant to subparagraph (9)(g) of this rule, the owner or operator shall maintain records of the nitrogen content of the oil fired in the affected facility and calculate the average fuel nitrogen content on a per calendar quarter basis. The nitrogen content shall be determined using ASTM Method D3431-80, Test Method for Trace Nitrogen in Liquid Petroleum Hydrocarbons, or fuel specification data obtained from fuel suppliers. If residual oil blends are being fired, 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 paragraph (4) of this rule, the owner or operator shall maintain records of opacity.

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

1. Calendar date.

2. The average hourly nitrogen oxides emission rates (nanograms per joule or lb per million Btu heat input) measured or predicted.

3. The 30 day average nitrogen oxide emission rates (nanogram per joule or lb per million Btu heat input) calculated at the end of the 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 average nitrogen oxide emission rates are in excess of the nitrogen oxides emissions standards under paragraph (5) of this rule 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 emissions data have been excluded from the calculation of average emission rates and the reasons for excluding the 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.

(Rules 1200-3-16-.59, continued)

9. Description of any modifications to the continuous monitoring system which could affect the ability of the continuous monitoring system to comply with Performance Specifications 2 or 3.

(h) The owner or operator of any affected facility in any category listed below in subparagraphs (h)1. and (h)2. of this paragraph 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 subparagraph (4)(e) of this rule or to the operating parameter monitoring requirements under subpart (i) of rule 1200–3–16–.01(8).

2. Any affected facility which is subject to the nitrogen oxides standard of paragraph (4) of this rule; fires natural gas, distillate oil, or residual oil with a nitrogen content of 0.3 percent or less; and 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 pursuant to part (9)(g)1. of this rule or steam generating unit operating conditions pursuant to part (9)(g)2. of this rule.

3. For the purpose of paragraph (4) of this rule, excess emissions are defined as all 6-minute periods during which the average opacity exceeds the opacity standards under subparagraph (4)(e) of this rule.

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

(i) The owner or operator of any affected facility subject to the continuous monitoring requirements for nitrogen oxides pursuant to paragraph (9) of this rule shall submit a quarterly report containing the information recorded pursuant to subparagraph (b) of this paragraph.

(j) (Reserved)

(k) (Reserved)

(l) (Reserved)

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

Authority*: T.C.A. §§68–25–105 and 4–5–202.* ***Administrative History****: Original rule filed September 21, 1988; effective November 6, 1988.*

1200–3–16–.60 RUBBER TIRE MANUFACTURING INDUSTRY. (A new rule to limit emissions from the manufacture of rubber tires)

(1) Applicability

(a) The provisions of this rule 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 rule apply to each facility identified in subparagraph (a) of this paragraph that commences construction or modification after (the effective date of this rule).

(c) Although the affected facilities listed under subparagraph (1)(a) are defined in reference to the production of components of a "tire," as defined under part (2)(a)16., the percent emission reduction requirements and VOC use cutoffs specified under subparagraph (3)(a) parts 1, 2, 6, 7(iii), 7(iv), 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 the tire types not listed in the part (2)(a)16. definition of "tire."

(2) Definitions

(a) All terms that are used in this rule and are not defined below are given the same meaning as in chapter 1200–3–2.

1. "Bead" means rubber-covered strands of wire, wound into a circular form, which ensures 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" mean the system used to apply a mold release agent and lubricant to the inside and/or 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.

(Rules 1200-3-16-.60, continued)

(Note: Docket A-80-9 is available for public inspection between 8:00 a.m. and 4:00 p.m., Monday through Friday, at the EPA's Central Docket Section, South Conference Center, Room 4, 401 M Street, SW., Washington, DC 20460. A reasonable fee may be charged for copying.)

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 operations" means the operation identified as Michelin-C-automatic in the Emission Standards and Engineering 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 record keeping 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 percent, 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 compenent or any other continuous strip component (except combined tread/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 and/or passenger vehicle tire that has bead diameter less than or equal to 0.5 meter (m) (19.7 inches) 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 solvents 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.

(Rules 1200-3-16-.60, continued)

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 percent or less, by weight, of VOC as sprayed.

(b) Notations used under this rule are defined as follows:

Bo = total number of beads cemented at a particular bead cementing affected facility for a month

Ca = concentration of VOC in gas stream in vents after a control device (parts per million by volume)

Cb = concentration of VOC in gas stream in vents before a control device (parts per million by volume)

Cf = 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)

Dc = density of cement or spray material (grams per liter)

Dr = density of VOC recovered by an emission control device (grams per liter)

E = emission control device efficiency, inlet versus outlet (fraction)

Fc = capture efficiency, VOC captured and routed to one control device versus total VOC used for an affected facility (fraction)

Fo = 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)

Gb = monthly average mass of VOC used per bead cemented for a particular bead cementing affected facility (grams per bead)

Lc = volume of cement for spray material used for a month (liters)

Lr = 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)

Mo = total mass of VOC used at an affected facility for a month (grams)

Mr = mass of VOC recovered by an emission control device for a month (gram)

(Rules 1200-3-16-.60, continued)

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)

Nb = mass of VOC emitted per bead cemented for an affected facility for a month (grams per bead)

Qa = volumetric flow rate in vents after a control device (dry standard cubic meters per hour)

Ob = volumetric flow rate in vents before a control device (dry standard cubic meters per hour)

Qf = volumetric flow rate of each stream vented directly to the atmosphere from an affected facility or form a temporary enclosure around an affected facility (dry standard cubic meters per hour)

R = overall efficiency of an emission reduction system (fraction)

Td = total number of days in monthly compliance period (days)

To = total number of tires cemented or sprayed with water-based green tire sprays at a particular affected facility for a month

Wo = weight fraction of VOC in a cement or spray material

(3) Standard for Volatile Organic Compounds

(a) On and after the date on which the initial performance test, required by rule 1200–3-16–.01(5)(g), is completed, but no later than 180 days after initial startup, each owner or operator subject to the provisions of this rule shall comply with the following conditions:

1. For each undertread cementing operation:

(i) Discharge into the atmosphere no more than 25 percent of the VOC used (75 percent emission reduction) for each month; or

(ii) Maintain total (uncontrolled) VOC use less than or equal to the levels specified below, depending upon the duration of the compliance period:

(I) 3,870 kilograms of VOC per 28 days,

(II) 4,010 kilograms of VOC per 29 days,

(III) 4,150 kilograms of VOC per 30 days,

(IV) 4,280 kilograms of VOC per 31 days, or

(V) 4,840 kilograms of VOC per 35 days.

2. For each sidewall cementing operation:

(i) Discharge into the atmosphere no more than 25 percent of the VOC used (75 percent emission reduction) for each month; or

(Rules 1200-3-16-.60, continued)

(ii) Maintain total (uncontrolled) VOC use less than or equal to the levels specified below, depending upon the duration of the compliance period:

(I) 3,220 kilograms of VOC per 28 days,

(II) 3,340 kilograms of VOC per 29 days,

(III) 3,450 kilograms of VOC per 30 days,

(IV) 3,570 kilograms of VOC per 31 days, or

(V) 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) cemented 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:

(i) 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

(ii) 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

6. For each green tire spraying operation where only organic solvent-based sprays are used:

(i) Discharge into the atmosphere no more than 25 percent of the VOC used in the organic solvent-based green tire sprays (75 percent emission reduction) for each month; or

(ii) Maintain total (uncontrolled) VOC use less than or equal to the levels specified below, depending upon the duration of the compliance period:

(I) 3,220 kilograms of VOC per 28 days,

(II) 3,340 kilograms of VOC per 29 days,

(III) 3,450 kilograms of VOC per 30 days,

(IV) 3,570 kilograms of VOC per 31 days, or

(V) 4,030 kilograms of VOC per 31 days, or

7. For each green tire spraying operation where both water-based and organic solvent-based sprays are used:

(i) 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

(ii) Discharge into the atmosphere no more than 1.2 grams of VOC tire sprayed with a water-based outside green tire spray for each month; and either

(Rules 1200-3-16-.60, continued)

(iii) Discharge into the atmosphere no more than 25 percent of the VOC used in the organic solvent-based green tire sprays (75 percent emission reduction) for each month; or

(iv) Maintain total (uncontrolled) VOC use for all organic solvent-based green tires sprays less than or equal to the levels specified under subpart (ii) of part 6 of this paragraph.

8. For each Michelin-A operation:

(i) Discharge into the atmosphere no more than 35 percent of the VOC used (65 percent emission reduction) for each month; or

(ii) Maintain total (uncontrolled) VOC use less than or equal to the levels specified below, depending upon the duration of the compliance period:

(I) 1,570 kilograms of VOC per 28 days,

(II) 1,630 kilograms of VOC per 29 days,

(III) 1,690 kilograms of VOC per 30 days,

(IV) 1,740 kilograms of VOC per 31 days, or

(V) 1,970 kilograms of VOC per 35 days.

9. For each Michelin-B operation:

(i) Discharge into the atmosphere no more than 25 percent of the VOC used (75 percent emission reduction) for each month; or

(ii) Maintain total (uncontrolled) VOC used less than or equal to the levels specified below, depending upon the duration of the compliance period:

(I) 1,310 kilograms of VOC per 28 days,

(II) 1,360 kilograms of VOC per 29 days,

(III) 1,400 kilograms of VOC per 30 days,

(IV) 1,450 kilograms of VOC per 31 days, or

(V) 1,640 kilograms of VOC per 35 days.

10. For each Michelin-C-Automatic operation:

(i) Discharge into the atmosphere no more than 35 percent of the VOC used (65 percent emission reduction) for each month; or

(ii) Maintain total (uncontrolled) VOC use less than or equal to the levels specified under subpart (ii) of part 8 of this paragraph.

(Rules 1200-3-16-.60, continued)

(4) Performance Test and Compliance Provisions.

(a) Rule 1200–3–16–.01(5)(d) does not apply to the monthly performance test procedures required by this rule. Rule 1200–3–16–.01(5)(d) does not apply to initial performance tests and to the performance tests specified under subparagraphs (b)2 and (b)3 of this paragraph. Rule 1200–3–16–.01(5)(f) does not apply when Method 24 is used.

(b) Performance tests shall be conducted as follows:

1. The owner or operator of an affected facility shall conduct an initial performance tests, as required under rule 1200–3–16–.01(5)(a), except as described under subparagraph (j) of this paragraph. The owner or operator of an affected facility shall thereafter conduct a performance test each month except as described under subparagraphs (g)1 and (j) of this paragraph. Initial and monthly performance tests shall be conducted according to the procedures in this paragraph.

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 subparagraphs (f) and (g) of this paragraph, shall repeat the performance test when directed by the Technical Secretary 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 subparts (f)2(i) through (iii) of this paragraph.

3. The owner or operator of an affected facility who seeks to comply with the equipment design and performance specifications as described under subparagraph (j) of this paragraph, shall repeat the performance test when directed by the Technical Secretary 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 measurements of capture system retention time or face velocity. The performance test shall be conducted in accordance with the procedures described under subparagraph (f)2(ii) of this paragraph.

(c) For each untreated 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 operations, 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 procedures to determine compliance with the applicable (depending upon duration under subparagraph (3)(a) subparts 1(ii), 2(ii), 6(ii), 7(iv), 8(ii), 9(ii), and 10(ii) of this paragraph. If both undertread cementing and sidewall cementing are performed at the same affected facility during a month, then the kg/mo limit specified under subparagraph (3)(a) subparts 1(ii) shall apply for that month.

1. Determine the density and weight fraction VOC (including dilution VOC) for each cement or green tire spray from its formulation or by analysis of the cement or green tire spray using Method 24 (as specified in rule 1200–3–16–.01(5)(g)). If a dispute arises, the Technical Secretary may require an owner or operator who used formulation data to analyze the cement or green tire spray using Method 24 (as specified in rule 1200–3–16–.01(5)(g)).

2. Calculate the total mass of VOC used at the affected facility for the month (Mo) by the following procedure:

(i) 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:

(Rules 1200-3-16-.60, continued)

$$Mo = \sum_{i=1}^{a} Lci \quad Dci \quad Woi$$

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.

(ii) 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:

(I) Calculate the total mass of VOC used for all of the facilities served by the common distribution system for the month (M):

$$M = \sum_{i=1}^{b} Lci \quad Dci \quad Woi$$

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.

(II) Determine the fraction (Fo) of M used at the affected facility by comparing the production records and process specifications for the material comented 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.

(III) Calculate the total monthly mass of VOC used at the affected facility for the month (Mo):

$$Mo = MFo$$

3. Determine the time duration of the monthly compliance period (Td).

(d) For each tread end cementing operation and each green tire spraying operation where water-based sprays are used (inside and/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 subparagraph (3)(a) subparts 3, 5(i), 5(ii), 7(i), and 7(ii).

1. Determine the density and weight fraction VOC as specified under subparagraph (c)1 of this paragraph.

2. Calculate the total mass of VOC used at the affected facility for the month (Mo) as specified under subparagraph (c)2 of this paragraph.

3. Determine the total number of tires cemented or sprayed at the affected facility for the month (To) by the following procedure:

(i) For a tread end cementing operation, To equals the number of tread or combined tread/sidewall components that receive an application of tread end cement for the month.

(Rules 1200-3-16-.60, continued)

(ii) For a green tire spraying operation that uses water-based inside green tire sprays, To equals the number of green tires that receive an application of water-based inside green tire spray for the month.

(iii) For a green tire spraying operation that uses water-based outside green tire sprays, To 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):

$$G = \frac{Mo}{To}$$

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 part 4 of subparagraph (3)(a).

1. Determine the density and weight fraction VOC as specified under subparagraph (c)1 of this paragraph.

2. Calculate the total mass of VOC used at the affected facility for the month (Mo) as specified under subparagraph (c)2 of this paragraph.

3. Determine the number of beads cemented at the affected facility during the month (Bo) using production records; Bo 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 (Gb):

$$Gb = \frac{Mo}{Bo}$$

5. Calculate the mass of VOC emitted per bead cemented at the affected facility for the month (Nb):

$$Nb = Gb$$

(f) For each tread end cementing operation and each bead cemented operation that uses 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 subparagraph (3)(a) parts 3 and 4 of this paragraph.

1. Calculate the mass of VOC used per tire cemented at the affected facility for the month (G), as specified under subparagraphs (d)1 through 4 of this paragraph, or mass of VOC used per bead cemented at the affected facility for the month (Gb), as specified under subparagraph (3) parts 1 through 4 of this paragraph.

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 (Nb):

$$N = G(1-R)$$

$$Nb = Gb(1-R)$$

For the initial performance test, the overall reduction efficiency (R) shall be determined as prescribed under subparagraph (f) subparts 2(i) through (iii) of this paragraph. 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 subparagraph (b)2 of this paragraph.

(i) The owner or operator of an affected facility shall construct a temporary enclosure around the application and drying areas during the performance test for the purpose of capturing fugitive VOC emissions. The enclosure must be maintained at a negative pressure to ensure that all evaporated VOC are measurable. Determine the fraction (Fc) of total VOC used at the affected facility that enters the control device:

$$Fc = \frac{\sum_{i=1}^{m} Cbi \quad Qbi}{\sum_{i=1}^{m} Cbi\ Qbi + \sum_{i=1}^{n} Cfi\ Qfi}$$

where: “m” is the number of vents from the affected facility to the control device, and “n” is the number of vents from the affected facility to the atmosphere and from the temporary enclosure.

(ii) 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 the control device:

$$E = \frac{\sum_{i=1}^{m} Cbi\ Qbi - \sum_{i=1}^{p} Cai\ Qai}{\sum_{i=1}^{m} Cbi\ Qbi}$$

where: “m” is the number of vents from the affected facility to the control device, and “p” is the number of vents after the control device.

(iii) Determine the overall reduction efficiency (R):

$$R = EFc$$

(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 subparagraph (3)(a) subparts 1(i), 2(i), 6(i), 7(iii), 8(i), 9(i) and 10(i).

1. For the initial performance test, the overall reduction efficiency (R) shall be determined as prescribed under subparagraph (f) subparts 2(i) through (iii) of this paragraph. The performance test shall be repeated during conditions described under subparagraph (b)2 of this paragraph. 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 subparagraph (4)(a) parts 3 and 4.

1. Calculate the mass of VOC used per tire cemented at the affected facility for the month (G), as specified under subparagraphs (d)1 through 4 of this paragraph, or mass of VOC used per bead cemented at the affected facility for the month (Gb), as specified under subparagraph (e) parts 1 through 4 of this paragraph.

2. Calculate the total mass of VOC recovered from the affected facility for the month (Mr):

$$Mr = Lr\ Dr$$

3. Calculate the overall reduction efficiency for the VOC emission reduction system (R) for the month:

$$R = \frac{Mr}{\overline{Mo}}$$

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 (Nb):

$$N = G\ (1 - R)$$

$$Nb = Gb\ (1 - R)$$

(i) For each undertread cementing operation, each sidewal 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 subparagraph (3)(a) subparts 1(i), 2(i), 6(i), 7(iii), 8(i), 9(i) and 10(i).

1. Determine the density and weight fraction VOC as specified under subparagraph (c)1 of this paragraph.

2. Calculate the total mass of VOC used at the affected facility for the month (Mo) as described under part (c)2 of this paragraph.

3. Calculate the total mass of VOC recovered from the affected facilitiy for the month (Mr) as described under part (h)2 of this paragraph.

(Rules 1200-3-16-.60, continued)

4. Calculate the overall reduction efficiency for the VOC emission reduction system (R) for the month as described under subparagraph (h)3 of this paragraph.

(j) Rather than seeking to demonstrate compliance with the provisions of subparagraph (3)(a) subparts 1(i), 2(i), 6(i), 7(iii), or 9(i) of this paragraph using the performance test procedures described under subparagraphs (g) and (i) of this paragraph, and 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 subparagraph (j) parts 1, 2, and 4 through 6 or under subparagraph (j) parts 1 and 3 through 6 of this paragraph, and by conducting a control device efficiency and performance test to determine compliance as described under part (j)7 of this paragraph. 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 rule 1200–3–16–.01(5)(g). Meeting the capture system design and performance specifications, in conjunction with operating a 95 percent 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 rule 1200–3–16–.01(5)(g), is waived. No monthly performance test 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 subparagraph (j) parts 2, 4, and 5 of this paragraph; 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 subparagraph (j) parts 3, 4, and 5 of this paragraph.

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 areas 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 opening shall remain closed at all times except when worker access is necessary.

5. The total area of all permanent openings into the enclosure shall not exceed the area that would be necessary to maintain the VOC concentration of the exhaust gas stream at 25 percent of the lower explosive limit (LEL) under the following conditions:

   (i) The facility is operating at the maximum solvent use rate;

   (ii) The face velocity through each permanent opening is 100 feet per minute; and

   (iii) All temporary openings are closed.

6. All captured VOC ducted to a VOC emission control device that is operated on a continuous basis and that achieves at least 95 percent destruction or recovery efficiency.

7. The efficiency of the control device (E) for the initial performance test is 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 subpart (f)2(ii) of this paragraph. The control device efficiency shall be redetermined during conditions specified under subpart (b)3 of this paragraph.

(k) Each owner or operator of an affected facility who initially elected to be subject to the applicable percent emission reduction requirement specified under subparagraph (3)(a) subparts 1(i), 2(i), 6(i), 7(iii), 8(i), 9(i) and 10(i) of this paragraph and who later seeks to comply with the applicable total (uncontrolled) monthly VOC use limit specified under subparagraph (3)(a) subparts 1(ii), 2(ii), 6(ii), 7(iv), 8(ii), 9(ii) or 10(ii) shall demonstrate, using the procedures described under subparagraph (c) of this paragraph, 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 subparagraph and subparagraph (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 or sprays used for tires other than those defined under subparagraph (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 subparagraph (2)(a) when determining To and Bo.

(5) Monitoring of Operations.

(a) Each owner or operator subject to the provisions of this rule 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 Technical Secretary:

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 percent of the temperature being measured in 0C or ± 0.50C, 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 percent of the temperature being measured in 0C or ± 0.50C, whichever is greater.

3. 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 adsorbor is used to meet the performance requirements specified under part 6 of subparagraph (4)(j), an organics monitoring device used to indicate the concentration level of 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 requirements specified under part 6 of subparagraph (4)(j), shall provide to the Technical Secretary information describing the operation of the control device and the process parameter(s) which would indicate proper operation and maintenance of the device. The Technical Secretary may request further information and will specify appropriate monitoring procedures or requirements.

(6) Record Keeping 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 averge temperature of the gas stream in the combustion zone was more than 280C (500F) 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 continuous records of the temperature of the gas stream both upstream and downstream of the catalyst bed of the incinerator, records of all 3-hour periods of operation for which the average temperature measured before the catalyst bed is more than 280C below the gas steam 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 records of all 3-hour periods for which the average temperature difference across the catalyst bed is less than 80 percent 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 part 6 of subparagraph (4)(j) 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 percent 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 untread 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 part 1 of subparagraph (4)(b), shall maintain records of the results of all monthly tests.

(7) Reporting Requirements.

(a) Each owner or operator subject to the provisions of this rule at the time of notification of the anticipated initial startup of an affected facility pursuant to rule 1200–3–16–.01(7)(a)2, shall provide a written report to the Technical Secretary declaring for each undertread cementing operation, each sidewall cementing operation, each green tires spraying operation where organic solvent-based spray are used, each Michelin-A operation, each Michelin-B operation, and each

(Rules 1200-3-16-.60, continued)

Michelin-C-automatic operation the emission limit he intends to comply with and the compliance method (where subparagraph (4)(j) is applicable) to be employed.

(b) Each owner or operator subject to the provisions of this rule at the time of notification of the anticipated initial startup of an affected facility pursuant to rule 1200–3–16–.01(7)(a)2, shall specify the monthly schedule (each calendar month or 4-4-5 week schedule) to be used in making compliance determinations.

(c) Each owner or operator subject to the provisions of this rule shall report the results of all initial performance tests, as required under rule 1200–3–16–.01(8)(a), and the results of the performance test required under subparagraph (4)(b) parts 2 and 3. The following data shall be included in the report for each of the above 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 subparagraph (3)(a). The monthly mass of VOC used (Mo) and the number days in the compliance period (Tdd).

2. For each affected facility that seeks to comply with a g/tire or g/bead limit specified under subparagraph (3)(a) without the use of a VOC emission reduction system: the mass of VOC used (Mo), the number of tires cemented or sprayed (To), the mass of VOC emitted per tire cemented or sprayed (N), the number of beads cemented (Bo), and the mass of VOC emitted per bead cemented (Nb).

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 subparagraph (3)(a): The mass of VOC used (Mo), the number of tires cemented or sprayed (To), the mass of VOC emitted per tire cemented or sprayed (N), the number of beads cemented (Bo), the mass of VOC emitted per bead cemented (Nb), the mass of VOC used per tire cemented or sprayed (G), the mass of VOC per bead cemented (Gb), the emission control device efficiency (E), the capture system efficiency (Fc), 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 subparagraph (3)(a): The emission control device efficiency (E), the capture system efficiency (Fc), the face velocity through each permanent opening in the capture 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 subparagraph (3)(a): The mass of VOC used (Mo), the number of tires cemented or sprayed (To), the mass of VOC used per tire cemented or sprayed (G), the number of beads cemented (Bo), the mass of VOC used per bead (Gb), the mass of VOC recovered (Mr), 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 (Nb).

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 subparagraph (3)(a): The mass of VOC used (Mo), the mass of VOC recovered (Mr), 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 subparagraph (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 type(s) 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 device(s), as applicable, in the report for each performance test specified under subparagraph (c) of this paragraph.

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 cayalytic 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 Technical Secretary where a VOC recovery device other than a carbon adsorber is used.

(f) Once every six (6) months each owner or operator subject to the provisions of paragraph six (6) shall report, as applicable:

1. Each monthly average VOC emission rate that exceeds the g/tire or g/bead limit specified under subparagraph (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 subparagraph (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 subparagraph (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 280C (500F) 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 280C (500F) 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 for 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 percent 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 VOC's in the exhaust gases from a carbon adsorber is more than 20 percent 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 subparagraph (3)(a) and who later seeks to comply with the applicable total (uncontrolled) monthly VOC use limit specified under subparagraph (3)(a) and who has satisfied the provisions specified under subparagraph (4)(k) shall furnish the Technical Secretary written notification no less than 30 days in advance of the date when he 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 as referenced in rule 1200–3–16–.01(5)(g), except as provided under rule 1200–3–16–.01(8)(b), shall be used to determine compliance with subparagraph (3)(a) as follows:

1. Method 24 (as referenced in rule 1200–3–16–.01(5)(g)), 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 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 referenced in rule 1200–3–16–.01(5)(g)) as the reference method for the determination of the VOC concentrations in each stack, both entering and leaving an emission control device. The owner or operator shall notify the Technical Secretary 30 days in advance of any test by Method 25. For Method 25, the sampling time for each of three runs shall be at least one (1) 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 (1) 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 Technical Secretary.

3. Methods 2, or 2A (as referenced in rule 1200–3–16–.01(5)(g), as appropriate, as the reference method for determination of the flow rate of the stack gas. The measurement site shall be the same as for 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 (as referenced in rule 1200–3–16–.01(5)(g) for determination of stack gas moisture.

***Authority**: T.C.A. §§68–25–105 and 4–5–202.* ***Administrative History**: Original rule filed April 18, 1990; effective June 2, 1990.*

1200–3–16–.61 STANDARDS OF PERFORMANCE FOR VOLATILE ORGANIC LIQUID STORAGE VESSELS (INCLUDING PETROLEUM LIQUID STORAGE VESSELS) FOR WHICH CONSTRUCTION, RECONSTRUCTION, OR MODIFICATION COMMENCED AFTER JUNE 2, 1990. (A new rule which limits emissions from volatile organic liquid storage vessels).

(1) Applicability

(a) Except as provided in subparagraphs (b), (c), and (d) of this paragraph, the affected facility to which this rule applies is each storage vessel with a capacity greater than or equal to 40 cubic meters (m3) that is used to store volatile organic liquids (VOL's) for which construction, reconstruction, or modification is commenced after June 2, 1990.

(b) Except as specified in subparagraphs (a) and (b) of paragraph (7), storage vessels with design capacity less than 75 m3 are exempt from the General Provisions (1200–3–16–.01) and from the provisions of this rule.

(c) Except as specified in subparagraph (a) and (b) of paragraph (7), vessels either with a capacity greater than or equal to 151 m3 storing a liquid with a maximum true vapor pressure less than 3.5 kPa or with a capacity greater than or equal to 75 m3 but less than 151 m3 storing a liguid with a maximum true vapor pressure less than 15.0 kPa are exempt from the General Provisions (1200–3–16–.01) and from the provisions of this rule.

(d) This rule 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 m3 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.

(a) All terms that are used in this rule and are not defined below are given the same meaning as in paragraph 1200–3–16–.01(4).

1. "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 calulated design throughput as may be limited by compliance with an enforceable condition under Federal requirement or Federal, State or loyal law, and discoverable by the Technical Secretary and any other person.

2. "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.

(Rules 1200-3-16-.61, continued)

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

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

5. "Gasoline service station" means any site where gasoline is dispensed to motor vehicle fuel tanks from stationary storage tanks.

6. "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:

   (i) In accordance with methods described in American Petroleum Institute Bulletin 2517. Evaporation Loss From External Floating Roof Tanks. (Reference 1200–3–16–.01(5)(g)); or

   (ii) As obtained from standard reference tests; or

   (iii) As determined by ASTM Method D2879-83 (Reference 1200–3–16–.01(5)(g)); or

   (iv) (Reserved)

7. "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 (reference 1200–3–16–.01(5)(g)).

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

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

10. "Storage vessel" means each tank, reservior, or container used for the storage of volatile organic liquids but does not include:

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

    (ii) Subsurface caverns or porous rock reservoirs.

11. "Volatile organic liquid" (VOL) means any organic liquid which can emit volatile organic compounds into the atomosphere except those VOL's that emit only those compounds which the Technical Secretary has determined do not contribute appreciably to the formation of ozone. These compounds are identified in EPA statements on ozone abatement policy for SIP revisions (42 FR 35314, 44 FR 32042, 45 FR 32424, and 45 FR 48941).

12. "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.

(Rules 1200-3-16-.61, continued)

(3) Standard for Volatile Organic Compounds (VOC)

(a) The owner or operator of each storage vessel either with a design capacity greater than or equal to 151 m3 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 m3 but less than 151 m3 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:

(i) 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 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.

(ii) 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:

(I) 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 tank.

(II) 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.

(III) A mechnical shoe seal. A merchanical 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.

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

(iv) Each opening in the internal floating roof except for leg sleeves, automatic bleeder vents, rim space vents, column wells, ladder walls, 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.

(v) 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.

(Rules 1200-3-16-.61, continued)

(vi) 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.

(vii) Each penetration of the internal floating roof for the purpose of sampling shall be a sample well. The sample well shall have a split fabric cover that covers at least 90 percent of the opening.

(viii) 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.

(ix) 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 must meet the following specifications:

(i) 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 two 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.

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

(II) 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 part 4 of subparagraph (4)(b).

(ii) 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 slotted membrane fabric cover that covers at least 90 percent of the area of the opening.

(iii) 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 tank 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:

(Rules 1200-3-16-.61, continued)

(i) 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 1200–3–16–.43(6).

(ii) The control device shall be designed and operated to reduce inlet VOC emissions by 95 percent or greater. If a flare is used as the control device, it shall meet the specifiications described in the general control device requirments (1200–3–16–.01) of the General Provisions.

4. A system equivalent to those described in parts (a)1, (a)2 or (a)3 of this paragraph as provided in paragraph (5) of this rule.

(b) The owner or operator of each storage vessel with a design capacity greater than or equal to 75 m3 which contains a VOL that, as stored, has a maximum true 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 part 3 of subparagraph (3)(a).

2. A system equivalent to that described in subparagraph (b)1 as provided in paragraph (5) of this rule.

(4) Test Methods and Procedures

(a) The owner or operator of each storage vessel as specified in paragraph (3)(a) shall meet the requirements of parts 1, 2, or 3 of subparagraph (b) of this paragraph. The applicable paragraph for a particular storage vessel depends on the control equipment installed to meet the requirements of paragraph (3).

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

(i) Visually inspect the internal floating roof, the primary seal, and the secondary seal (if one is on 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.

(ii) 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 in 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 Technical Secretary in the inspection report required in part 3 of subparagraphs (6)(a) and (b). Such a request for an extension must document that alternate storage capacity is unavailable and specify a schedule of actions the company will take that will assure that the control equipment will be repaired or the vessel will be emptied as soon as possible.

(iii) For vessels equipped with a double-seal system as specified in item II of subpart (3)(a)1(ii):

(I) Visually inspect the vessel as specifed in subpart (a)1(iv) of this paragraph at least every 5 years; or

(II) Visually inspect the vessel as specified in subpart (a)1(i) of this paragraph.

(iv) 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, or the secondary seal has holes, tears, or other openings in the seal or the seal fabric, or the gaskets no longer close off the liquid surfaces from the atmosphere, or the slotted membrane has more than 10 percent 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 shall inspections conducted in accordance with this provision occur at intervals greater than 10 years in the case of vessels conducting the annual visual inspection as specified in subpart (a)1(ii) of this paragraph and at intervals no greater than 5 years in the case of vessels specified in subpart (a)1(iii) of this paragraph.

(v) Notify the Technical Secretary in writing at least 30 days prior to the filling or refilling of each storage vessel for which an inspection is required by subparagraphs (a)1(i) and (a)1(iv) of this paragraph to afford the Technical Secretary the opportunity to have an observer present. If the inspection required by subpart (a)1(ii) of this paragraph is not planned and the owner or operator could not have known about the inspection 30 days in advance of refilling the tank, the owner or operator shall notify the Technical Secretary at least 7 days prior to the refilling of the storage vessel. Notification shall be made by telephone immediately followed by written documentation demnostrating 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 Technical Secretary at least 7 days prior to the refilling.

(b) After installing the control equipment required to meet part 3 of subparagraph (3)(a) (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:

(i) Measurements of gaps between the tank 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.

(ii) Measurements of gaps between the tank wall and the secondary seal shall be performed within 60 days of the initial fill with VOL and at least once per year thereafter.

(iii) If any sources ceases to store VOL for a period of 1 year or more, subsequent introduction of VOL into the vessel shall be considered an initial fill for the purposes of subparts (i) and (ii) of part (b)1 of this paragraph.

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

(Rules 1200-3-16-.61, continued)

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

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

(iii) The total surface area of each gap described in subpart (b)2(ii) of this paragraph shall be determined by using probes of various widths to measure accurately the actual distance from the tank 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 by the nominal diameter of the tank and compare each ratio to the respective standards in subpart (b)4 of this paragraph.

4. Make necessary repairs or empty the storage vessel within 45 days of idenitification in any inspection for seals not meeting the requirements listed in subparts (i) and (ii) of part (b)4. of this paragraph:

(i) The accumulated area of gaps between the tank wall and the mechanial shoe or liquid-mounted primary seal shall not exceed 212 cm2 per meter of tank diameter, and the width of any portion of any gap shall not exceed 3.81 cm.

(I) 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.

(II) There are to be no holes, tears, or other openings in the shoe, seal fabric, or seal envelope.

(ii) The secondary seal is to meet the following requirements:

(I) The secondary seal is to 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 subpart (b)2(iii) of this paragraph.

(II) The accumulated area of gaps between the tank wall and the secondary seal shall not exceed 21.2 cm2 per meter of tank diameter, and the width of any portions of any gap shall not exeed 1.27 cm.

(III) There are to be no holes, tears, or other openings in the seal or seal fabric.

(iii) If a failure that is detected during inspection required in part 1 of subparagraph (4)(b) 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 Technical Secretary in the inspection report required in part (6)(b)4. Such extension request must include a demonstration of unavailability of alternate storage capacity and a specification of schdule that will assure that the control equipment will be repaired or the vessel will be emptied as soon as possible.

5. Notify the Technical Secretary 30 days in advance of any gap measurements required by subpart (b)1 of this paragraph to afford the Technical Secretary the 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.

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

   (ii) For all the inspections required by part (b)6 of this paragraph, the owner or operator shall notify the Technical Secretary in writing at least 30 days prior to the filling or refilling of each storage vessel to afford the Technical Secretary the opportunity to inspect the storage vessel prior to refilling. If the inspection required by part (b)6 of this paragraph is not planned and the owner or operator could not have known about the inspection 30 days in advance of refilling the tank, the owner or operator shall notify the Technical Secretary 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 Technical Secretary 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 parts (a)3 or (b)2 of paragraph (3) (other than flare) is exempt from rule 1200–3–16–.01(5) of the General Provisions and shall meet the following requirments.

1. Submit for approval by the Technical Secretary as an attachment to the notification required by rule 1200–3–16–.01(7)(a)1. If the facility is exempt from rule 1200–3–16–.01(7)(a)1, as an attachment to the notification required by rule 1200–3–16–.01(7)(a)2, an operating plan containing the information listed below.

   (i) Documentation demonstrating that the control device will achieve the required control efficiency during maximum loading conditions. This documentation is to include a descripeion of the gas stream which enters the control device, including flow and VOC content under varying liquid level conditions (dynamic and static) and manafacturer’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 rule, the efficiency demonstration is to include consideration of all vapors, gases, and liquids received by the closed vent capture system and control device. If an enclosed combustion device with a minimum residence time of 0.75 seconds and minimum temperature of 8160C is used to meet the 95 percent requirement, documentation that those conditions will exist is sufficient to meet the requirements of this subparagraph.

   (ii) 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 Technical Secretary, in accordance with part (c)1 of this subparagraph, unless the plan was modified by the Technical Secretary during the review process. In this case, the modified plan applies.

(Rules 1200-3-16-.61, continued)

(d) The owner or operator of each source that is equipped with a closed vent system and a flare to meet the requirements in parts (a)3 or (b)2 of paragraph (3) shall meet the requirements as specified in the general control device requirements, subparagraph (e) and (f) of paragraph (7).

(5) (Reserved)

(6) Reporting and Record Keeping Requirements

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

(a) After installing control equipment in accordance with subpart (i) part (3)(a)1 (fixed roof and internal floating roof), the owner or operator shall meet the flowing requirements.

1. Furnish the Technical Secretary with a report that describes the control equipment and certifies that the control equipment meets the specifications of parts (3)(a)1 and (4)(a)1. This report shall be an attachment to the notification required by rule 1200–3–16–.01(7)(a)3.

2. Keep a record of each inspection performed as required by subparts (4)(a)1(i), (ii), (iii), (iv). 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 subpart (ii) of part (4)(a)1 are detected during the annual visual inspection (as required by that subpart), a report shall be furnished to the Technical Secretary 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 subpart (iii) of paragraph (4)(a)1 that finds holes or tears in the seal or seal fabric, or defects in the internal floating roof, or other control equipment defects listed in subpart 4(a)1(ii), a report shall be furnished to the Technical Secretary within 30 days of the inspection. The report shall identify the storage vessel and the reason why it did not meet the specifications of either subpart (i) of part (3)(a)1 or subpart (iii) of part (4)(a)1 and list each repair made.

(b) After installing control equipment in accordance with subpart (iii) of part (3)(a)1 (external floating roof), the owner or operator shall meet the following requirements.

1. Furnish the Technical Secretary with a report that describes the control equipment and certifies that the control equipment meets the specifications of subpart (ii) of part (3)(a)1 and subpart (ii) of part (4)(b)1. This report shall be an attachment to the notification required by rule 1200–3–16–.01(7)(a)3.

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

(i) The date of measurement.

(ii) The raw data obtained in the measurement.

(iii) The calculations described in parts 2 and 3 of subpragraph (4)(b).

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

(i) The date of measurement.

(ii) The raw data obtained in the measurement.

(iii) The calculations described in subparagraph (4)(b) partd 2 and 3.

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

(c) After installing control equipment in accordance with part 3 or 4 of subparagraph (3)(a) or (b) (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 part 2 of subparagraph (4)(c).

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

1. A report containing the measurements required by part 1, 2, 3, 4, 5, and 6 of subparagraph (4)(b) of this paragraph, shall be furnished to the Technical Secretary as required by rule 1200–3–16–.01(7) of the General Provisions. The report shall be submitted within 6 months of the initial start-up 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 part 2 of subparagraph (6)(d) in which the pilot flame was absent shall be furnished to the Technical Secretary.

(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 subparagraph (b) of this paragraph, for at least 2 years. The record required by subparagraph (b) of this paragraph will be kept for the life of the source.

(b) The owner or operator of each storage vessel as specified in subparagraph (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 m3 is subject to no provision of this rule other than those required by this subparagraph.

(c) Except as provided in subparagraphs (f) and (g) of this paragraph, the owner or operator of each storage vessel either with a design capacity greater than or equal to 151 m3 storing a liquid with a maximum true vapor pressure greater than or equal to 3.5 kPa or with a design capacity

greater than or equal to 75 m3 but less than 151 m3 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 subparagraph (g) of this paragraph, the owner or operator of each storage vessel either with a design capacity greater than or equal to 151 m3 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 m3 but less than 151 m3 storing a liquid with a maximum true vapor pressure that is normally less than 27.6 kPa shall notify the Technical Secretary within 30 days when the maximum true vapor pressure of the liquid exceeds the respective maximum true vapor values for each volume range.

(e) Available data on the storage temperature may be used to determine the maximum true vapor pressure as determined below.

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 storages 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:

(i) 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 pressure from nomographs contained in API Bulletin 2517 (Note: All references to API Bulletins refer to the American Petroleum Institute. Copies of the bullentins may be obtained by writing to A.P.I. Publications Department, 1220 L Street, N.W., Washington, D.C. 20005. Be sure and specify which bulletin you are requesting. There may be a charge for some bulletins.), unless the Technical Secretary or specifically requests that the liquid be sampled, the actual storage temperature determined, and the Reid vapor pressure determined from the sample(s).

(ii) 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:

(i) May be obtained from standard reference texts; or

(ii) Determined by ASTM Method D2879-83; or

(iii) (Reserved)

(iv) (Reserved)

(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 will be determined using the methods described in subparagraph (e) of this paragraph.

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 subparagraph (3)(a), an initial physical test of the vapor pressure is required; and a physical test at least once every six (6) months thereafter is required as determined by the following methods:

(i) ASTM Method D2879-83; or

(ii) ASTM Method D323-82; or

(iii) (Reserved)

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

Authority*: T.C.A. §§68–25–105 and 4–5–202.* ***Administrative History****: Original rule filed April 18, 1990; effective June 2, 1990.*

1200–3–16–.62 THROUGH 1200–3–16–.73 RESERVED.

1200-3-16-.74 STANDARDS OF PERFORMANCE FOR CALCINERS AND DRYERS IN MINERAL INDUSTRIES.

(1) For what follows, "Administrator" means the Technical Secretary of the Tennessee Air Pollution Control Board in those cases for which authority to implement and enforce provisions of the rule have been delegated to Tennessee. Otherwise, "Administrator" means the Administrator of the United States Environmental Protection Agency. "State" means the State of Tennessee."

(2) Adopted herein by reference are the federal regulations in Paragraph (4) of this rule as appearing in 40 CFR Part §60 Subpart UUU, revised as of July 1, 1994. Source: (published in the Federal Register / Vol. 57, No. 188 / Monday, September 28, 1992 / Rules and Regulations 44503), unless otherwise noted.

(3) The standards provided herein are the requirements of the State.

(4) Subpart UUU of 40 CFR Part §60

§60.730 Applicability and designation of affected facility.

(a) The affected facility to which the provisions of this subpart apply is each calciner and dryer at a mineral processing plant. Feed and product conveyors are not considered part of the affected facility. For the brick and related clay products industry, only the calcining and drying of raw materials prior to firing of the brick are covered.

(b) An affected facility that is subject to the provisions of subpart LL, Metallic Mineral Processing Plants, is not subject to the provisions of this subpart. Also, the following processes and process units used at mineral processing plants are not subject to the provisions of this subpart: vertical shaft kilns in the magnesium compounds industry; the chlorination-oxidation process in the titanium dioxide industry; coating kilns, mixers, and aerators in the roofing granules industry; and tunnel kilns, tunnel dryers, apron dryers, and grinding equipment that also dries the process material used in any of the 17 mineral industries (as defined in §60.731, "Mineral processing plant").

(c) The owner or operator of any facility under paragraph (a) of this section that commences construction, modification, or reconstruction after April 23, 1986, is subject to the requirements of this subpart.

§60.731 Definitions.

As used in this subpart, all terms not defined herein shall have the meaning given them in the Clean Air Act and in subpart A of this part.

Calciner means the equipment used to remove combined (chemically bound) water and/or gases from mineral material through direct or indirect heating. This definition includes expansion furnaces and multiple hearth furnaces.

Control device means the air pollution control equipment used to reduce particulate matter emissions released to the atmosphere from one or more affected facilities.

Dryer means the equipment used to remove uncombined (free) water from mineral material through direct or indirect heating.

Installed in series means a calciner and dryer installed such that the exhaust gases from one flow through the other and then the combined exhaust gases are discharged to the atmosphere.

Mineral processing plant means any facility that processes or produces any of the following minerals, their concentrates or any mixture of which the majority (>50 percent) is any of the following minerals or a combination of these minerals: alumina, ball clay, bentonite, diatomite, feldspar, fire clay, fuller's earth, gypsum, industrial sand, kaolin, lightweight aggregate, magnesium compounds, perlite, roofing granules, talc, titanium dioxide, and vermiculite.

§60.732 Standards for particulate matter.

Each owner or operator of any affected facility that is subject to the requirements of this subpart shall comply with the emission limitations set forth in this section on and after the date on which the initial performance test required by §60.8 is completed, but not later than 180 days after the initial startup, whichever date comes first. No emissions shall be discharged into the atmosphere from any affected facility that:

(a) Contains particulate matter in excess of 0.092 gram per dry standard cubic meter (g/dscm) [0.040 grain per dry standard cubic foot (gr/dscf)] for calciners and for calciners and dryers installed in series and in excess of 0.057 g/dscm for dryers; and

(b) Exhibits greater than 10 percent opacity, unless the emissions are discharged from an affected facility using a wet scrubbing control device.

§60.733 Reconstruction.

The cost of replacement of equipment subject to high temperatures and abrasion on processing equipment shall 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 §60.15. Calciner and dryer equipment subject to high temperatures and abrasion are: end seals, flights, and refractory lining.

§60.734 Monitoring of emissions and operations.

(a) With the exception of the process units described in paragraphs (b), (c), and (d) of this section, the owner or operator of an affected facility subject to the provisions of this subpart who uses a dry control device to comply with the mass emission standard shall install, calibrate, maintain, and operate a continuous monitoring system to measure and record the opacity of emissions discharged into the atmosphere from the control device.

(b) In lieu of a continuous opacity monitoring system, the owner or operator of a ball clay vibrating grate dryer, a bentonite rotary dryer, a diatomite flash dryer, a diatomite rotary calciner, a feldspar rotary dryer, a fire clay rotary dryer, an industrial sand fluid bed dryer, a kaolin rotary

calciner, a perlite rotary dryer, a roofing granules fluid bed dryer, a roofing granules fluid bed dryer a roofing granules rotary dryer, a talc rotary calciner, a titanium dioxide spray dryer, a titanium dioxide fluid bed dryer, a vermiculite fluid bed dryer, or a vermiculite rotary dryer who uses a dry control device may have a certified visible emissions observer measure and record three 6-minute averages of the opacity of visible emissions to the atmosphere each day of operation in accordance with Method 9 of appendix A of part 60.

(c) The owner or operator of a ball clay rotary dryer, a diatomite rotary dryer, a feldspar fluid bed dryer, a fuller's earth rotary dryer, a gypsum rotary dryer, a gypsum flash calciner, gypsum kettle calciner, an industrial sand rotary dryer, a kaolin rotary dryer, a kaolin multiple hearth furnace, a perlite expansion furnace, a talc flash dryer, a talc rotary dryer, a titanium dioxide direct or indirect rotary dryer or a vermiculite expansion furnace who uses a dry control device is exempt from the monitoring requirements of this section.

(d) The owner or operator of an affected facility subject to the provisions of this subpart who uses a wet scrubber to comply with the mass emission standard for any affected facility shall install, calibrate, maintain, and operate monitoring devices that continuously measure and record the pressure loss of the gas stream through the scrubber and the scrubbing liquid flow rate to the scrubber. The pressure loss monitoring device must be certified by the manufacturer to be accurate within 5 percent of water column gauge pressure at the level of operation. The liquid flow rate monitoring device must be certified by the manufacturer to be accurate within 5 percent of design scrubbing liquid flow rate.

§60.735 Recordkeeping and reporting requirements.

(a) Records of the measurements required in §60.734 of this subpart shall be retained for at least 2 years.

(b) Each owner or operator who uses a wet scrubber to comply with §60.732 shall determine and record once each day, from the recordings of the monitoring devices in §60.734(d), and arithmetic average over a 2-hour period of both the change in pressure of the gas stream across the scrubber and the flowrate of the scrubbing liquid.

(c) Each owner or operator shall submit written reports semiannually of exceedances of control device operation parameters required to be monitored by §60.734 of this subpart. For the purpose of these reports, exceedances are defined as follows:

(1) All 6-minute periods during which the average opacity from dry control devices is greater than 10 percent; or

(2) Any daily 2-hour average of the wet scrubber pressure drop determined as described in §60.735(b) that is less than 90 percent of the average value recorded according to §60.736(c) during the most recent performance test that demonstrated compliance with the particulate matter standard; or

(3) Each daily wet scrubber liquid flow rate recorded as described in §60.735(b) that is less than 80 percent or greater than 120 percent of the average value recorded according to §60.736(c) during the most recent performance test that demonstrate compliance with the particulate matter standard.

(d) The requirements of this section remain in force until and unless the Agency, in delegating enforcement authority to a State under section 111(c) of the Clean Air Act, approves reporting requirements or an alternative means of compliance surveillance adopted by such State. In that event, affected facilities within the State will be relieved of the obligation to comply with this section provided that they comply with the requirements established by the State.

[57FR 44503, Sept. 28, 1992, as amended at 58 FR 40591, July 29, 1993]

(Rules 1200-3-16-.74, continued)

§60.736 Test methods and procedures.

(a) In conducting the performance tests required in §60.8, the owner or operator shall use the test methods in appendix A of this part or other methods and procedures as specified in this section, except as provided in §60.8(b).

(b) The owner or operator shall determine compliance with the particulate matter standards in §60.732 as follows:

(1) Method 5 shall be used to determine the particulate matter concentration. The sampling time and volume for each test run shall be at least 2 hours and 1.70 dscm.

(2) Method 9 and the procedures in §60.11 shall be used to determine opacity from stack emissions.

(c) During the initial performance test of a wet scrubber, the owner or operator shall use the monitoring devices of §60.734(d) to determine the average change in pressure of the gas stream across the scrubber and the average flowrate of the scrubber liquid during each of the particulate matter runs. The arithmetic averages of the three runs shall be used as the baseline average values for the purposes of §60.735(c).

§60.737 Delegation of authority.

(a) In delegating implementation and enforcement authority to a State under section 111(c) of the Act, the authorities contained in paragraph (b) of this section shall be retained by the Administrator and not transferred to a State.

(b) Authorities which will not be delegated to States: No restrictions.

***Authority**: T.C.A. §§68-201-105 and 4-5-201 et. seq.* ***Administrative History**: Original ruled filed May 21, 1997; effective August 4, 1997.*

1200–3–16–.75 RESERVED.

1200-3-16-.76 STANDARDS OF PERFORMANCE FOR MUNICIPAL SOLID WASTE LANDFILLS (40 CFR 60, SUBPART WWW).

(1) For what follows, "Administrator" means the Technical Secretary of the Tennessee Air Pollution Control Board in those cases for which authority to implement and enforce provisions of the rule have been delegated to Tennessee. Otherwise, "Administrator" means the Administrator of the United States Environmental Protection Agency. "State" means the State of Tennessee."

(2) Two typographical errors were found in the regulation as published in the Federal Register. Specifically in §60.753(g), a reference is made to §60.752(a)(3) through (5). This reference should be to §60.755(a)(3) through (5) where the referenced information is actually found in the regulation. Next, in §60.758(c)(1)(ii), the reference to "paragraph (b)(3)(i) of this section" should be to "paragraph (b)(3) of this section", since no paragraph (b)(3)(i) exists.

(3) Adopted herein by reference are the Federal regulations in Paragraph (4) of this rule as appearing in Subpart WWW of 40 CFR Part 60. Source: (published in the Federal Register / Vol. 61, No. 49 / Tuesday, March 12, 1996 / Rules and Regulations 9919), unless otherwise noted.

(4) Subpart WWW - Standards of Performance for Municipal Solid Waste Landfills.

Sec.
60.750 Applicability, designation of affected facility, and delegation of authority.
60.751 Definitions.
60.752 Standards for air emissions from municipal solid waste landfills.

(Rules 1200-3-16-.76, continued)

60.753 Operational standards for collection and control systems.
60.754 Test methods and procedures.
60.755 Compliance provisions.
60.756 Monitoring of operations.
60.757 Reporting requirements.
60.758 Recordkeeping requirements.
60.759 Specifications for active collection systems.

Authority: 42 U.S.C. 7401,7411, 7414, 7416 and 7601.

Subpart WWW - Standards of Performance for Municipal Solid Waste Landfills

§60.750 Applicability, designation of affected facility, and delegation of authority.

(a) The provisions of this subpart apply to each municipal solid waste landfill that commenced construction, reconstruction or modification or began accepting waste on or after May 30, 1991. Physical or operational changes made to an existing MSW landfill solely to comply with Subpart Cc of this part are not considered construction, reconstruction, or modification for the purposes of this section.

(b) The following authorities shall be retained by the Administrator and not transferred to the State: None.

§60.751 Definitions.

As used in this subpart, all terms not defined herein shall have the meaning given them in the Act or in subpart A of this part.

"Active collection system" means a gas collection system that uses gas mover equipment.

"Active landfill" means a landfill in which solid waste is being placed or a landfill that is planned to accept waste in the future.

"Closed landfill" means a landfill in which solid waste is no longer being placed, and in which no additional solid wastes will be placed without first filing a notification of modification as prescribed under § 60.7(a)(4). Once a notification of modification has been filed, and additional solid waste is placed in the landfill, the landfill is no longer closed. A landfill is considered closed after meeting the criteria of § 258.60 of this title.

"Closure" means that point in time when a landfill becomes a closed landfill.

"Commercial solid waste" means all types of solid waste generated by stores, offices, restaurants, warehouses, and other nonmanufacturing activities, excluding residential and industrial wastes.

"Controlled landfill" means any landfill at which collection and control systems are required under this subpart as a result of the nonmethane organic compounds emission rate. The landfill is considered controlled at the time either (1) a notification of intent to install a collection and control system or (2) a collection and control system design plan is submitted in compliance with § 60.752(b)(2)(i).

"Design capacity" means the maximum amount of solid waste a landfill can accept, as specified in the construction or operating permit issued by the State, local, or Tribal agency responsible for regulating the landfill.

(Rules 1200-3-16-.76, continued)

"Disposal facility" means all contiguous land and structures, other appurtenances, and improvements on the land used for the disposal of solid waste.

"Emission rate cutoff" means the threshold annual emission rate to which a landfill compares its estimated emission rate to determine if control under the regulation is required.

"Enclosed combustor" means an enclosed firebox which maintains a relatively constant limited peak temperature generally using a limited supply of combustion air. An enclosed flare is considered an enclosed combustor.

"Flare" means an open combustor without enclosure or shroud.

"Gas mover equipment" means the equipment (i.e., fan, blower, compressor) used to transport landfill gas through the header system.

"Household waste" means any solid waste (including garbage, trash, and sanitary waste in septic tanks) derived from households (including, but not limited to, single and multiple residences, hotels and motels, bunkhouses, ranger stations, crew quarters, campgrounds, picnic grounds, and day-use recreation areas).

"Industrial solid waste" means solid waste generated by manufacturing or industrial processes that is not a hazardous waste regulated under Subtitle C of the Resource Conservation and Recovery Act, §§ 264 and 265 of this title. Such waste may include, but is not limited to, waste resulting from the following manufacturing processes: electric power generation; fertilizer/agricultural chemicals; food and related products/by-products; inorganic chemicals; iron and steel manufacturing; leather and leather products; nonferrous metals manufacturing/foundries; organic chemicals; plastics and resins manufacturing; pulp and paper industry; rubber and miscellaneous plastic products; stone, glass, clay, and concrete products; textile manufacturing; transportation equipment; and water treatment. This term does not include mining waste or oil and gas waste.

"Interior Well" means any well or similar collection component located inside the perimeter of the landfill. A perimeter well located outside the landfilled waste is not an interior well.

"Landfill" means an area of land or an excavation in which wastes are placed for permanent disposal, and that is not a land application unit, surface impoundment, injection well, or waste pile as those terms are defined under § 257.2 of this title.

"Lateral expansion" means a horizontal expansion of the waste boundaries of an existing MSW landfill. A lateral expansion is not a modification unless it results in an increase in the design capacity of the landfill.

"Municipal solid waste landfill" or "MSW landfill" means an entire disposal facility in a contiguous geographical space where household waste is placed in or on land. An MSW landfill may also receive other types of RCRA Subtitle D wastes (§ 257.2 of this title) such as commercial solid waste, nonhazardous sludge, conditionally exempt small quantity generator waste, and industrial solid waste. Portions of an MSW landfill may be separated by access roads. An MSW landfill may be publicly or privately owned. An MSW landfill may be a new MSW landfill, an existing MSW landfill, or a lateral expansion.

"Municipal solid waste landfill emissions" or "MSW landfill emissions" means gas generated by the decomposition of organic waste deposited in an MSW landfill or derived from the evolution of organic compounds in the waste.

"NMOC" means nonmethane organic compounds, as measured according to the provisions of § 60.754.

"Nondegradable waste" means any waste that does not decompose through chemical breakdown or microbiological activity. Examples are, but are not limited to, concrete, municipal waste combustor ash, and metals.

"Passive collection system" means a gas collection system that solely uses positive pressure within the landfill to move the gas rather than using gas mover equipment.

"Sludge" means any solid, semisolid, or liquid waste generated from a municipal, commercial, or industrial wastewater treatment plant, water supply treatment plant, or air pollution control facility, exclusive of the treated effluent from a wastewater treatment plant.

"Solid waste" means any garbage, sludge from a wastewater treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities, but does not include solid or dissolved material in domestic sewage, or solid or dissolved materials in irrigation return flows or industrial discharges that are point sources subject to permits under 33 U.S.C. 1342, or source, special nuclear, or by-product material as defined by the Atomic Energy Act of 1954, as amended (42 U.S.C 2011 et seq.).

"Sufficient density" means any number, spacing, and combination of collection system components, including vertical wells, horizontal collectors, and surface collectors, necessary to maintain emission and migration control as determined by measures of performance set forth in this part.

"Sufficient extraction rate" means a rate sufficient to maintain a negative pressure at all wellheads in the collection system without causing air infiltration, including any wellheads connected to the system as a result of expansion or excess surface emissions, for the life of the blower.

§60.752 Standards for air emissions from municipal solid waste landfills.

(a) Each owner or operator of an MSW landfill having a design capacity less than 2.5 million megagrams by mass or 2.5 million cubic meters by volume shall submit an initial design capacity report to the Administrator as provided in § 60.757(a). The landfill may calculate design capacity in either megagrams or cubic meters for comparison with the exemption values. Any density conversions shall be documented and submitted with the report. For purposes of part 70 permitting, a landfill with a design capacity less than 2.5 million megagrams or 2.5 million cubic meters does not require an operating permit under part 70 of this chapter. Submittal of the initial design capacity report shall fulfill the requirements of this subpart except as provided for in paragraphs (a)(1) and (a)(2) of this section.

(1) The owner or operator shall submit to the Administrator an amended design capacity report, as provided for in § 60.757(a)(3), when there is any increase in the design capacity of a landfill subject to the provisions of this subpart, whether the increase results from an increase in the area or depth of the landfill, a change in the operating procedures of the landfill, or any other means.

(2) If any increase in the maximum design capacity of a landfill exempted from the provisions of § 60.752(b) through § 60.759 of this subpart on the basis of the design capacity exemption in paragraph (a) of this section results in a revised maximum design capacity equal to or greater than 2.5 million megagrams or 2.5 million cubic meters, the owner or operator shall comply with the provision of paragraph (b) of this section.

(b) Each owner or operator of an MSW landfill having a design capacity equal to or greater than 2.5 million megagrams or 2.5 million cubic meters, shall either comply with paragraph (b)(2) of this section or calculate an NMOC emission rate for the landfill using the procedures specified in § 60.754. The NMOC emission rate shall be recalculated annually, except as provided in § 60.757(b)(1)(ii) of this subpart. The owner or operator of an MSW landfill subject to this subpart with a design capacity greater than or equal to 2.5 million megagrams or 2.5 million cubic meters is subject to part 70 permitting requirements. When a landfill is closed, and either never

needed control or meets the conditions for control system removal specified in § 60.752(b)(2)(v) of this subpart, a part 70 operating permit is no longer required.

(1) If the calculated NMOC emission rate is less than 50 megagrams per year, the owner or operator shall:

(i) Submit an annual emission report to the Administrator, except as provided for in § 60.757(b)(1)(ii); and

(ii) Recalculate the NMOC emission rate annually using the procedures specified in § 60.754(a)(1) until such time as the calculated NMOC emission rate is equal to or greater than 50 megagrams per year, or the landfill is closed.

(A) If the NMOC emission rate, upon recalculation required in paragraph (b)(1)(ii) of this section, is equal to or greater than 50 megagrams per year, the owner or operator shall install a collection and control system in compliance with paragraph (b)(2) of this section.

(B) If the landfill is permanently closed, a closure notification shall be submitted to the Administrator as provided for in § 60.757(d).

(2) If the calculated NMOC emission rate is equal to or greater than 50 megagrams per year, the owner or operator shall:

(i) Submit a collection and control system design plan prepared by a professional engineer to the Administrator within 1 year:

(A) The collection and control system as described in the plan shall meet the design requirements of paragraph (b)(2)(ii) of this section.

(B) The collection and control system design plan shall include any alternatives to the operational standards, test methods, procedures, compliance measures, monitoring, recordkeeping or reporting provisions of §§ 60.753 through 60.758 proposed by the owner or operator.

(C) The collection and control system design plan shall either conform with specifications for active collection systems in § 60.759 or include a demonstration to the Administrator's satisfaction of the sufficiency of the alternative provisions to § 60.759.

(D) The Administrator shall review the information submitted under paragraphs (b)(2)(i)(A),(B) and (C) of this section and either approve it, disapprove it, or request that additional information be submitted. Because of the many site-specific factors involved with landfill gas system design, alternative systems may be necessary. A wide variety of system designs are possible, such as vertical wells, combination horizontal and vertical collection systems, or horizontal trenches only, leachate collection components, and passive systems.

(ii) Install a collection and control system within 18 months of the submittal of the design plan under paragraph (b)(2)(i) of this section that effectively captures the gas generated within the landfill.

(A) An active collection system shall:

(1) Be designed to handle the maximum expected gas flow rate from the entire area of the landfill that warrants control over the intended use period of the gas control or treatment system equipment;

(2) Collect gas from each area, cell, or group of cells in the landfill in which the initial solid waste has been placed for a period of:

(i) 5 years or more if active; or

(ii) 2 years or more if closed or at final grade;

(3) Collect gas at a sufficient extraction rate;

(4) Be designed to minimize off-site migration of subsurface gas.

(B) A passive collection system shall:

(1) Comply with the provisions specified in paragraphs (A)(1),(2), and (4) of paragraph (b)(2)(ii) of this section.

(2) Be installed with liners on the bottom and all sides in all areas in which gas is to be collected. The liners shall be installed as required under § 258.40 of this title.

(iii) Route all the collected gas to a control system that complies with the requirements in either paragraph (b)(2)(iii)(A), (B) or (C) of this section.

(A) An open flare designed and operated in accordance with § 60.18;

(B) A control system designed and operated to reduce NMOC by 98 weight-percent, or, when an enclosed combustion device is used for control, to either reduce NMOC by 98 weight percent or reduce the outlet NMOC concentration to less than 20 parts per million by volume, dry basis as hexane at 3 percent oxygen. The reduction efficiency or parts per million by volume shall be established by an initial performance test, required under § 60.8 using the test methods specified in § 60.754(d).

(1) If a boiler or process heater is used as the control device, the landfill gas stream shall be introduced into the flame zone.

(2) The control device shall be operated within the parameter ranges established during the initial or most recent performance test. The operating parameters to be monitored are specified in § 60.756;

(C) Route the collected gas to a treatment system that processes the collected gas for subsequent sale or use. All emissions from any atmospheric vent from the gas treatment system shall be subject to the requirements of paragraph (b)(2)(iii)(A) or (B) of this section.

(Rules 1200-3-16-.76, continued)

(iv) Operate the collection and control device installed to comply with this subpart in accordance with the provisions of § § 60.753, 60.755 and 60.756.

(v) The collection and control system may be capped or removed provided that all the conditions of paragraphs (b)(2)(v)(A), (B), and (C) of this section are met:

(A) The landfill shall be no longer accepting solid waste and be permanently closed under the requirements of § 258.60 of this title. A closure report shall be submitted to the Administrator as provided in § 60.757(d);

(B) The collection and control system shall have been in operation a minimum of 15 years; and

(C) Following the procedures specified in § 60.754(b) of this subpart, the calculated NMOC gas produced by the landfill shall be less than 50 megagrams per year on three successive test dates. The test dates shall be no less than 90 days apart, and no more than 180 days apart.

§60.753 Operational standards for collection and control systems.

Each owner or operator of an MSW landfill gas collection and control system used to comply with the provisions of § 60.752(b)(2)(ii) of this subpart shall:

(a) Operate the collection system such that gas is collected from each area, cell, or group of cells in the MSW landfill in which solid waste has been in place for:

(1) 5 years or more if active; or

(2) 2 years or more if closed or at final grade;

(b) Operate the collection system with negative pressure at each wellhead except under the following conditions:

(1) A fire or increased well temperature. The owner or operator shall record instances when positive pressure occurs in efforts to avoid a fire. These records shall be submitted with the annual reports as provided in § 60.757(f)(1);

(2) Use of a geomembrane or synthetic cover. The owner or operator shall develop acceptable pressure limits in the design plan;

(3) A decommissioned well. A well may experience a static positive pressure after shut down to accommodate for declining flows. All design changes shall be approved by the Administrator;

(c) Operate each interior wellhead in the collection system with a landfill gas temperature less than 55 ^{o}C and with either a nitrogen level less than 20 percent or an oxygen level less than 5 percent. The owner or operator may establish a higher operating temperature, nitrogen, or oxygen value at a particular well. A higher operating value demonstration shall show supporting data that the elevated parameter does not cause fires or significantly inhibit anaerobic decomposition by killing methanogens.

(1) The nitrogen level shall be determined using Method 3C, unless an alternative test method is established as allowed by § 60.752(b)(2)(i) of this subpart.

(2) Unless an alternative test method is established as allowed by § 60.752(b)(2)(i) of this subpart, the oxygen shall be determined by an oxygen meter using Method 3A except that:

(i) The span shall be set so that the regulatory limit is between 20 and 50 percent of the span;

(ii) A data recorder is not required;

(iii) Only two calibration gases are required, a zero and span, and ambient air may be used as the span;

(iv) A calibration error check is not required;

(v) The allowable sample bias, zero drift, and calibration drift are ± 10 percent.

(d) Operate the collection system so that the methane concentration is less than 500 parts per million above background at the surface of the landfill. To determine if this level is exceeded, the owner or operator shall conduct surface testing around the perimeter of the collection area along a pattern that traverses the landfill at 30 meter intervals and where visual observations indicate elevated concentrations of landfill gas, such as distressed vegetation and cracks or seeps in the cover. The owner or operator may establish an alternative traversing pattern that ensures equivalent coverage. A surface monitoring design plan shall be developed that includes a topographical map with the monitoring route and the rationale for any site-specific deviations from the 30 meter intervals. Areas with steep slopes or other dangerous areas may be excluded from the surface testing.

(e) Operate the system such that all collected gases are vented to a control system designed and operated in compliance with § 60.752(b)(2)(iii). In the event the collection or control system is inoperable, the gas mover system shall be shut down and all valves in the collection and control system contributing to venting of the gas to the atmosphere shall be closed within 1 hour; and

(f) Operate the control or treatment system at all times when the collected gas is routed to the system.

(g) If monitoring demonstrates that the operational requirement in paragraphs (b), (c), or (d) of this section are not met, corrective action shall be taken as specified in § 60.752(a)(3) through (5) or § 60.755(c) of this subpart. If corrective actions are taken as specified in § 60.755, the monitored exceedance is not a violation of the operational requirements in this section.

§60.754 Test methods and procedures.

(a) (1) The landfill owner or operator shall calculate the NMOC emission rate using either the equation provided in paragraph (a)(1)(i) of this section or the equation provided in paragraph (a)(1)(ii) of this section. The values to be used in both equations are 0.05 per year for k, 170 cubic meters per megagram for L_O, and 4,000 parts per million by volume as hexane for the C_{NMOC}.

(i) The following equation shall be used if the actual year-to-year solid waste acceptance rate is known.

$$M_{NMOC} = \sum_{i=1}^{n} 2kL_o M_i \left(e^{-kt_i}\right)\left(C_{NMOC}\right)\left(3.6x10^{-9}\right)$$

where,

(Rules 1200-3-16-.76, continued)

M_{NMOC} = Total NMOC emission rate from the landfill, megagrams per year
k = methane generation rate constant, year^{-1}
L_o = methane generation potential, cubic meters per megagram solid waste
M_i = mass of solid waste in the ith section, megagrams
t_i = age of the ith section, years
C_{NMOC} = concentration of NMOC, parts per million by volume as hexane
3.6×10^{-9} = conversion factor

The mass of nondegradable solid waste may be subtracted from the total mass of solid waste in a particular section of the landfill when calculating the value for M_i if the documentation provisions of § 60.758(d)(2) are followed.

(ii) The following equation shall be used if the actual year-to-year solid waste acceptance rate is unknown.

$$M_{NMOC} = 2L_o R (e^{-kc} - e^{-kt}) (C_{NMOC})(3.6 \times 10^{-9})$$

where,

M_{NMOC} = mass emission rate of NMOC, megagrams per year
L_0= methane generation potential, cubic meters per megagram solid waste
R = average annual acceptance rate, megagrams per year
k = methane generation rate constant, year^{-1}
C_{NMOC} = concentration of NMOC, parts per million by volume as hexane
c = time since closure, years. For active landfill c = O and $e^{-kc} = 1$
3.6×10^{-9} = conversion factor

The mass of nondegradable solid waste may be subtracted from the average annual acceptance rate when calculating a value for R, if the documentation provisions of § 60.758(d)(2) are followed.

(2) Tier 1. The owner or operator shall compare the calculated NMOC mass emission rate to the standard of 50 megagrams per year.

(i) If the NMOC emission rate calculated in paragraph (a)(1) of this section is less than 50 megagrams per year, then the landfill owner shall submit an emission rate report as provided in § 60.757(b)(1), and shall recalculate the NMOC mass emission rate annually as required under § 60.752(b)(1).

(ii) If the calculated NMOC emission rate is equal to or greater than 50 megagrams per year, then the landfill owner shall either comply with § 60.752(b)(2), or determine a site-specific NMOC concentration and recalculate the NMOC emission rate using the procedures provided in paragraph (a)(3) of this section.

(3) Tier 2. The landfill owner or operator shall determine the NMOC concentration using the following sampling procedure. The landfill owner or operator shall install at least two sample probes per hectare of landfill surface that has retained waste for at least 2 years. If the landfill is larger than 25 hectares in area, only 50 samples are required. The sample probes should be located to avoid known areas of nondegradable solid waste. The owner or operator shall collect and analyze one sample of landfill gas from each probe to determine the NMOC concentration using Method 25C of appendix A of this part or Method 18 of appendix A of this part. If using Method 18 of appendix A of this part, the

minimum list of compounds to be tested shall be those published in the most recent Compilation of Air Pollutant Emission Factors (AP-42). If composite sampling is used, equal volumes shall be taken from each sample probe. If more than the required number of samples are taken, all samples shall be used in the analysis. The landfill owner or operator shall divide the NMOC concentration from Method 25C of appendix A of this part by six to convert from C_{NMOC} as carbon to C_{NMOC} as hexane.

(i) The landfill owner or operator shall recalculate the NMOC mass emission rate using the equations provided in paragraph (a)(1)(i) or (a)(1)(ii) of this section and using the average NMOC concentration from the collected samples instead of the default value in the equation provided in paragraph (a)(1) of this section.

(ii) If the resulting mass emission rate calculated using the site-specific NMOC concentration is equal to or greater than 50 megagrams per year, then the landfill owner or operator shall either comply with § 60.752(b)(2), or determine the site-specific methane generation rate constant and recalculate the NMOC emission rate using the site-specific methane generation rate using the procedure specified in paragraph (a)(4) of this section.

(iii) If the resulting NMOC mass emission rate is less than 50 megagrams per year, the owner or operator shall submit a periodic estimate of the emission rate report as provided in § 60.757(b)(1) and retest the site-specific NMOC concentration every 5 years using the methods specified in this section.

(4) Tier 3. The site-specific methane generation rate constant shall be determined using the procedures provided in Method 2E of appendix A of this part. The landfill owner or operator shall estimate the NMOC mass emission rate using equations in paragraph (a)(1)(i) or (a)(1)(ii) of this section and using a site-specific methane generation rate constant k, and the site-specific NMOC concentration as determined in paragraph (a)(3) of this section instead of the default values provided in paragraph (a)(1) of this section. The landfill owner or operator shall compare the resulting NMOC mass emission rate to the standard of 50 megagrams per year.

(i) If the NMOC mass emission rate as calculated using the site-specific methane generation rate and concentration of NMOC is equal to or greater than 50 megagrams per year, the owner or operator shall comply with § 60.752(b)(2).

(ii) If the NMOC mass emission rate is less than 50 megagrams per year, then the owner or operator shall submit a periodic emission rate report as provided in § 60.757(b)(1) and shall recalculate the NMOC mass emission rate annually, as provided in § 60.757(b)(1) using the equations in paragraph (a)(1) of this section and using the site-specific methane generation rate constant and NMOC concentration obtained in paragraph (a)(3) of this section. The calculation of the methane generation rate constant is performed only once, and the value obtained is used in all subsequent annual NMOC emission rate calculations.

(5) The owner or operator may use other methods to determine the NMOC concentration or a site-specific k as an alternative to the methods required in paragraphs (a)(3) and (a)(4) of this section if the method has been approved by the Administrator as provided in § 60.752(b)(2)(i)(B).

(b) After the installation of a collection and control system in compliance with § 60.755, the owner or operator shall calculate the NMOC emission rate for purposes of determining when the system can be removed as provided in § 60.752(b)(2)(v), using the following equation:

(Rules 1200-3-16-.76, continued)

$$M_{NMOC} = 1.89 \times 10^{-3} Q_{LFG} C_{NMOC}$$

where,

M_{NMOC} = mass emission rate of NMOC, megagrams per year
Q_{LFG} = flow rate of landfill gas, cubic meters per minute
C_{NMOC} = NMOC concentration, parts per million by volume as hexane

(1) The flow rate of landfill gas, Q_{LFG}, shall be determined by measuring the total landfill gas flow rate at the common header pipe that leads to the control device using a gas flow measuring device calibrated according to the provisions of section 4 of Method 2E of appendix A of this part.

(2) The average NMOC concentration, C_{NMOC}, shall be determined by collecting and analyzing landfill gas sampled from the common header pipe before the gas moving or condensate removal equipment using the procedures in Method 25C or Method 18 of appendix A of this part. If using Method 18 of appendix A of this part, the minimum list of compounds to be tested shall be those published in the most recent Compilation of Air Pollutant Emission Factors (AP-42). The sample location on the common header pipe shall be before any condensate removal or other gas refining units. The landfill owner or operator shall divide the NMOC concentration from Method 25C of appendix A of this part by six to convert from C_{NMOC} as carbon to C_{NMOC} as hexane.

(3) The owner or operator may use another method to determine landfill gas flow rate and NMOC concentration if the method has been approved by the Administrator as provided in § 60.752(b)(2)(i)(B).

(c) The owner or operator of each MSW landfill subject to the provisions of this subpart shall estimate the NMOC emission rate for comparison to the PSD major source and significance levels in §§ 51.166 or 52.21 of this chapter using AP-42 or other approved measurement procedures. If a collection system, which complies with the provisions in § 60.752(b)(2) is already installed, the owner or operator shall estimate the NMOC emission rate using the procedures provided in paragraph (b) of this section.

(d) For the performance test required in § 60.752(b)(2)(iii)(B), Method 25 or Method 18 of appendix A of this part shall be used to determine compliance with 98 weight-percent efficiency or the 20 ppmv outlet concentration level, unless another method to demonstrate compliance has been approved by the Administrator as provided by § 60.752(b)(2)(i)(B). If using Method 18 of appendix A of this part, the minimum list of compounds to be tested shall be those published in the most recent Compilation of Air Pollutant Emission Factors (AP-42). The following equation shall be used to calculate efficiency:

$$\text{Control Efficiency} = (NMOC_{in} - NMOC_{out})/(NMOC_{in})$$

where,

$NMOC_{in}$ = mass of NMOC entering control device
$NMOC_{out}$ = mass of NMOC exiting control device

(Rules 1200-3-16-.76, continued)

§60.755 Compliance provisions.

(a) Except as provided in § 60.752(b)(2)(i)(B), the specified methods in paragraphs (a)(1) through (a)(6) of this section shall be used to determine whether the gas collection system is in compliance with § 60.752(b)(2)(ii).

(1) For the purposes of calculating the maximum expected gas generation flow rate from the landfill to determine compliance with § 60.752(b)(2)(ii)(A)(1), one of the following equations shall be used. The k and L_o kinetic factors should be those published in the most recent Compilation of Air Pollutant Emission Factors (AP-42) or other site specific values demonstrated to be appropriate and approved by the Administrator. If k has been determined as specified in § 60.754(a)(4), the value of k determined from the test shall be used. A value of no more than 15 years shall be used for the intended use period of the gas mover equipment. The active life of the landfill is the age of the landfill plus the estimated number of years until closure.

(i) For sites with unknown year-to-year solid waste acceptance rate:

$$Q_m = 2L_o R (e^{-kc} - e^{-kt})$$

where,

Q_m = maximum expected gas generation flow rate, cubic meters per year
L_o = methane generation potential, cubic meters per megagram solid waste
R = average annual acceptance rate, megagrams per year
k = methane generation rate constant, $year^{-1}$
t = age of the landfill at equipment installation plus the time the owner or operator intends to use the gas mover equipment or active life of the landfill, whichever is less. If the equipment is installed after closure, t is the age of the landfill at installation, years
c = time since closure, years (for an active landfill c=0 and e^{-kc} =1)

(ii) For sites with known year-to-year solid waste acceptance rate:

$$Q_M = \sum_{i=1}^{n} 2kL_o M_i \left(e^{-kt_i}\right)$$

where,

Q_M =maximum expected gas generation flow rate, cubic meters per year
k = methane generation rate constant, $year^{-1}$
L_o = methane generation potential, cubic meters per megagram solid waste
M_i = mass of solid waste in the ith section, megagrams
t_i = age of the ith section, years

(iii) If a collection and control system has been installed, actual flow data may be used to project the maximum expected gas generation flow rate instead of, or in conjunction with, the equations in paragraphs (a)(1)(i) and (ii) of this section. If the landfill is still accepting waste, the actual measured flow data will not equal the maximum expected gas generation rate, so calculations using the equations in paragraphs (a)(1)(i) or (ii) or other methods shall be used to predict the

maximum expected gas generation rate over the intended period of use of the gas control system equipment.

(2) For the purposes of determining sufficient density of gas collectors for compliance with § 60.752(b)(2)(ii)(A)(2), the owner or operator shall design a system of vertical wells, horizontal collectors, or other collection devices, satisfactory to the Administrator, capable of controlling and extracting gas from all portions of the landfill sufficient to meet all operational and performance standards.

(3) For the purpose of demonstrating whether the gas collection system flow rate is sufficient to determine compliance with § 60.752(b)(2)(ii)(A)(3), the owner or operator shall measure gauge pressure in the gas collection header at each individual well, monthly. If a positive pressure exists, action shall be initiated to correct the exceedance within 5 calendar days, except for the three conditions allowed under § 60.753(b). If negative pressure cannot be achieved without excess air infiltration within 15 calendar days of the first measurement, the gas collection system shall be expanded to correct the exceedance within 120 days of the initial measurement of positive pressure. Any attempted corrective measure shall not cause exceedances of other operational or performance standards.

(4) Owners or operators are not required to install additional wells as required in paragraph (a)(3) of this section during the first 180 days after gas collection system start-up.

(5) For the purpose of identifying whether excess air infiltration into the landfill is occurring, the owner or operator shall monitor each well monthly for temperature and nitrogen or oxygen as provided in § 60.753(c). If a well exceeds one of these operating parameters, action shall be initiated to correct the exceedance within 5 calendar days. If correction of the exceedance cannot be achieved within 15 calendar days of the first measurement, the gas collection system shall be expanded to correct the exceedance within 120 days of the initial exceedance. Any attempted corrective measure shall not cause exceedances of other operational or performance standards.

(6) An owner or operator seeking to demonstrate compliance with § 60.752(b)(2)(ii)(A)(4) through the use of a collection system not conforming to the specifications provided in § 60.759 shall provide information satisfactory to the Administrator as specified in § 60.752(b)(2)(i)(C) demonstrating that off-site migration is being controlled.

(b) For purposes of compliance with § 60.753(a), each owner or operator of a controlled landfill shall place each well or design component as specified in the approved design plan as provided in § 60.752(b)(2)(i). Each well shall be installed within 60 days of the date in which the initial solid waste has been in place for a period of:

(1) 5 years or more if active; or

(2) 2 years or more if closed or at final grade;.

(c) The following procedures shall be used for compliance with the surface methane operational standard as provided in § 60.753(d).

(1) After installation of the collection system, the owner or operator shall monitor surface concentrations of methane along the entire perimeter of the collection area and along a serpentine pattern spaced 30 meters apart (or a site-specific established spacing) for each collection area on a quarterly basis using an organic vapor analyzer, flame ionization

detector, or other portable monitor meeting the specifications provided in paragraph (d) of this section.

(2) The background concentration shall be determined by moving the probe inlet upwind and downwind outside the boundary of the landfill at a distance of at least 30 meters from the perimeter wells.

(3) Surface emission monitoring shall be performed in accordance with section 4.3.1 of Method 21 of appendix A of this part, except that the probe inlet shall be placed within 5 to 10 centimeters of the ground. Monitoring shall be performed during typical meteorological conditions.

(4) Any reading of 500 parts per million or more above background at any location shall be recorded as a monitored exceedance and the actions specified in paragraphs (c)(4)(i) through (v) of this section shall be taken. As long as the specified actions are taken, the exceedance is not a violation of the operational requirements of § 60.753(d).

(i) The location of each monitored exceedance shall be marked and the location recorded.

(ii) Cover maintenance or adjustments to the vacuum of the adjacent wells to increase the gas collection in the vicinity of each exceedance shall be made and the location shall be re-monitored within 10 calendar days of detecting the exceedance.

(iii) If the re-monitoring of the location shows a second exceedance, additional corrective action shall be taken and the location shall be monitored again within 10 days of the second exceedance. If the re-monitoring shows a third exceedance for the same location, the action specified in paragraph (c)(4)(v) of this section shall be taken, and no further monitoring of that location is required until the action specified in paragraph (c)(4)(v) has been taken.

(iv) Any location that initially showed an exceedance but has a methane concentration less than 500 ppm methane above background at the 10-day re-monitoring specified in paragraph (c)(4)(ii) or (iii) of this section shall be re-monitored 1 month from the initial exceedance. If the 1-month remonitoring shows a concentration less than 500 parts per million above background, no further monitoring of that location is required until the next quarterly monitoring period. If the 1-month remonitoring shows an exceedance, the actions specified in paragraph (c)(4)(iii) or (v) shall be taken.

(v) For any location where monitored methane concentration equals or exceeds 500 parts per million above background three times within a quarterly period, a new well or other collection device shall be installed within 120 calendar days of the initial exceedance. An alternative remedy to the exceedance, such as upgrading the blower, header pipes or control device, and a corresponding timeline for installation may be submitted to the Administrator for approval.

(5) The owner or operator shall implement a program to monitor for cover integrity and implement cover repairs as necessary on a monthly basis.

(d) Each owner or operator seeking to comply with the provisions in paragraph (c) of this section shall comply with the following instrumentation specifications and procedures for surface emission monitoring devices:

(Rules 1200-3-16-.76, continued)

(1) The portable analyzer shall meet the instrument specifications provided in section 3 of Method 21 of appendix A of this part, except that "methane" shall replace all references to VOC.

(2) The calibration gas shall be methane, diluted to a nominal concentration of 500 parts per million in air.

(3) To meet the performance evaluation requirements in section 3.1.3 of Method 21 of appendix A of this part, the instrument evaluation procedures of section 4.4 of Method 21 of appendix A of this part shall be used.

(4) The calibration procedures provided in section 4.2 of Method 21 of appendix A of this part shall be followed immediately before commencing a surface monitoring survey.

(e) The provisions of this subpart apply at all times, except during periods of start-up, shutdown, or malfunction, provided that the duration of start-up, shutdown, or malfunction shall not exceed 5 days for collection systems and shall not exceed 1 hour for treatment or control devices.

§ 60.756 Monitoring of operations.

Except as provided in § 60.752(b)(2)(i)(B),

(a) Each owner or operator seeking to comply with § 60.752(b)(2)(ii)(A) for an active gas collection system shall install a sampling port and a thermometer or other temperature measuring device at each wellhead and:

(1) Measure the gauge pressure in the gas collection header on a monthly basis as provided in § 60.755(a)(3); and

(2) Monitor nitrogen or oxygen concentration in the landfill gas on a monthly basis as provided in § 60.755(a)(5); and

(3) Monitor temperature of the landfill gas on a monthly basis as provided in § 60.755(a)(5).

(b) Each owner or operator seeking to comply with § 60.752(b)(2)(iii) using an enclosed combustor shall calibrate, maintain, and operate according to the manufacturer's specifications, the following equipment.

(1) A temperature monitoring device equipped with a continuous recorder and having an accuracy of ± 1 percent of the temperature being measured expressed in degrees Celsius or ± 0.5 ^{o}C, whichever is greater. A temperature monitoring device is not required for boilers or process heaters with design heat input capacity greater than 44 megawatts.

(2) A gas flow rate measuring device that provides a measurement of gas flow to or bypass of the control device. The owner or operator shall either:

(i) Install, calibrate, and maintain a gas flow rate measuring device that shall record the flow to the control device at least every 15 minutes; or

(ii) Secure the bypass line valve in the closed position with a car-seal or a lock-and-key type configuration. A visual inspection of the seal or closure mechanism shall be performed at least once every month to ensure that the valve is maintained in the closed position and that the gas flow is not diverted through the bypass line.

(c) Each owner or operator seeking to comply with § 60.752(b)(2)(iii) using an open flare shall install, calibrate, maintain, and operate according to the manufacturer's specifications the following equipment:

(1) A heat sensing device, such as an ultraviolet beam sensor or thermocouple, at the pilot light or the flame itself to indicate the continuous presence of a flame.

(2) A device that records flow to or bypass of the flare. The owner or operator shall either:

(i) Install, calibrate, and maintain a gas flow rate measuring device that shall record the flow to the control device at least every 15 minutes; or

(ii) Secure the bypass line valve in the closed position with a car-seal or a lock-and-key type configuration. A visual inspection of the seal or closure mechanism shall be performed at least once every month to ensure that the valve is maintained in the closed position and that the gas flow is not diverted through the bypass line.

(d) Each owner or operator seeking to demonstrate compliance with § 60.752(b)(2)(iii) using a device other than an open flare or an enclosed combustor shall provide information satisfactory to the Administrator as provided in § 60.752(b)(2)(i)(B) describing the operation of the control device, the operating parameters that would indicate proper performance, and appropriate monitoring procedures. The Administrator shall review the information and either approve it, or request that additional information be submitted. The Administrator may specify additional appropriate monitoring procedures.

(e) Each owner or operator seeking to install a collection system that does not meet the specifications in § 60.759 or seeking to monitor alternative parameters to those required by § 60.753 through § 60.756 shall provide information satisfactory to the Administrator as provided in § 60.752(b)(2)(i)(B) and (C) describing the design and operation of the collection system, the operating parameters that would indicate proper performance, and appropriate monitoring procedures. The Administrator may specify additional appropriate monitoring procedures.

(f) Each owner or operator seeking to demonstrate compliance with § 60.755(c), shall monitor surface concentrations of methane according to the instrument specifications and procedures provided in § 60.755(d). Any closed landfill that has no monitored exceedances of the operational standard in three consecutive quarterly monitoring periods may skip to annual monitoring. Any methane reading of 500 ppm or more above background detected during the annual monitoring returns the frequency for that landfill to quarterly monitoring.

§ 60.757 Reporting requirements.

Except as provided in § 60.752(b)(2)(i)(B),

(a) Each owner or operator subject to the requirements of this subpart shall submit an initial design capacity report to the Administrator.

(1) The initial design capacity report shall fulfill the requirements of the notification of the date construction is commenced as required under § 60.7(a)(1) and shall be submitted no later than the earliest day from the following:

(i) 90 days of the issuance of the State, Local, Tribal, or RCRA construction or operating permit; or

(ii) 30 days of the date of construction or reconstruction as defined under § 60.15; or

(iii) 30 days of the initial acceptance of solid waste.

(2) The initial design capacity report shall contain the following information:

(i) A map or plot of the landfill, providing the size and location of the landfill, and identifying all areas where solid waste may be landfilled according to the provisions of the State, local, Tribal, or RCRA construction or operating permit;

(ii) The maximum design capacity of the landfill. Where the maximum design capacity is specified in the State or local construction or RCRA permit, a copy of the permit specifying the maximum design capacity may be submitted as part of the report. If the maximum design capacity of the landfill is not specified in the permit, the maximum design capacity shall be calculated using good engineering practices. The calculations shall be provided, along with such parameters as depth of solid waste, solid waste acceptance rate, and compaction practices as part of the report. The State, Tribal, local agency or Administrator may request other reasonable information as may be necessary to verify the maximum design capacity of the landfill.

(3) An amended design capacity report shall be submitted to the Administrator providing notification of any increase in the design capacity of the landfill, whether the increase results from an increase in the permitted area or depth of the landfill, a change in the operating procedures, or any other means which results in an increase in the maximum design capacity of the landfill above 2.5 million megagrams or 2.5 million cubic meters. The amended design capacity report shall be submitted within 90 days of the issuance of an amended construction or operating permit, or the placement of waste in additional land, or the change in operating procedures which will result in an increase in maximum design capacity, whichever occurs first.

(b) Each owner or operator subject to the requirements of this subpart shall submit an NMOC emission rate report to the Administrator initially and annually thereafter, except as provided for in paragraphs (b)(1)(ii) or (b)(3) of this section. The Administrator may request such additional information as may be necessary to verify the reported NMOC emission rate.

(1) The NMOC emission rate report shall contain an annual or 5-year estimate of the NMOC emission rate calculated using the formula and procedures provided in § 60.754(a) or (b), as applicable.

(i) The initial NMOC emission rate report shall be submitted within 90 days of the date waste acceptance commences and may be combined with the initial design capacity report required in paragraph (a) of this section. Subsequent NMOC emission rate reports shall be submitted annually thereafter, except as provided for in paragraphs (b)(1)(ii) and (b)(3) of this section.

(ii) If the estimated NMOC emission rate as reported in the annual report to the Administrator is less than 50 megagrams per year in each of the next 5 consecutive years, the owner or operator may elect to submit an estimate of the NMOC emission rate for the next 5-year period in lieu of the annual report. This estimate shall include the current amount of solid waste-in-place and the estimated waste acceptance rate for each year of the 5 years for which an NMOC emission rate is estimated. All data and calculations upon which this estimate is based shall be provided to the Administrator. This estimate shall be

revised at least once every 5 years. If the actual waste acceptance rate exceeds the estimated waste acceptance rate in any year reported in the 5-year estimate, a revised 5-year estimate shall be submitted to the Administrator. The revised estimate shall cover the 5-year period beginning with the year in which the actual waste acceptance rate exceeded the estimated waste acceptance rate.

(2) The NMOC emission rate report shall include all the data, calculations, sample reports and measurements used to estimate the annual or 5-year emissions.

(3) Each owner or operator subject to the requirements of this subpart is exempted from the requirements of paragraphs (b)(1) and (2) of this section, after the installation of a collection and control system in compliance with § 60.752(b)(2), during such time as the collection and control system is in operation and in compliance with § § 60.753 and 60.755.

(c) Each owner or operator subject to the provisions of § 60.752(b)(2)(i) shall submit a collection and control system design plan to the Administrator within 1 year of the first report, required under paragraph (b) of this section, in which the emission rate exceeds 50 megagrams per year, except as follows:

(1) If the owner or operator elects to recalculate the NMOC emission rate after Tier 2 NMOC sampling and analysis as provided in § 60.754(a)(3) and the resulting rate is less than 50 megagrams per year, annual periodic reporting shall be resumed, using the Tier 2 determined site-specific NMOC concentration, until the calculated emission rate is equal to or greater than 50 megagrams per year or the landfill is closed. The revised NMOC emission rate report, with the recalculated emission rate based on NMOC sampling and analysis, shall be submitted within 180 days of the first calculated exceedance of 50 megagrams per year.

(2) If the owner or operator elects to recalculate the NMOC emission rate after determining a site-specific methane generation rate constant (k), as provided in Tier 3 in § 60.754(a)(4), and the resulting NMOC emission rate is less than 50 Mg/yr, annual periodic reporting shall be resumed. The resulting site-specific methane generation rate constant (k) shall be used in the emission rate calculation until such time as the emissions rate calculation results in an exceedance. The revised NMOC emission rate report based on the provisions of § 60.754(a)(4) and the resulting site-specific methane generation rate constant (k) shall be submitted to the Administrator within 1 year of the first calculated emission rate exceeding 50 megagrams per year.

(d) Each owner or operator of a controlled landfill shall submit a closure report to the Administrator within 30 days of waste acceptance cessation. The Administrator may request additional information as may be necessary to verify that permanent closure has taken place in accordance with the requirements of § 258.60 of this title. If a closure report has been submitted to the Administrator, no additional wastes may be placed into the landfill without filing a notification of modification as described under § 60.7(a)(4).

(e) Each owner or operator of a controlled landfill shall submit an equipment removal report to the Administrator 30 days prior to removal or cessation of operation of the control equipment.

(1) The equipment removal report shall contain all of the following items:

(i) A copy of the closure report submitted in accordance with paragraph (d) of this section;

(ii) A copy of the initial performance test report demonstrating that the 15 year minimum control period has expired; and

(iii) Dated copies of three successive NMOC emission rate reports demonstrating that the landfill is no longer producing 50 megagrams or greater of NMOC per year.

(2) The Administrator may request such additional information as may be necessary to verify that all of the conditions for removal in § 60.752(b)(2)(v) have been met.

(f) Each owner or operator of a landfill seeking to comply with § 60.752(b)(2) using an active collection system designed in accordance with § 60.752(b)(2)(ii) shall submit to the Administrator annual reports of the recorded information in (f)(1) through (f)(6) of this paragraph. The initial annual report shall be submitted within 180 days of installation and start-up of the collection and control system, and shall include the initial performance test report required under § 60.8. For enclosed combustion devices and flares, reportable exceedances are defined under § 60.758(c).

(1) Value and length of time for exceedance of applicable parameters monitored under § 60.756(a), (b), (c), and (d).

(2) Description and duration of all periods when the gas stream is diverted from the control device through a bypass line or the indication of bypass flow as specified under § 60.756.

(3) Description and duration of all periods when the control device was not operating for a period exceeding 1 hour and length of time the control device was not operating.

(4) All periods when the collection system was not operating in excess of 5 days.

(5) The location of each exceedance of the 500 parts per million methane concentration as provided in § 60.753(d) and the concentration recorded at each location for which an exceedance was recorded in the previous month.

(6) The date of installation and the location of each well or collection system expansion added pursuant to paragraphs (a)(3), (b), and (c)(4) of § 60.755.

(g) Each owner or operator seeking to comply with § 60.752(b)(2)(i) shall include the following information with the initial performance test report required under § 60.8:

(1) A diagram of the collection system showing collection system positioning including all wells, horizontal collectors, surface collectors, or other gas extraction devices, including the locations of any areas excluded from collection and the proposed sites for the future collection system expansion;

(2) The data upon which the sufficient density of wells, horizontal collectors, surface collectors, or other gas extraction devices and the gas mover equipment sizing are based;

(3) The documentation of the presence of asbestos or nondegradable material for each area from which collection wells have been excluded based on the presence of asbestos or nondegradable material;

(4) The sum of the gas generation flow rates for all areas from which collection wells have been excluded based on nonproductivity and the calculations of gas generation flow rate for each excluded area; and

(Rules 1200-3-16-.76, continued)

(5) The provisions for increasing gas mover equipment capacity with increased gas generation flow rate, if the present gas mover equipment is inadequate to move the maximum flow rate expected over the life of the landfill; and

(6) The provisions for the control of off-site migration.

§ 60.758 Recordkeeping requirements.

Except as provided in § 60.752(b)(2)(i)(B),

(a) Each owner or operator of an MSW landfill subject to the provisions of § 60.752(b) shall keep for at least 5 years up-to-date, readily accessible, on-site records of the maximum design capacity, the current amount of solid waste in-place, and the year-by-year waste acceptance rate. Off-site records may be maintained if they are retrievable within 4 hours. Either paper copy or electronic formats are acceptable.

(b) Each owner or operator of a controlled landfill shall keep up-to-date, readily accessible records for the life of the control equipment of the data listed in paragraphs (b)(1) through (b)(4) of this section as measured during the initial performance test or compliance determination. Records of subsequent tests or monitoring shall be maintained for a minimum of 5 years. Records of the control device vendor specifications shall be maintained until removal.

(1) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with § 60.752(b)(2)(ii):

(i) The maximum expected gas generation flow rate as calculated in § 60.755(a)(1). The owner or operator may use another method to determine the maximum gas generation flow rate, if the method has been approved by the Administrator.

(ii) The density of wells, horizontal collectors, surface collectors, or other gas extraction devices determined using the procedures specified in § 60.759(a)(1).

(2) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with § 60.752(b)(2)(iii) through use of an enclosed combustion device other than a boiler or process heater with a design heat input capacity greater than 44 megawatts:

(i) The average combustion temperature measured at least every 15 minutes and averaged over the same time period of the performance test.

(ii) The percent reduction of NMOC determined as specified in § 60.752(b)(2)(iii)(B) achieved by the control device.

(3) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with § 60.752(b)(2)(iii)(B)(1) through use of a boiler or process heater of any size: a description of the location at which the collected gas vent stream is introduced into the boiler or process heater over the same time period of the performance testing.

(4) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with § 60.752(b)(2)(iii)(A) through use of an open flare, the flare type (i.e., steam-assisted, air-assisted, or nonassisted), all visible emission readings, heat content determination, flow rate or bypass flow rate measurements, and exit velocity determinations made during the performance test as specified in § 60.18; continuous

records of the flare pilot flame or flare flame monitoring and records of all periods of operations during which the pilot flame of the flare flame is absent.

(c) Each owner or operator of a controlled landfill subject to the provisions of this subpart shall keep for 5 years up-to-date, readily accessible continuous records of the equipment operating parameters specified to be monitored in § 60.756 as well as up-to-date, readily accessible records for periods of operation during which the parameter boundaries established during the most recent performance test are exceeded.

(1) The following constitute exceedances that shall be recorded and reported under § 60.757(f):

(i) For enclosed combustors except for boilers and process heaters with design heat input capacity of 44 megawatts (150 million British thermal unit per hour) or greater, all 3-hour periods of operation during which the average combustion temperature was more than 28 ^{o}C below the average combustion temperature during the most recent performance test at which compliance with § 60.752(b)(2)(iii) was determined.

(ii) For boilers or process heaters, whenever there is a change in the location at which the vent stream is introduced into the flame zone as required under paragraph (b)(3)(i) of this section.

(2) Each owner or operator subject to the provisions of this subpart shall keep up-to-date, readily accessible continuous records of the indication of flow to the control device or the indication of bypass flow or records of monthly inspections of car-seals or lock-and-key configurations used to seal bypass lines, specified under § 60.756.

(3) Each owner or operator subject to the provisions of this subpart who uses a boiler or process heater with a design heat input capacity of 44 megawatts or greater to comply with § 60.752(b)(2)(iii) shall keep an up-to-date, readily accessible record of all periods of operation of the boiler or process heater. (Examples of such records could include records of steam use, fuel use, or monitoring data collected pursuant to other State, local, Tribal, or Federal regulatory requirements.)

(4) Each owner or operator seeking to comply with the provisions of this subpart by use of an open flare shall keep up-to-date, readily accessible continuous records of the flame or flare pilot flame monitoring specified under § 60.756(c), and up-to-date, readily accessible records of all periods of operation in which the flame or flare pilot flame is absent.

(d) Each owner or operator subject to the provisions of this subpart shall keep for the life of the collection system an up-to-date, readily accessible plot map showing each existing and planned collector in the system and providing a unique identification location label for each collector.

(1) Each owner or operator subject to the provisions of this subpart shall keep up-to-date, readily accessible records of the installation date and location of all newly installed collectors as specified under § 60.755(b).

(2) Each owner or operator subject to the provisions of this subpart shall keep readily accessible documentation of the nature, date of deposition, amount, and location of asbestos-containing or nondegradable waste excluded from collection as provided in § 60.759(a)(3)(i) as well as any nonproductive areas excluded from collection as provided in § 60.759(a)(3)(ii).

(Rules 1200-3-16-.76, continued)

(e) Each owner or operator subject to the provisions of this subpart shall keep for at least 5 years up-to-date, readily accessible records of all collection and control system exceedances of the operational standards in § 60.753, the reading in the subsequent month whether or not the second reading is an exceedance, and the location of each exceedance.

§ 60.759 Specifications for active collection systems.

(a) Each owner or operator seeking to comply with § 60.752(b)(2)(i) shall site active collection wells, horizontal collectors, surface collectors, or other extraction devices at a sufficient density throughout all gas producing areas using the following procedures unless alternative procedures have been approved by the Administrator as provided in § 60.752(b)(2)(i)(C) and (D):

(1) The collection devices within the interior and along the perimeter areas shall be certified to achieve comprehensive control of surface gas emissions by a professional engineer. The following issues shall be addressed in the design: depths of refuse, refuse gas generation rates and flow characteristics, cover properties, gas system expandibility, leachate and condensate management, accessibility, compatibility with filling operations, integration with closure end use, air intrusion control, corrosion resistance, fill settlement, and resistance to the refuse decomposition heat.

(2) The sufficient density of gas collection devices determined in paragraph (a)(1) of this section shall address landfill gas migration issues and augmentation of the collection system through the use of active or passive systems at the landfill perimeter or exterior.

(3) The placement of gas collection devices determined in paragraph (a)(1) of this section shall control all gas producing areas, except as provided by paragraphs (a)(3)(i) and (a)(3)(ii) of this section.

(i) Any segregated area of asbestos or nondegradable material may be excluded from collection if documented as provided under § 60.758(d). The documentation shall provide the nature, date of deposition, location and amount of asbestos or nondegradable material deposited in the area, and shall be provided to the Administrator upon request.

(ii) Any nonproductive area of the landfill may be excluded from control, provided that the total of all excluded areas can be shown to contribute less than 1 percent of the total amount of NMOC emissions from the landfill. The amount, location, and age of the material shall be documented and provided to the Administrator upon request. A separate NMOC emissions estimate shall be made for each section proposed for exclusion, and the sum of all such sections shall be compared to the NMOC emissions estimate for the entire landfill. Emissions from each section shall be computed using the following equation:

$$Q_i = 2\ k\ L_o\ M_i\ (e^{-kt_i})\ (C_{NMOC})\ (3.6 \times 10^{-9})$$

where,

Q_i = NMOC emission rate from the ith section, megagrams per year

k = methane generation rate constant, year $^{-1}$

L_o = methane generation potential, cubic meters per megagram solid waste

M_i = mass of the degradable solid waste in the ith section, megagram

t_i = age of the solid waste in the ith section, years

C_{NMOC} = concentration of nonmethane organic compounds, parts per million by volume

3.6×10^{-9} = conversion factor

(iii) The values for k, L_o, and C_{NMOC} determined in field testing shall be used, if field testing has been performed in determining the NMOC emission rate or the radii of influence. If field testing has not been performed, the default values for k, L_o and C_{NMOC} provided in § 60.754(a)(1) shall be used. The mass of nondegradable solid waste contained within the given section may be subtracted from the total mass of the section when estimating emissions provided the nature, location, age, and amount of the nondegradable material is documented as provided in paragraph (a)(3)(i) of this section.

(b) Each owner or operator seeking to comply with § 60.752(b)(2)(i)(A) shall construct the gas collection devices using the following equipment or procedures:

(1) The landfill gas extraction components shall be constructed of polyvinyl chloride (PVC), high density polyethylene (HDPE) pipe, fiberglass, stainless steel, or other nonporous corrosion resistant material of suitable dimensions to: convey projected amounts of gases; withstand installation, static, and settlement forces; and withstand planned overburden or traffic loads. The collection system shall extend as necessary to comply with emission and migration standards. Collection devices such as wells and horizontal collectors shall be perforated to allow gas entry without head loss sufficient to impair performance across the intended extent of control. Perforations shall be situated with regard to the need to prevent excessive air infiltration.

(2) Vertical wells shall be placed so as not to endanger underlying liners and shall address the occurrence of water within the landfill. Holes and trenches constructed for piped wells and horizontal collectors shall be of sufficient cross-section so as to allow for their proper construction and completion including, for example, centering of pipes and placement of gravel backfill. Collection devices shall be designed so as not to allow indirect short circuiting of air into the cover or refuse into the collection system or gas into the air. Any gravel used around pipe perforations should be of a dimension so as not to penetrate or block perforations.

(3) Collection devices may be connected to the collection header pipes below or above the landfill surface. The connector assembly shall include a positive closing throttle valve, any necessary seals and couplings, access couplings and at least one sampling port. The collection devices shall be constructed of PVC, HDPE, fiberglass, stainless steel, or other nonporous material of suitable thickness.

(c) Each owner or operator seeking to comply with § 60.752(b)(2)(i)(A) shall convey the landfill gas to a control system in compliance with § 60.752(b)(2)(iii) through the collection header pipe(s). The gas mover equipment shall be sized to handle the maximum gas generation flow rate expected over the intended use period of the gas moving equipment using the following procedures:

(1) For existing collection systems, the flow data shall be used to project the maximum flow rate. If no flow data exists, the procedures in paragraph (c)(2) of this section shall be used.

(2) For new collection systems, the maximum flow rate shall be in accordance with § 60.755(a)(1).

(Rules 1200-3-16-.76, continued)

***Authority**: T.C.A. §§68-201-105 and 4-5-201 et seq.* ***Administrative History**: Original ruled filed December 30, 1997; effective March 16, 1998.*

1200–3–16–.77 THROUGH 1200–3–16–.99 RESERVED.