

Title 7 DNREC
1100 Air Quality Management Section

1124 CONTROL OF VOLATILE ORGANIC COMPOUND EMISSIONS

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Section 1—

1.0 General Provisions

01/11/1993

1.1 a.—This ~~R~~regulation ~~No. 24~~, "Control of Volatile Organic Compound Emissions", replaces and supersedes Regulation No. 24, "Control of Volatile Organic Compound Emissions" dated July 3, 1990.

1.2 b.—This regulation is applicable to the sources of Volatile Organic Compounds (VOCs) as set-forth herein, except:

1.2.1 4.—Sources, other than solvent metal-cleaning sources, whose emissions of Volatile Organic Compounds (VOCs) are not more than fifteen (15) pounds per day, unless other limits are specified herein, provided the emission rates are determined and certified in a manner acceptable to the Department.

1.2.2 2.—Sanitary landfills conforming to the State of Delaware Statewide Solid Waste Management Plan.

1.3 e.—No owner or operator shall substitute either methyl chloroform or methylene chloride for any other Volatile Organic Compound (VOC) for any solvent metal cleaning purpose on or after the effective date of this regulation.

1.4 d.—The provisions of this regulation shall not apply to the startup and shutdown of equipment which operates continuously or in an extended steady-state when emissions from such equipment during startup and shutdown are governed by an Operating Permit issued pursuant to the provisions of ~~Section 2, Regulation No. 2~~ 2.0 of 7 DE Admin Code 1102.

1.5 e.—Any owner or operator currently permitted to operate a VOC emission source under ~~Regulation No. 2~~ 7 DE Admin Code 1102 or the previous Regulation No. 24 shall submit to the Department, within 90 days of the effective date of this regulation, an application to amend the current permit and to comply with the provisions of this regulation. Any owner or operator of a non-permitted source subject to the provisions of this regulation, on and after the effective date of the regulation, shall immediately submit to the Department an application for a permit to construct, modify, reconstruct ~~and/or~~ operate the source.

1.6 f.—Any owner or operator who owns or operates a process or operation regulated by a subsequent section of this regulation may submit to the Department proposals for alternative compliance schedules. The Department may, with the concurrence of the Administrator of the U. S. Environmental Protection Agency (U.S. EPA), approve the alternative compliance schedules if:

1.6.1 4.—The proposal contains projected increments of progress which are substantially equivalent to the compliance schedules in the appropriate subsequent sections of this regulation, and,

1.6.2 ~~2.~~—Final compliance with emission standards is achieved not later than that stipulated in appropriate subsequent sections of this regulation, or not later than May 31, 1995, if agreed in writing by the Department.

1.7 ~~g.~~—In the event that the applicant's schedule of interim measures is not acceptable, the Department shall give written notice to the applicant, advising that the schedule contained in the appropriate sections of this regulation will be ordered unless an equitable compromise is agreed-upon, or a public hearing is requested. The expense of such hearing shall be borne by the applicant. The Department may order a schedule to be implemented after considering relevant testimony at the hearing, or, if no hearing is requested, issue an order on its own initiative.

1.8 ~~h.~~—Any alternative compliance schedule approved by the Department shall be incorporated in the State Implementation Plan (SIP).

Section 2—

2.0 Definitions

01/11/2002

For the purpose of this regulation, the following definitions apply:

a.—“**Actual emissions**” means the quantity VOCs emitted from a source during a particular time period.

b.—“**As applied**” means including any dilution solvents added before application of the coating.

c.—“**Basecoat**” means a pigmented topcoat that is the first coat applied as part of a multistage topcoat system.

d.—“**Bulk gasoline plant**” means a gasoline storage and distribution facility with an average daily throughput of 76,000 liters (L) (20,000 gallons [gal]) of gasoline or less on a monthly average.

e.—“**Bulk gasoline terminal**” means a gasoline storage facility that receives gasoline from refineries, delivers gasoline to bulk gasoline plants or to commercial or retail accounts, and has a daily throughput of more than 76,000 L (20,000 gal) of gasoline on a monthly average.

f.—“**Capture efficiency**” means the weight per unit time of VOC entering a capture system and delivered to a control device divided by the weight per unit time of total VOC generated by a source of VOC, expressed as a percentage.

g.—“**Capture system**” means all equipment (including, but not limited to, hoods, ducts, fans, booths, ovens, dryers, etc.) that contains, collects, and transports an air pollutant to a control device.

h.—“**Carbon absorber**” means an add-on control device that uses activated carbon to absorb VOCs from a gas stream.

i.—“**Carbon adsorption system**” means a carbon adsorber with an inlet and outlet for exhaust gases and a system to regenerate the saturated adsorbent.

j.—“**Clearcoat**” means a topcoat that contains no pigments or only transparent pigments and that is the final coat applied as part of a multistage topcoat system.

k.—“**Coating**” means a material applied onto or impregnated into a substrate for protective, decorative, or functional purposes. Such materials include, but are not limited to, paints, varnishes, sealants, adhesives, inks, maskants, and temporary protective coatings.

l.—“**Coating unit**” means a series of one or more coating applicators and any associated drying area and/or oven wherein a coating is applied, dried, and/or cured. A coating unit ends at the point where the coating is dried or cured, or prior

to any subsequent application of a different coating. It is not necessary to have an oven or a flash-off area in order to be included in this definition.

~~m.~~—“**Continuous vapor control system**” means a vapor control system that treats vapors displaced from tanks during filling on a demand basis without intermediate accumulation.

~~n.~~—“**Control device**” means equipment (such as an incinerator or carbon adsorber) used to reduce, by destruction or removal, the amount of air pollutant~~(s)~~ or pollutants in an air stream prior to discharge to the ambient air.

~~o.~~—“**Control system**” means a combination of one or more capture system~~(s)~~ or systems and control device~~(s)~~ or devices working in concert to reduce discharges of pollutants to the ambient air.

~~p.~~—“**Day**” means a period of 24 consecutive hours beginning at midnight local time, or beginning at a time consistent with a facility's operating schedule.

~~q.~~—“**Destruction or removal efficiency**” means the amount of VOC destroyed or removed by a control device expressed as a percent of the total amount of VOC entering the device.

~~r.~~—“**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.

~~s.~~—“**Exempt compounds**” means any of the compounds listed in ~~Regulation 1, Section 2~~ 2.0 of 7 DE Admin Code 1101 - Definitions, "Volatile Organic Compounds," which have been determined to have negligible photochemical reactivity.

For determining compliance with emission limits, VOCs will be measured according to the procedures in Methods 25 and 25A of Appendix A of 40 CFR, Part 60, and the procedures and equations in §60.755. Where such a method also measures compounds with negligible photochemical reactivity, an owner or operator may exclude these negligibly-reactive compounds when determining compliance with an emission standard. However, the Department may require such owner or operator, as a precondition to excluding these compounds for purposes of determining compliance, to provide monitoring methods and monitoring results demonstrating, to the satisfaction of the Department, the amount of negligibly-reactive compounds in the sources emissions.

In addition to the procedures for requesting a satisfactory compliance determination, where the Department proposes to allow the use of a test method for excluding negligibly-reactive compounds that is different or not specified in the approved SIP, such change shall be submitted to the U.S. EPA for approval as part of a SIP revision.

~~t.~~—“**External floating roof**” means a cover over an open-top storage tank consisting of a double deck or pontoon single deck that rests upon and is

supported by the volatile organic liquid being contained and is equipped with a closure seal or seals to close the space between the roof edge and tank shell.

Ⓣ.—"Facility" means all of the pollutant-emitting activities, excluding pollutant-emitting activities from mobile sources that are located on one (1) or more contiguous or adjacent properties, and are under the control of the same person (or person under common control).

Ⓥ.—"First attempt at repair" means to take rapid action for the purpose of stopping or reducing leakage of organic material to the atmosphere using best practices.

Ⓦ.—"Flash-off area" means the space between the coating application area and the oven.

Ⓧ.—"Gasoline tank truck" means a delivery tank truck used at bulk gasoline plants, bulk gasoline terminals, or gasoline dispensing facilities that is loading or unloading gasoline or that has loaded or unloaded gasoline on the immediately previous load.

Ⓨ.—"Gloss flattener" means a low-gloss coating that is formulated to eliminate glare on the interior surfaces of a vehicle for safety purposes, as specified under the U.S. Department of Transportation Motor Vehicle Safety Standards.

Ⓩ.—"Heavy-duty truck" means any motor vehicle rated at greater than 3,864 kg (8,500 lb) gross weight designed primarily to transport property.

ⓐ.—"Incinerator" means a combustion apparatus in which solid, semisolid, liquid, or gaseous combustible wastes are ignited and burned and from which the solid and gaseous residues contain little or no combustible material.

ⓑ.—"Intermittent vapor control system" means a vapor control system that employs an intermediate vapor holder to accumulate vapors displaced from tanks during filling. The control device treats the accumulated vapors only during automatically controlled cycles.

Ⓒ.—"Internal Floating Roof" means a cover or roof in a fixed-roof tank that rests upon or is floated upon, the liquid being contained, and is equipped with a closure seal or seals to close the space between the roof edge and the tank shell.

Ⓓ.—"Knife coating" means the application of a coating material to a substrate by means of drawing the substrate beneath a knife that spreads the coating evenly over the full width of the substrate.

Ⓔ.—"Leak" means a VOC emission indicated by an instrument calibrated according to Method 21 of 40 CFR, Part 60, Appendix A, using zero air (less than 10 parts per million [ppm] of hydrocarbon in air) and a mixture of methane or n-hexane and air at a concentration of about, but less than, 10,000 ppm methane or n-hexane.

ff.—“**Lease custody transfer**” means the transfer of produced crude oil 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.

gg.—“**Liquid-mounted seal**” means a primary seal mounted in continuous contact with the liquid between the tank wall and the floating roof around the circumference of the tank.

hh.—“**Loading rack**” means an aggregation or combination of gasoline loading equipment arranged so that all loading outlets in the combination can be connected to a tank truck or trailer parked in a specified loading space.

ii.—“**Lower explosive limit**” (LEL) means the concentration of a compound in air below which a flame will not propagate if the mixture is ignited.

jj.—“**Maximum theoretical emissions**” means the quantity of VOC that theoretically could be emitted by a source without control devices based on the design capacity or maximum production capacity of the source and 8,760 hours of operation per year. The design capacity or maximum production capacity includes use of coatings and inks with the highest VOC content used in practice by the source for the 2 two preceding years.

kk.—“**Maximum true vapor pressure**” means the equilibrium partial pressure exerted by a stored liquid at the temperature equal to:

1. for liquids stored above or below the ambient temperature, the highest calendar-month average of the liquid storage temperature, or
2. for liquids stored at the ambient temperature, the local maximum monthly average temperature as reported by the National Weather Service. This pressure shall be determined by one of the following:
 - i. In accordance with methods described in American Petroleum Institute Bulletin 2517, "Evaporation Loss From External Floating Roof Tanks."
 - ii. By using standard reference texts.
 - iii. By ASTM D2879-83.
 - iv. By any other method approved by the Department as part of the State Implementation Plan (SIP) Revision.

ll.—“**Multicomponent coating**” means a coating which is packaged in two or more parts, which parts are combined before application, and where a coreactant from one part of the coating chemically reacts, at ambient conditions, with a coreactant from another part of the coating.

mm.—“**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.

~~nn.~~—“**Organic compound**” means any carbon-containing chemical compound excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate.

~~oo.~~—“**Oven**” means a chamber which is used to bake, cure, polymerize, and/or dry a coating.

~~pp.~~—“**Overall emission reduction efficiency**” means the weight per unit time of VOC removed or destroyed by a control device divided by the weight per unit time of VOC generated by a source, expressed as a percentage. The overall emission reduction efficiency can also be calculated as the product of the capture efficiency and the control device destruction or removal efficiency.

~~qq.~~—“**Owner or Operator**” means any person who owns, leases, controls, operates or supervises a facility, a source, or air pollution control or monitoring equipment.

~~rr.~~—“**Person**” means any individual, partnership, copartnership, firm, company, corporation, association, joint stock company, trust, estate, political subdivision, or any other legal entity, or their legal representative, agent, or assigns.

~~ss.~~—“**Petroleum**” means the crude oil removed from the earth and the oils derived from tar sands, shale and coal.

~~tt.~~—“**Petroleum Liquid**” means petroleum condensate, and any finished or intermediate products manufactured in a petroleum refinery.

~~uu.~~—“**Plastisol**” means a coating made of a mixture of finely divided resin and a plasticizer. Plastisol is applied as a thick gel that solidifies when heated.

~~vv.~~—“**Press-Ready Ink**” means the ink, as applied to the substrate, after all solvents and diluents have been added.

~~ww.~~—“**Pressure release**” means the emission of materials resulting from system pressure being greater than set pressure of the pressure relief device.

~~xx.~~—“**Primer**” means any coating applied prior to the application of a topcoat or color coat for the purposes of surface preparation, corrosion resistance, adhesion, and color uniformity.

~~yy.~~—“**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.

~~zz.~~—“**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.

~~aaa.~~—“**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.

~~bbb.~~—“**Roll coating**” means the application of a coating material to a moving substrate by means of hard rubber, elastomeric, or metal rolls.

~~ccc.~~—“**Rotogravure coating**” means the application of a coating material to a substrate by means of a roll coating technique in which the pattern to be applied is recessed relative to the non-image area, and the coating material is picked up in these recessed areas and is transferred to the substrate.

~~ddd.~~—“**Shutdown**” means the cessation of operation of a facility or of its emission control or emission monitoring equipment.

~~eee.~~—“**Source**” means any building, structure, equipment (excluding mobile equipment temporarily in place), or installation that directly or indirectly releases or discharges, or has the potential to release or discharge, VOCs into the atmosphere.

~~fff.~~—“**Stage I Vapor Recovery System**” means the control of gasoline vapor from any delivery vessel into any stationary storage vessel, where the vapor displaced by the liquid gasoline is returned to the delivery vessel and transported to the refinery.

~~gig.~~—“**Stage II Vapor Recovery System**” means a system that controls the emissions of gasoline vapor at the vehicle fill-pipe, where the vapor is captured and returned to a vapor-tight storage tank, or is destroyed; which achieves an overall control efficiency of at least 95%.

~~hhh.~~—“**Standard conditions**” means a temperature of 20°C (68°F) and pressure of 760 mm Hg (29.92 in. Hg).

~~iii.~~—“**Startup**” means the setting in operation of a source or of its emission control or emission monitoring equipment.

~~jjj.~~—“**Storage Vessel**” means each tank, reservoir or container used for the storage of Volatile Organic Liquids, but does not include:

1. Frames, housing, auxiliary supports or other components that are not directly involved in the containment of liquids or vapors; or
2. Subsurface caverns or porous rock reservoirs.

~~kkk.~~—“**Submerged fill**” means the method of filling a delivery vessel or storage vessel where product enters within 150 millimeters (mm) (5.9 inches [in.]) of the bottom of the delivery or storage vessel. Bottom filling of delivery and storage vessels is included in this definition.

iii.—“**Substrate**” means the surface onto which a coating is applied or into which a coating is impregnated.

mmm.—“**Throughput**” means the amount of gasoline dispensed at a gasoline dispensing facility during a calendar month after November 15, 1990.

nnn.—“**Transfer efficiency**” means the ratio of the amount of coating solids adhering to the object being coated to the total amount of coating solids used in the application process, expressed as a percentage.

ooo.—“**Vapor collection system**” means all piping, seals, hoses, connections, pressure-vacuum vents, and other equipment between the gasoline tank truck and the vapor processing unit and/or the storage tanks and vapor holder.

ppp.—“**Vapor control system**” means a system that limits or prevents release to the atmosphere of organic compounds in the vapors displaced from a tank during the transfer of gasoline.

qqq.—“**Vapor-mounted seal**” means a primary seal mounted 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.

rrr.—“**Vapor recovery system**” means a vapor-gathering system capable of collecting VOC vapors and gases emitted during the operation of any transfer, storage, or process equipment.

sss.—“**Vapor-tight**” means equipment that allows no loss of vapors. Compliance with vapor-tight requirements can be determined by checking to ensure that the concentration at a potential leak source is not equal to or greater than 100% of the LEL when measured with a combustible gas detector, calibrated with propane, at a distance of 2.54 centimeters (cm) (1 inch) from the source.

ttt.—“**Vapor-tight gasoline tank truck**” means a gasoline tank truck that has demonstrated within the 12 preceding months that its product delivery tank will sustain a pressure change of not more than 75 mm (3.0 in.) of water within ~~5~~ five minutes (min) after it is pressurized to 450 mm (18 in.) of water; or when evacuated to 150 mm (5.9 in.) of water, the same tank will sustain a pressure change of not more than 75 mm (3.0 in.) of water within 5 min. This capability is to be demonstrated using the test procedures specified in Method 27 of Appendix A of 40 CFR, Part 60 (July 1, 1992).

uuu.—“**Volatile Organic Liquid**” (VOL) means any organic liquid which can emit any Volatile Organic Compound into the atmosphere (see definition of “Volatile Organic Compound” of this regulation).

vvv.—“**Volatile Organic Compound**” (VOC) means any carbon-containing compound excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates and ammonium carbonate, which participates in atmospheric photochemical reactions. This includes any organic compounds other

than those defined as "Exempt Compounds", which have been determined to have negligible photochemical reactivity (see definition of "Exempt Compounds" of this regulation). In addition to the procedures for requesting a satisfactory compliance demonstration, where the Department proposes to allow the use of a test method for excluding negligibly reactive compounds that is different from or not specified in the approved SIP, such change shall be submitted to the Environmental Protection Agency (U.S. EPA) for approval as part of a SIP Revision.

~~www.~~–“**Web coating line**” means all of the coating applicator(~~s~~) or applicators, drying area(~~s~~) or areas, or oven(~~s~~) or ovens, located between an unwind station and a rewind station, that are used to apply coating onto a continuous strip of substrate (the web). A web coating line need not have a drying oven.

Section 3—

3.0 Applicability

01/11/1993

3.1 a.—All existing, new, reconstructed and modified sources shall meet all applicable provisions of this regulation.

3.2 b.—Nothing in this regulation shall be construed to exempt new, reconstructed or modified sources from meeting any other applicable Department or federal rules, including New Source Review requirements.

3.3 e.—This regulation does not apply to any equipment at a facility used exclusively for chemical or physical analysis or determination of product quality and commercial acceptance provided the operation of the equipment is not an integral part of the production process and the total actual emissions from all such equipment at the facility do not exceed 204 kilograms (kg) (450 pounds [lb]) in any calendar month. Any facility claiming exemption from the provisions 3.3 of this regulation ~~under paragraph (c)~~ shall comply with the provisions of ~~Paragraph (e)~~ 3.5 of this regulation.

3.4 d.

3.4.1 4.—Any facility that becomes or is currently subject to the provisions of this regulation by exceeding an applicability threshold will remain subject to these provisions, even if its throughput or emissions later fall below the applicability threshold, except as provided in ~~Paragraph (g)~~ 3.7 of this regulation.

3.4.2 2.—Any facility that is currently subject to a state or federal rule promulgated pursuant to the Clean Air Act Amendments of 1977 by exceeding an applicability threshold is and will remain subject to these provisions, even if its throughput or emissions have fallen or later fall below the applicability threshold.

3.5 e.—Any facility that claims exemption from the provisions of this regulation by reason of meeting the conditions in ~~paragraph (c)~~ 3.3 of this ~~Section~~ regulation shall maintain the following annual records in a readily accessible location for at least 5 years and shall make those records available to the Department upon verbal or written request:

3.5.1 4.—Records to document the purpose of the equipment for which the exemption is claimed.

3.5.2 2.—Records to document the amount of each volatile organic compound (VOC)-containing material used in the equipment each calendar month and the VOC content of each material such that emissions can be determined for each calendar month.

3.6 ~~f.~~—The owner or operator of a facility or source subject to any control requirement of this regulation may comply with an alternative control plan that has been approved by the Department and the U.S. EPA.

3.7 ~~g.~~—The owner or operator of a facility or source subject to this regulation may petition the Department for exemption from the requirements of this regulation upon a showing that such facility or source no longer has the potential to emit Volatile Organic Compounds (VOCs). Any exemption granted shall be embodied in a Consent Order which shall contain terms and conditions necessary to ensure that no Volatile Organic Compounds (VOCs) may be emitted from the facility or source. For federal enforcement purposes, such exemption shall not be effective until approved by the U.S. EPA.

Section 4—

4.0 Compliance Certification, Recordkeeping, and Reporting Requirements for Coating Sources

11/29/1994

4.1 a.—To establish the records required under ~~this Section~~ 4.0 of this regulation, the volatile organic compound (VOC) content of each coating, as applied, and the efficiency of each capture system and control device shall be determined by the applicable test methods and procedures specified in **Appendix B** and **Appendix D** of this regulation.

4.2 b.—Requirements for coating sources exempt from emission limitations. Any owner or operator of a coating unit, line, or operation that is exempt from the emission limitations of ~~Section 10 through Section 23~~ 10.0 through 23.0 of this regulation because combined VOC emissions from all coating units, lines, and operations at the facility are below the applicability threshold specified in the individual sections of this regulation, before the application of capture systems and control devices, shall comply with the following for each section of this regulation from which the owner or operator claims an exemption:

4.2.1 1.—Certification. By November 15, 1993, the owner or operator of a facility referenced in paragraph (b) 4.2 of this ~~Section~~ regulation shall certify to the Department that the facility is exempt from emission limitations by providing all of the following:

4.2.1.1 i.—The name and location of the facility.

4.2.1.2 ii.—The address and telephone number of the person responsible for the facility.

4.2.1.3 iii.—A declaration that the facility is exempt from the emission limitations of ~~Section 10 through Section 23~~ 10.0 through 23.0 of this regulation because combined VOC emissions from all coating units, lines, and operations at the facility that are covered by an individual section of this regulation are below the appropriate applicability threshold before the application of capture systems and control devices.

4.2.1.4 iv.—Calculations of the daily-weighted average that demonstrate that the combined VOC emissions from all coating units, lines, and operations at the facility that are covered by an individual section of this regulation for a day representative of current maximum production levels are less than 6.8 kilograms (kg) (15 pounds [lb]) before the application of capture systems and control devices. The following equation shall be used to calculate total VOC emissions for that day:

$$T = \sum_{i=1}^n A_i B_i \quad (4-1)$$

where:

T = Total VOC emissions from coating units, lines, and operations at the facility before the application of capture systems and control devices in units of kg/day (lb/day).

n = Number of different coatings applied on each coating unit, each coating line, or each operation at the facility.

i = Subscript denoting an individual coating.

A_i = Mass of VOC per volume of coating (i) (excluding water and exempt compounds), as applied, used at the facility in units of kilograms VOC per liter (kg VOC/L) (pounds VOC per gallon [lb VOC/gal]).

B_i = Volume of coating (i) (excluding water and exempt compounds), as applied, used at the facility in units of liters per day (L/day) (gallons per day [gal/day]). The instrument or method by which the owner or operator accurately measured or calculated the volume of each coating, as applied, used at the facility shall be described in the certification to the Department.

4.2.2 ~~2~~—Recordkeeping. On and after November 15, 1993, the owner or operator of a facility referenced in ~~paragraph (b)~~ 4.2 of this ~~Section~~ regulation shall collect and record all of the following information each day and maintain the information at the facility for a period of 5 years:

4.2.2.1 ~~i~~—The name and identification number of each coating, as applied.

4.2.2.2 ~~ii~~—The mass of VOC per volume (excluding water and exempt compounds) and the volume of coating (i) (excluding water and exempt compounds), as applied, used each day.

4.2.2.3 ~~iii~~—The total VOC emissions at the facility, as calculated using the equation under ~~paragraph (b)(1)(iv)~~ 4.2.1.4 of this ~~Section~~ regulation.

4.2.3 ~~3~~—Reporting. On and after November 15, 1993, the owner or operator of a facility referenced in ~~paragraph (b)~~ 4.2 of this ~~Section~~ regulation shall notify the Department of any record showing that combined VOC emissions from all coating units, lines, and operations at the coating facility exceed 6.8 kg (15 lb) on any day, before the application of capture systems and control devices. A copy of such record shall be sent to the Department within 45 calendar days after the exceedance occurs. This reporting requirement is in addition to any other exceedance reporting requirements mandated by the State of Delaware.

4.3 ~~e~~—Requirements for coating sources using complying coatings. Any owner or operator of a coating unit, line, or operation subject to the limitations of ~~Sections 10 through 12~~ 10.0 through 12.0 or of ~~Section 13(c)(1)~~ 13.3.1 or ~~Section 14 through Section 23~~ 14.0 through 23.0 of this regulation and complying by means of the use of complying coatings shall comply with the following:

4.3.1 ~~1~~—Certification. By November 15, 1993, or upon startup of a new coating unit, line, or operation, or upon changing the method of compliance for an existing subject coating unit, line, or operation from daily-weighted averaging or control devices to the use of complying coatings, the owner or operator of a coating unit, line, or operation referenced in ~~paragraph (c)~~ 4.3 of this ~~Section~~ regulation shall certify to the Department that the coating unit, line, or operation is or will be in compliance with the requirements of the applicable section of this regulation on and after November 15, 1993, or on and after the initial startup date. Such certification shall include:

4.3.1.1 ~~i~~—The name and location of the facility.

4.3.1.2 ~~ii~~—The address and telephone number of the person responsible for the facility.

4.3.1.3 ~~iii~~—Identification of subject sources.

4.3.1.4 ~~iv~~—The name and identification number of each coating, as applied, on each coating unit, line, or operation.

4.3.1.5 ~~v~~—The mass of VOC per volume (excluding water and exempt compounds) and the volume of each coating (excluding water and exempt compounds), as applied per day.

4.3.1.6 ~~vi~~—The time at which the facility's "day" begins if a time other than midnight local time is used to define a "day."

4.3.2 ~~2~~—Recordkeeping. On and after November 15, 1993, or on and after the initial startup date, the owner or operator of a coating unit, line, or operation referenced in ~~paragraph (c)~~ 4.3 of this ~~Section~~ regulation and complying by the use of complying coatings shall collect and record all of the following information each day for each coating unit, line, or operation and maintain the information at the facility for a period of ~~5~~ five years:

4.3.2.1 ~~i~~—The name and identification number of each coating, as applied, on each coating unit, line, or operation.

4.3.2.2 ~~ii~~—The mass of VOC per volume of each coating (excluding water and exempt compounds), as applied, used each day on each coating unit, line, or operation.

4.3.2.3 ~~iii~~—The volume of each coating applied each day on each coating unit line or operation.

4.3.3 ~~3~~—Reporting. On and after November 15, 1993, the owner or operator of a subject coating unit, line, or operation referenced in ~~paragraph (c)~~ 4.3 of this ~~Section~~ regulation shall notify the Department in either of the following instances:

4.3.3.1 ~~i~~—Any record showing use of any non-complying coatings shall be reported by sending a copy of such record to the Department within 45 calendar days following that use.

4.3.3.2 ~~ii~~—At least 30 calendar days before changing the method of compliance from the use of complying coatings to daily-weighted averaging or control devices, the owner or operator shall comply with all requirements of ~~paragraph (d)(1) or (e)(1)~~ 4.4.1 or 4.5.1 of this ~~Section~~ regulation, respectively, as well as ~~Regulation No. 2~~ **7 DE Admin Code 1102**. Upon changing the method of compliance from the use of complying coatings to daily-weighted averaging or control devices, the owner or operator shall comply with all requirements of the section of this regulation applicable to the coating unit, line, or operation referenced in ~~paragraph (c)~~ 4.3 of this ~~Section~~ regulation.

4.4 ~~d~~—Requirements for coating sources using daily-weighted averaging. Any owner or operator of a coating unit, line, or operation subject to the limitations of ~~Sections 10 through 12~~ 10.0 through 12.0 or ~~Section 13(c)(1)~~ 13.3.1 or ~~Section 14 through Section 23~~ 14.0 through 23.0 of this regulation and complying by means of daily-weighted averaging on that unit, line, or operation shall comply with the following:

4.4.1 ~~4~~—Certification. By November 15, 1993, or upon startup of a new coating unit, line, or operation, or upon changing the method of compliance for an existing subject coating unit, line, or operation from the use of complying coatings or control devices to daily-weighted averaging, the owner or operator of the subject coating unit, line, or operation shall certify to the Department that the coating unit, line, or operation is or will be in compliance with ~~paragraph (d)~~ 4.4 of this ~~Section~~ regulation on and after November 15, 1993, or on and after the initial startup date. Such certification shall include:

4.4.1.1 ~~i~~—The name and location of the facility.

4.4.1.2 ~~ii~~—The address and telephone number of the person responsible for the facility.

4.4.1.3 ~~iii~~—Identification of subject sources.

4.4.1.4 ~~iv~~—The name and identification number of each coating unit, line, or operation that will comply by means of daily-weighted averaging.

4.4.1.5 ~~v~~—The instrument or method by which the owner or operator will accurately measure or calculate the volume of each coating (excluding water and exempt compounds), as applied, used each day on each coating unit, line, or operation.

4.4.1.6 ~~vi.~~—The method by which the owner or operator will create and maintain records each day as required in ~~paragraph (d)(2)~~ 4.4.2 of this ~~Section~~ regulation.

4.4.1.7 ~~vii.~~—Calculation of the daily-weighted average, using the procedure in 1.0 of Appendix C-(a) of this regulation, for a day representative of current or projected maximum production levels.

4.4.1.8 ~~viii.~~—The time at which the facility's "day" begins if a time other than midnight local time is used to define a "day."

4.4.2 ~~2.~~—Recordkeeping. On and after November 15, 1993, or on and after the initial startup date, the owner or operator of a coating unit, line, or operation referenced in ~~paragraph (d)~~ 4.4 of this ~~Section~~ regulation and complying by means of daily-weighted averaging shall collect and record all of the following information each day for each coating unit, line, or operation and maintain the information at the facility for a period of ~~5~~ five years:

4.4.2.1 ~~i.~~—The name and identification number of each coating, as applied, on each coating unit, line, or operation.

4.4.2.2 ~~ii.~~—The mass of VOC per volume (excluding water and exempt compounds) and the volume of each coating (excluding water and exempt compounds), as applied, used each day on each coating unit, line, or operation.

4.4.2.3 ~~iii.~~—The daily-weighted average VOC content of all coatings, as applied, on each coating unit, line, or operation calculated according to the procedure in 1.0 of Appendix C-(a) of this regulation.

4.4.3 ~~3.~~—Reporting. On and after November 15, 1993, the owner or operator of a subject coating unit, line, or operation referenced in ~~paragraph (d)~~ 4.4 of this ~~Section~~ regulation shall notify the Department in either of the following instances:

4.4.3.1 ~~i.~~—Any record showing noncompliance with the applicable daily-weighted average requirements shall be reported by sending a copy of the record to the Department within 45 calendar days following the occurrence.

4.4.3.2 ~~ii.~~—At least 30 calendar days before changing the method of compliance from daily-weighted averaging to the use of complying coatings or control devices, the owner or operator shall comply with all requirements of ~~paragraph (c)(1) or (e)(1)~~ 4.3.1 or 4.5.1 of this ~~Section~~ regulation, respectively, as well as ~~Regulation No. 2~~ 7 DE Admin Code 1102. Upon changing the method of compliance from daily-weighted averaging to the use of complying coatings or control devices, the owner or operator shall comply with all requirements of

the ~~Section~~ of this regulation applicable to the coating unit, line, or operation referenced in ~~paragraph (d)~~ 4.4 of this ~~Section~~ regulation.

4.5 ~~e~~—Requirements for coating sources using control devices. Any owner or operator of a coating unit, line, or operation subject to the limitations of ~~Section 10 through Section 23~~ 10.0 through 23.0 of this regulation and complying by means of control devices shall comply with the following:

4.5.1 ~~1~~—Testing of control equipment. By November 15, 1993, or upon startup of a new coating unit, line, or operation, or upon changing the method of compliance for an existing coating unit, line, or operation from the use of complying coatings or daily-weighted averaging to control devices, the owner or operator of the subject coating unit, line, or operation shall perform a compliance test. Testing shall be performed within ~~ninety (90)~~ 90 days of startup, and pursuant to the procedures in **Appendix A** through **Appendix D** of this regulation. The owner or operator of the subject coating unit, line, or operation shall submit to the Department the results of all tests and calculations necessary to demonstrate that the subject coating unit, line, or operation is or will be in compliance with the applicable section of this regulation on and after November 15, 1993, or on and after the initial startup date.

4.5.2 ~~2~~—Recordkeeping. On and after November 15, 1993, or on and after the initial startup date, the owner or operator of a coating unit, line, or operation referenced in ~~paragraph (e)~~ 4.5 of this ~~Section~~ regulation shall collect and record all of the following information each day for each coating unit, line, or operation and maintain the information at the facility for a period of ~~5~~ five years:

4.5.2.1 ~~i~~—The name and identification number of each coating used on each coating unit, line, or operation.

4.5.2.2 ~~ii~~—The mass of VOC per unit volume of coating solids, as applied, the volume solids content, as applied, and the volume, as applied, of each coating used each day on each coating unit, line, or operation.

4.5.2.3 ~~iii~~—The maximum VOC content (mass of VOC per unit volume of coating solids, as applied) or the daily-weighted average VOC content (mass of VOC per unit volume of coating solids, as applied) of the coatings used each day on each coating unit, line, or operation.

4.5.2.4 ~~iv~~—The required overall emission reduction efficiency for each day for each coating unit, line, or operation as determined in ~~Section 10(e)(1)(iii), Section 11(d), Section 12(e)(1)(iii), Section 13(e)(1)(iii), Section 14(e)(1)(iii), Section 15(e)(1)(iii), Section 16(e)(1)(iii), Section 17(e)(1)(iii), Section 18(e)(1)(iii), Section 19(e)(1)(iii), Section 20(e)(1)(iii), Section 21(e)(1)(iii), Section 22(e)(1)(iii), Section 23(e)(1)(iii)~~ 10.5.1.3, 11.4, 12.5.1.3, 13.5.1.3,

14.5.1.3, 15.5.1.3, 16.5.1.3, 17.5.1.3, 18.5.1.3, 19.5.1.3, 20.5.1.3, 21.5.1.3, 22.5.1.3, 23.5.1.3 of this regulation.

4.5.2.5 ~~v.~~—The actual overall emission reduction efficiency achieved for each day for each coating unit, line, or operation as determined in 3.0 of Appendix D-(e) of this regulation.

4.5.2.6 ~~vi.~~—Control device monitoring data.

4.5.2.7 ~~vii.~~—A log of operating time for the capture system, control device, monitoring equipment, and the associated coating unit, line, or operation.

4.5.2.8 ~~viii.~~—A maintenance log for the capture system, control device, and monitoring equipment detailing all routine and non-routine maintenance performed including dates and duration of any outages.

4.5.2.9 ~~ix.~~—For thermal incinerators, all 3-hour periods of operation in which the average combustion temperature was more than 28°C (50°F) below the average combustion temperature during the most recent performance test that demonstrated that the facility was in compliance. The combustion chamber set-point shall be no less than that during the most recent performance test that demonstrated that the facility was in compliance.

4.5.2.10 ~~x.~~—For catalytic incinerators, all 3-hour periods of operation in which the average temperature of the process vent stream immediately before the catalyst bed is more than 28°C (82°F) below the average temperature of the process vent stream immediately before the catalyst bed during the most recent performance test that demonstrated that the facility was in compliance. The set-point for the process vent stream immediately before the catalyst bed shall be no less than that during the most recent performance test that demonstrated that the facility was in compliance.

4.5.2.11 ~~xi.~~—For carbon adsorbers, all ~~3~~ three-hour periods of operation during which either the average VOC concentration or the reading of organics in the exhaust gases is more than 20% ~~percent~~ greater than the average exhaust gas concentration 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 facility was in compliance.

4.5.3 ~~3.~~—Reporting. On and after November 15, 1993, the owner or operator of a subject coating unit, line, or operation referenced in ~~paragraph (e)~~ 4.5 of this ~~Section~~ regulation shall notify the Department in either of the following instances:

4.5.3.1 ~~i.~~—Any record showing noncompliance with the applicable requirements for control devices shall be reported by sending a copy

of the record to the Department within 45 calendar days following the occurrence.

4.5.3.2 ~~ii~~—At least 30 calendar days before changing the method of compliance from control devices to the use of complying coatings or daily-weighted averaging, the owner or operator shall comply with all requirements of ~~paragraph (c)(1) 4.3.1 or (d)(1) 4.4.1~~ of this ~~Section regulation~~, respectively, as well as ~~Regulation No. 2~~ **7 DE Admin Code 1102**. Upon changing the method of compliance from control devices to the use of complying coatings or daily-weighted averaging, the owner or operator shall comply with all requirements of the section of this regulation applicable to the coating unit, line, or operation referenced in ~~paragraph (e) 4.5~~ of this ~~Section regulation~~.

Section 5—

5.0 Compliance Certification, Recordkeeping, and Reporting Requirements for Non-Coating Sources

01/11/1993

5.1 a—Initial compliance certification. The owner or operator of any facility containing sources subject to ~~this Section~~ 5.0 of this regulation shall submit to the Department an initial compliance certification by November 15, 1993. The owner or operator of any new facility containing sources that become subject to ~~this Section~~ 5.0 of this regulation after November 15, 1992 shall submit an initial compliance certification immediately upon startup of the facility.

5.1.1 4—The initial compliance certification shall provide at a minimum the following information:

5.1.1.1 i—The name and location of the facility.

5.1.1.2 ii—The address and telephone number of the person responsible for the facility.

5.1.1.3 iii—Identification of subject sources.

5.1.2 2—For each subject source, the initial compliance certification shall also provide at a minimum:

5.1.2.1 i—The applicable emission limitation, equipment specification, or work practice.

5.1.2.2 ii—The method of compliance.

5.1.2.3 iii—For each source subject to numerical emission limitations of this regulation, the estimated emissions without control.

5.1.2.4 iv—The control system(s) or systems in use.

5.1.2.5 v—The design performance efficiency of the control system.

5.1.2.6 vi—For each source subject to numerical emission limitations of this regulation, the estimated emissions after control.

5.1.2.7 vii—Certification that each subject source at the facility is in compliance with the applicable emission limitation, equipment specification, or work practice.

5.1.2.8 viii—The time at which the facility's "day" begins if a time other than midnight local time is used to define a "day."

5.2 b—Reports of excess emissions. The owner or operator of any facility containing sources subject to ~~this Section~~ 5.0 of this regulation shall, for each occurrence of excess emissions, within 30 calendar days of becoming aware of

such occurrence, supply the Department with the following information, in addition to complying with any other reporting requirements mandated by the State of Delaware:

5.2.1 ~~4~~—The name and location of the facility.

5.2.2 ~~2~~—The subject sources that caused the excess emissions.

5.2.3 ~~3~~—The time and date of first observation of the excess emissions.

5.2.4 ~~4~~—The cause and expected duration of the excess emissions.

5.2.5 ~~5~~—For sources subject to numerical emission limitations, the estimated rate of emissions (expressed in the units of the applicable emission limitation) and the operating data and calculations used in determining the magnitude of the excess emissions.

5.2.6 ~~6~~—The proposed corrective actions and schedule to correct the conditions causing the excess emissions.

5.3 ~~e~~—Requirements for sources using control devices.

5.3.1 ~~4~~—Testing of control equipment. By November 15, 1993, or upon startup of a new source, or upon changing the method of compliance for an existing source, the owner or operator of the subject source shall perform all tests and submit to the Department the results of all tests and calculations necessary to demonstrate that the subject source will be in compliance with the applicable section of this regulation on and after November 15, 1993, or on and after the initial startup date.

5.3.2 ~~2~~—Recordkeeping.

5.3.2.1 ~~i~~—Each owner or operator of a source subject to ~~this Section 5.0 of this regulation~~ shall maintain up-to-date, readily accessible continuous records of any equipment operating parameters specified to be monitored in the applicable section of this regulation as well as up-to-date, readily accessible records of periods of operation during which the parameter boundaries established during the most recent performance test are exceeded. These records shall be maintained for at least ~~5~~ five years. The Department may at any time require a report of these data. Periods of operation during which the parameter boundaries established during the most recent performance tests are exceeded are defined as follows:

5.3.2.1.1 ~~A~~—For thermal incinerators, all ~~3~~ three-hour periods of operation in which the average combustion temperature was more than 28°C (50°F) below the average combustion temperature during the most recent performance test that demonstrated that the facility was in compliance. The combustion chamber set-point shall be no less than that

during the most recent performance test that demonstrated that the facility was in compliance.

5.3.2.1.2 ~~B.~~—For catalytic incinerators, all ~~3~~ three-hour periods of operation in which the average temperature of the process vent stream immediately before the catalyst bed is more than 28°C (50°F) below the average temperature of the process vent stream immediately before the catalyst bed during the most recent performance test that demonstrated that the facility was in compliance. The set-point for the process vent stream immediately before the catalyst bed shall be no less than that during the most recent performance test that demonstrated that the facility was in compliance.

5.3.2.1.3 ~~C.~~—For carbon adsorbers, all ~~3~~ three-hour periods of operation during which either the average VOC concentration or the reading of organics in the exhaust gases is more than 20% ~~percent~~ greater than the average exhaust gas concentration 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 facility was in compliance.

5.3.2.2 ~~ii.~~—A log of operating time for the capture system, control device, monitoring equipment, and the associated source.

5.3.2.3 ~~iii.~~—A maintenance log for the capture system, control device, and monitoring equipment detailing all routine and non-routine maintenance performed including dates and duration of any outages.

Section 6—

6.0 General Recordkeeping

01/11/1993

Each owner or operator of a source subject to this regulation shall maintain all records necessary for determining compliance with this regulation at the facility for a period of ~~5~~ five years.

Section 7—

7.0 Circumvention

01/11/1993

7.1 a.—No owner or operator subject to this regulation may build, erect, install, or use any article, machine, equipment, process, or other method the use of which conceals emissions that would otherwise constitute non-compliance with an applicable section of this regulation.

7.2 b. ~~Paragraph (a) of this Section 7.1 of this regulation~~ includes, but is not limited to, the use of gaseous diluents to achieve compliance, and the piecemeal carrying out of an operation to avoid coverage by a section of this regulation that applies only to operations larger than a specified size.

7.3 e.—No owner or operator of a facility subject to this regulation shall discharge or dispose of VOCs or material containing VOCs to surface impoundments, pits, wastewater treatment facilities or sewers for the purpose of circumventing any provision or requirement of this regulation.

Section 8—

8.0 Handling, Storage, and Disposal of Volatile Organic Compounds (VOCs)

11/29/1994

8.1 ~~a~~—No owner or operator of a facility subject to this regulation may cause, allow, or permit the disposal of more than ~~5~~ five kilograms (kg) (11 pounds [lb]) of any VOC, or of any materials containing more than ~~5~~ five kg (11 lb) of any VOCs, at that facility in any ~~4~~ one day in a manner that would permit the evaporation of VOC into the ambient air. This provision does not apply to:

8.1.1 ~~4~~—Any VOC or material containing VOC emitted from a regulated entity that is subject to a VOC standard under this regulation.

8.1.2 ~~2~~—Coating sources that are exempt from the emission limitations of ~~Section 10 through Section 23~~ 10.0 through 23.0 of this regulation.

8.1.3 ~~3~~—Waste paint (sludge) handling systems, water treatment systems, and other similar operations at coating facilities using complying coatings.

8.1.4 ~~4~~—Any VOC or material containing VOCs used during process maintenance turnarounds for cleaning purposes, provided that the provisions of ~~8(c), (d) and (e)~~ 8.3, 8.4 and 8.5 are followed.

8.2 ~~b~~—~~Paragraph (a) of this Section 8.2 of this regulation~~ includes, but is not limited to, the disposal of VOC from VOC control devices.

8.3 ~~e~~—No owner or operator of a facility subject to this regulation shall use open containers for the storage or disposal of cloth or paper impregnated with VOCs that are used for surface preparation, cleanup, or coating removal. Containers for the storage or disposal of cloth or paper impregnated with VOCs shall be kept closed, except when adding or removing material.

8.4 ~~d~~—No owner or operator of a facility subject to this regulation shall store in open containers spent or fresh VOC to be used for surface preparation, cleanup or coating removal. Containers for the storage of spent or fresh VOCs shall be kept closed, except when adding or removing material.

8.5 ~~e~~—No owner or operator of a facility subject to this regulation shall use VOC for the cleanup of spray equipment unless equipment is used to collect the cleaning compounds and to minimize their evaporation to the atmosphere.

Section 9—

9.0 Compliance, Permits, Enforceability

01/11/1993

9.1 a.—Compliance with the provisions of this regulation is required immediately upon promulgation.

9.2 b.—Permits. After the effective date of this regulation, no owner or operator shall construct, modify or operate any source subject to this regulation without first obtaining a permit for such construction, modification or operation pursuant to the provisions of ~~Regulation No. 2~~ **7 DE Admin Code 1102**.

9.3 c.—Compliance Programs and Schedules. For sources as a result of this regulation that are required to make major process changes and/or major capital expenditures, as determined by the Department, an acceptable program to comply with this regulation shall be developed and submitted to the Department by the owner and/or operator of such source within ~~one hundred eighty (180)~~ 180 days of the effective date of the regulation. The program shall include the dates for ordering, receiving, installation and startup of necessary equipment. All such programs shall contain a schedule and timetable for compliance certification, including increments of progress which will require compliance with the applicable requirements as expeditiously as practicable, but not later than the date specified in the applicable requirement. [Note: For federal purposes and for federal enforcement, no such program approved by the Department shall be federally-approved pursuant to the Clean Air Act until the Administrator of the U.S. EPA determines that such program was approved in accordance with these requirements, or within the applicable provisions of the Federal Clean Air Act, and any such program approved by the Department shall cease to be federally approved upon a determination by the Administrator of the U.S. EPA that it was not issued in accordance with the applicable provisions of the Federal Clean Air Act].

9.4 d.—Enforceability. For the purpose of federal enforceability of the provisions of this regulation, references to the Department shall also mean the Administrator of the U.S. EPA.

Section 10—
10.0 Aerospace Coatings
08/11/2002

10.1 ~~a~~—Applicability

10.1.1 ~~4~~—Except as provided for in ~~(a)(2) and (a)(3)~~ 10.1.2 and 10.1.3 of this regulation, this Section 10.0 of this regulation applies to any owner or operator of any aerospace manufacturing or rework facility that conducts any of the following operation~~(s)~~ or operations:

10.1.1.1 ~~i~~—hand-wipe cleaning;

10.1.1.2 ~~ii~~—spray gun cleaning;

10.1.1.3 ~~iii~~—flush cleaning;

10.1.1.4 ~~iv~~—primer, topcoat, self-priming topcoat, and specialty coating application;

10.1.1.5 ~~v~~—the depainting of the outer surface of aerospace vehicles (except for depainting parts or units normally removed during depainting);

10.1.1.6 ~~vi~~—Type I or Type II chemical milling maskant application;
and

10.1.1.7 ~~vii~~—VOC handling and storage.

10.1.2 ~~2~~—Except for the requirements in ~~paragraph (c)(8)~~ 10.3.8 of this regulation, this Section 10.0 of this regulation does not apply to the following operations in any aerospace manufacturing or rework facility:

10.1.2.1 ~~i~~—Chemical milling;

10.1.2.2 ~~ii~~—Metal finishing;

10.1.2.3 ~~iii~~—Electrodeposition (except for the electrodeposition of paints); and

10.1.2.4 ~~iv~~—Composite processing operations (except for cleaning and coating of composite parts or components that become part of an Aerospace vehicle or component as well as composite tooling that comes in contact with such composite parts or components prior to cure).

10.1.3 ~~3~~—The requirements of ~~this Section 10.0 of this regulation~~ do not apply to aerospace manufacturing or rework facilities whose plant-wide, actual emissions from the operations in paragraph (a)(1) without control devices are less than 6.8 kilograms (kg) (15 pounds [lbs]) of volatile organic compounds (VOCs) per day.

10.1.4 4.—Existing sources affected by ~~this Section 10.0~~ of this regulation shall comply with the provisions of ~~this Section 10.0~~ of this regulation on and after the effective date of ~~this Section 10.0~~ of this regulation, except for the requirements of ~~paragraph (e)(6)(ii) and (e)(7)~~ 10.3.6.2 and 10.3.7 of this regulation. Existing sources affected by ~~this Section 10.0~~ of this regulation shall comply with the requirements of ~~paragraph (e)(6)(ii) and (e)(7)~~ 10.3.6.2 and 10.3.7 of this regulation beginning as soon as practical, but no later than the date one year after the effective date of ~~this Section 10.0~~ of this regulation. New, modified, or reconstructed sources affected by ~~this Section 10.0~~ of this regulation shall comply with the provisions of ~~this Section 10.0~~ of this regulation on and after startup. Notwithstanding ~~Section (1)(e) of Regulation 24~~ 1.5 of this regulation, any owner or operator currently permitted under ~~Regulation 2 and/or Regulation 30~~ 7 DE Admin Code 1102 or 1130, or both 1102 and 1130 to operate an *aerospace manufacturing or rework facility* shall submit to the Department an application to amend the current permit and to comply with the provisions of this Section, pursuant to ~~Regulation 2 and/or Regulation 30~~ 7 DE Admin Code 1102 or 1130, or both 1102 and 1130, as applicable.

10.1.5 5.—Any facility that becomes or is currently subject to the provisions of ~~this Section 10.0~~ of this regulation by exceeding the applicability threshold in ~~paragraph (a)(3)~~ 10.1.3 of this ~~Section~~ regulation shall remain subject to these provisions even if its emissions later fall below the applicability threshold.

10.1.6 6.—Any facility that is currently subject to a state or federal rule promulgated pursuant to the Clean Air Act Amendments of 1977 by exceeding an applicability threshold is and shall remain subject to these provisions, even if its throughput or emissions later fall below the applicability threshold.

10.2 b.—Definitions. As used in ~~this Section 10.0~~ of this regulation, all terms not defined herein shall have the meaning given them in the November 15, 1990 Clean Air Act Amendments (CAAA), or in ~~Section 2 of Regulation 24~~ 2.0 of this ~~regulation~~ of the State of Delaware “Regulations Governing the Control of Air Pollution.”

“**Ablative coating**” means a specialty coating that chars when exposed to open flame or extreme temperatures, as would occur during the failure of an engine casing or during aerodynamic heating. The ablative char surface serves as an insulation barrier, protecting adjacent components from the heat or open flame.

“**Adhesion promoter**” means a very thin specialty coating applied to a substrate to promote wetting and form a chemical bond with the subsequently applied material.

“**Adhesive bonding**” means the joining together of two or more metal parts, such as the parts of a honeycomb core. The surfaces to be bonded are first coated with an adhesive bonding primer to promote adhesion and protect from

subsequent corrosion. Structural adhesives are applied as either a thin film or as a paste, and can be oven cured or cured in an autoclave.

“Adhesive bonding primer” means a specialty coating that is applied in a thin film to aerospace components for the purpose of corrosion inhibition and increased adhesive bond strength by attachment. There are two categories of adhesive bonding primers: primers with a design cure at 250°F or below and primers with a design cure above 250°F.

“Aerospace manufacturing or rework facility” means a commercial, civil, or military facility that produces in any amount an aerospace vehicle or component, or a commercial, civil, or military facility that reworks (or repairs) any aerospace vehicle or component.

“Aerospace vehicle or component” means any fabricated part, processed part, assembly of parts, or completed unit of any aircraft including, but not limited to, airplanes, helicopters, missiles, rockets, and space vehicles.

“Aircraft fluid system” means those systems that handle hydraulic fluids, fuel, cooling fluids, or oils.

“Aircraft transparency” means the aircraft windshield, canopy, passenger windows, lenses and other components that are constructed of transparent materials.

“Antichafe coating” means a coating applied to areas of moving aerospace components that may rub during normal operations or installation.

“Bearing coating” means a specialty coating applied to an antifriction bearing, a bearing housing, or the area adjacent to such a bearing in order to facilitate bearing function or to protect base material from excessive wear. A material shall not be classified as a bearing coating if it can also be classified as a dry lubricative material or a solid film lubricant.

“Bonding maskant” means a temporary specialty coating used to protect selected areas of aerospace parts from strong acid or alkaline solutions during processing for bonding.

“Brush coating” means the application of a coating material to a substrate by means of a brush (this technique is commonly used for touch-up and maskant operations).

“Caulking and smoothing compounds” means semi-solid specialty coating materials which are applied by hand application methods and are used to aerodynamically smooth exterior vehicle surfaces or fill cavities such as bolt hole accesses. A material shall not be classified as a caulking and smoothing compound if it can also be classified as a sealant.

“Chemical agent-resistant coating (CARC)” means an exterior topcoat; specialty coating designed to withstand exposure to chemical warfare agents or the decontaminants used on these agents.

“Chemical milling” means a process used to reduce the thickness of selected areas of metal parts in order to reduce weight by submerging the metal parts in an etchant.

“Chemical milling maskant” means a coating that is applied directly to aluminum components to protect surface areas when chemically milling the component with a Type I or II etchant. Type I chemical milling maskants are used with a Type I etchant and Type II chemical milling maskants are used with a Type II etchant. This definition does not include bonding maskants, critical use and line sealer maskants, and seal coat maskants. Additionally, maskants that must be used with a combination of Type I or II etchants and any of the above types of maskants (i.e., bonding, critical use and line sealer, and seal coat) are not included.

“Chemical milling maskant application” means the use of spray equipment or a dip tank to apply a Chemical milling maskant, prior to chemically milling the component with a Type I or II etchant.

“Cleaning operation” means collectively spray gun, hand-wipe, and flush cleaning operations.

“Cleaning solvent” means a liquid VOC containing material used for hand-wipe, spray gun, or flush cleaning.

“Clear coating” means a transparent coating applied to any substrate.

“Coating” means a material that is applied to the surface of an aerospace vehicle or component to form a decorative, protective, or functional solid film, or the solid film itself.

“Coating operation” means the use of a spray booth, tank, or other enclosure or area, such as a hangar, for the application of a single type of coating (e.g., primer). The use of the same spray booth for the application of another type of coating (e.g., topcoat) constitutes a separate coating operation for which compliance determinations are performed separately.

“Commercial exterior aerodynamic structure primer” means a specialty coating primer used on aerodynamic components and structures that protrude from the fuselage, such as wings and attached components, control surfaces, horizontal stabilizers, vertical fins, wing-to-body fairings, antennae, and landing gear and doors, for the purpose of extended corrosion protection and enhanced adhesion.

“Commercial interior adhesive” means specialty coating materials used in the bonding of passenger cabin interior components that meet the FAA fireworthiness requirements.

“Compatible substrate primer” means a specialty coating that is either a compatible epoxy primer or an adhesive primer. Compatible epoxy primer is primer that is compatible with the filled elastomeric coating and is epoxy based. The compatible substrate primer is an epoxy-polyamide primer used to promote adhesion of elastomeric coatings such as impact-resistant coatings. Adhesive primer is a coating that (1) inhibits corrosion and serves as a primer applied to bare metal surfaces or prior to adhesive application, or (2) is applied to surfaces that can be expected to contain fuel. Fuel tank coatings are excluded from this category.

“Composite processing operations” include layup, thermal forming, debulking, curing, break-out, compression molding, and injection molding. Layup means the process of assembling the layers of the composite structure by positioning composite material in a mold and impregnating the material with a resin. Thermal forming means the process of forming the layup in a mold, which usually takes place in an autoclave. Debulking means the simultaneous application of low-level heat and pressure to the composite structure to force out excess resin, trapped air, vapor, and volatiles from between the layers of the composite structure. Curing means the process of changing the resin into a solid material through a polymerization reaction. Break-out means the removal of the composite structure from the mold or curing fixtures. Compression molding means the process of filling one half of molds with a molding compound, closing the mold, and applying heat and pressure until the material is cured. Injection molding means the use of a closed mold, where the molding compound is injected into the mold, maintained under pressure, and then cured by applying heat.

“Corrosion prevention system” means a coating system that provides corrosion protection by displacing water and penetrating mating surfaces, forming a protective barrier between the metal surface and moisture. Coatings containing oils or waxes are excluded from this category.

“Critical use line and sealer maskant” means a temporary specialty coating, not covered under other maskant categories, used to protect selected areas of aerospace parts from strong acid or alkaline solutions such as those used in anodizing, plating, chemical milling and processing of magnesium, titanium, or high-strength steel, high-precision aluminum chemical milling of deep cuts, and aluminum chemical milling of complex shapes. Materials used for repairs or to bridge gaps left by scribing operations (i.e., line sealer) are also included in this category.

“Cryogenic flexible primer” means a specialty coating primer designed to provide corrosion resistance, flexibility, and adhesion of subsequent coating systems when exposed to loads up to and surpassing the yield point of the substrate at cryogenic temperatures (-275°F and below).

“Cryoprotective coating” means a specialty coating that insulates cryogenic or subcooled surfaces to limit propellant boil-off, maintain structural integrity of metallic structures during ascent or re-entry, and prevent ice formation.

“Cyanoacrylate adhesive” means a fast-setting, single component specialty coating adhesive that cures at room temperature. Also known as “super glue.”

“Depainting” means the removal of any coating from the outer surface of an aerospace vehicle or component by either chemical or non-chemical means.

“Depainting operation” means the use of a chemical agent, media blasting, or any other technique to remove coatings from the outer surface of aerospace vehicles or components. The depainting operation includes washing of the aerospace vehicle or component to remove residual stripper and coating residue.

“Dip coating” means the application of a coating material to a substrate by dipping the part into a tank of the coating material.

“Dry lubricative material” means a specialty coating consisting of lauric acid, cetyl alcohol, waxes, or other noncross linked or resin-bound materials that act as a dry lubricant.

“Electric or radiation-effect coating” means a specialty coating or coating system engineered to interact, through absorption or reflection, with specific regions of the electromagnetic energy spectrum, such as the ultraviolet, visible, infrared, or microwave regions. Uses include, but are not limited to, lightning strike protection, electromagnetic pulse (EMP) protection, and radar avoidance. Coatings that have been designated as “classified” by the Department of Defense are exempt.

“Electrodeposition” means an additive process for metal substrates in which another metal layer is added to the substrate in order to enhance corrosion and wear resistance necessary for the successful performance of the component. The two types of electrodeposition typically used are electroplating and plasma arc spraying.

“Electrostatic discharge and electromagnetic interference (EMI) coating” means a specialty coating applied to space vehicles, missiles, aircraft radomes, and helicopter blades to disperse static energy or reduce electromagnetic interference.

“Electrostatic spray” means a method of applying a spray coating in which opposite electrical charges are applied to the substrate and the coating. The coating is attracted to the substrate by the electrostatic potential between them.

“Elevated-temperature Skydrol-resistant commercial primer” means a specialty coating primer applied primarily to commercial aircraft (or commercial aircraft adapted for military use) that must withstand immersion in phosphate-ester (PE) hydraulic fluid (Skydrol 500b or equivalent) at the elevated temperature of 150°F for 1,000 hours.

“Epoxy polyamide topcoat” means a specialty coating used where harder films are required or where engraving is accomplished in camouflage colors.

“Etchant” means a chemical used to mill a part or subassembly (e.g., sodium hydroxide for aluminum parts).

“Exempt solvent” means an organic compound that has been determined to have negligible photochemical reactivity, as specified, and is defined in ~~Regulation 24, Section 2~~ 2.0 of this regulation under “exempt compounds.”

“Fire-resistant (interior) coating” means for civilian aircraft, fire-resistant interior coatings used on passenger cabin interior parts that are subject to the FAA fire worthiness requirements. For military aircraft, fire-resistant interior coatings mean coatings that are used on parts that are subject to the flammability requirements of MIL-STD-1630A and MIL-A-87721. For space applications, fireresistant interior coatings means coatings that are used on parts that are subject to the flammability requirements of SE-R-0006 and SSP 30233.

“Flexible primer” means a specialty coating primer that meets flexibility requirements such as those needed for adhesive bond primed fastener heads or on surfaces expected to contain fuel. The flexible coating is required because it provides a compatible, flexible substrate over bonded sheet rubber and rubber-type coatings as well as a flexible bridge between the fasteners, skin, and skin-to-skin joints on outer aircraft skins. This flexible bridge allows more topcoat flexibility around fasteners and decreases the chance of the topcoat cracking around the fasteners. The result is better corrosion resistance.

“Flow coating” means the application of a coating material to a substrate by pouring the coating over the suspended part.

“Flush cleaning” means the cleaning of an aerospace vehicle or component by passing solvent over, into, or through the vehicle or component. The solvent may simply be poured into the vehicle or component and then drained, or assisted by air or hydraulic pressure, or by pumping. Hand-wipe cleaning operations where wiping, scrubbing, mopping, or other hand action is used are not flush cleaning operations.

“Formulation” means a specific coating made by a specific manufacturer. Each different color of a specific coating is considered a separate formulation.

“Fuel tank adhesive” means a specialty coating adhesive used to bond components exposed to fuel which shall be compatible with fuel tank coatings.

“Fuel tank coating” means a specialty coating applied to fuel tank components for the purpose of corrosion and/or bacterial growth inhibition, and to assure sealant adhesion in extreme environmental conditions.

“Hand-wipe cleaning operation” means the removal of contaminants such as dirt, grease, oil, and coatings from aerospace vehicles or components by physically rubbing them with a material such as a rag, paper, or cotton swab that has been moistened with a cleaning solvent.

“High temperature coating” means a specialty coating designed to withstand temperatures of more than 350°F.

“High volume low pressure (HVLP) spray equipment” means spray equipment that is used to apply coatings using a spray gun that operates at equal to or less than 10.0 psig of atomized air pressure at the air cap.

“Insulation covering” means a specialty coating material that is applied to foam insulation to protect the insulation from mechanical or environmental damage.

“Intermediate release coating” means a thin specialty coating applied beneath topcoats to assist in removing the topcoat in depainting operations, which generally allows the use of less hazardous depainting methods.

“Lacquer” means a clear or pigmented specialty coating formulated with a nitrocellulose or synthetic resin to dry by evaporation without a chemical reaction. Lacquers are resolvable in their original solvent.

“Leak” means any visible leakage, including misting and clouding.

“Limited access space” means internal surfaces or passages of an aerospace vehicle or component that cannot be reached for the application of coatings without the aid of an airbrush or a spray gun extension.

“Metal finishing” means conversion coating, anodizing, desmutting, descaling, and any operation that chemically affect the surface layer of a part, and is used to prepare the surface of a part for better adhesion, improved surface hardness, and improved corrosion resistance.

“Metalized epoxy coating” means a specialty coating that contains relatively large quantities of metallic pigmentation for appearance and/or added protection.

“Mold release” means a specialty coating applied to a mold surface to prevent the molded piece from sticking to the mold as it is removed.

“Non-chemical-based depainting equipment” means any depainting equipment or technique that does not rely on a chemical stripper to depaint an aerospace vehicle or component (e.g., media blasting equipment).

“Nonstructural adhesive” means a specialty coating adhesive that bonds nonload bearing aerospace components in noncritical applications and is not covered in any other specialty adhesive categories.

“Optical anti-reflective coating” means a coating with a low reflectance in the infrared and invisible wavelength ranges that is used for anti-reflection on or near optical and laser hardware.

“Part marking coating” means a specialty coating or ink used to make identifying markings on materials, components, and/or assemblies. These markings may be either permanent or temporary.

“Pretreatment coating” means an organic specialty coating that contains at least 0.5% percent acids by weight and is applied directly to metal or composite surfaces to provide surface etching, corrosion resistance, adhesion, and ease of stripping.

“Primer” means the first layer and any subsequent layers of identically formulated coating applied to the surface of an aerospace vehicle or component. Primers are typically used for corrosion prevention, environment protection, functional fluid resistance, and adhesion promotion of subsequent coatings. Primers that are defined as specialty coatings are not included under this definition.

“Radome” means the non-metallic protective housing for electromagnetic transmitters and receivers (e.g., radar, electronic countermeasures, etc.).

“Rain erosion-resistant coating” means a specialty coating or coating system used to protect the leading edges of parts such as flaps, stabilizers, radomes, engine inlet nacelles, etc. against erosion caused by rain impact during flight.

“Research and development” means an operation whose primary purpose is for research and development of new processes and products and that is conducted under the close supervision of technically trained personnel and is not involved in the manufacture of final or intermediate products for commercial purposes, except in a de minimis manner.

“Rocket motor bonding adhesive” means a specialty coating adhesive used in rocket motor bonding applications.

“Rocket motor nozzle coating” means a catalyzed epoxy specialty coating system used in elevated temperature applications on rocket motor nozzles.

“Rubber-based adhesive” means a quick setting, specialty coating contact cement that provides a strong, yet flexible bond between two mating surfaces that may be of dissimilar materials.

“Scale inhibitor” means a specialty coating that is applied to the surface of a part prior to thermal processing to inhibit the formation of scale.

“Screen print ink” means a specialty coating ink used in screen printing processes during fabrication of decorative laminates and decals.

“Sealant” means a specialty coating material used to prevent the intrusion of water, fuel, air, or other liquids or solids from certain areas of aerospace vehicles or components. There are two categories of sealants: extrudable/rollable/brushable sealants and sprayable sealants.

“Seal coat maskant” means a specialty coating overcoat applied over a maskant to improve abrasion and chemical resistance during production operations.

“Self-priming topcoat” means a coating that is applied directly to an Aerospace vehicle or component for purposes of corrosion protection, environmental protection, and functional fluid resistance and that is not subsequently topcoated. More than one layer of identical coating formulation may be applied to the aerospace vehicle or component. Self-priming topcoats that are defined as specialty coatings are not included under this definition.

“Silicone insulation material” means an insulating specialty coating material applied to exterior metal surfaces for protection from high temperatures caused by atmospheric friction or engine exhaust. These materials differ from ablative coatings in that they are not “sacrificial.”

“Solids” means the nonvolatile portion of the coating that after drying makes up the dry film.

“Solid film lubricant” means a very thin specialty coating consisting of a binder system containing as its main pigment material one or more of the following: molybdenum, graphite, polytetrafluoroethylene (PTFE), or other solids that act as a dry lubricant between faying (i.e., closely or tightly fitting) surfaces.

“Space vehicle” means a man-made device, either manned or unmanned, designed for operation prototypes, molds, jigs, tooling, hardware jackets, and test coupons. Also included is auxiliary equipment associated with test, transport, and storage that through contamination can compromise the space vehicle performance.

“Specialty coating” means a coating that, even though it meets the definition of a primer, topcoat, or self-priming topcoat, has additional performance criteria beyond those of primers, topcoats, and self-priming topcoats for specific applications. These performance criteria may include, but are not limited to, temperature or fire resistance, substrate compatibility, antireflection, temporary protection or marking, sealing, adhesively joining substrates, or enhanced corrosion protection. A specialty coating is any coating listed in Table 7-4 10-1 of this regulation and defined in ~~paragraph (b)~~ 10.2 of this Section regulation.

“Specialized function coating” means a specialty coating that fulfills extremely specific engineering requirements that are limited in application and are characterized by low volume usage. This category excludes coatings covered in other Specialty Coating categories.

“Spray gun” means a device that uses air pressure or air flow to atomize a coating or other material, and to project the atomized coating particulates or other material onto a component.

“Stripper” means a liquid that is applied to an aerospace vehicle or component to remove primer, topcoat, self-priming topcoat, or coating residue.

“Structural autoclavable adhesive” means a specialty coating adhesive used to bond load-carrying aerospace components that are cured by heat and pressure in an autoclave.

“Structural nonautoclavable adhesive” means a specialty coating adhesive cured under ambient conditions that is used to bond load-carrying aerospace components or other critical functions, such as nonstructural bonding in the proximity of engines.

“Surface preparation” means the removal of contaminants from the surface of an aerospace vehicle or component, or the activation or reactivation of the surface in preparation for the application of a coating.

“Temporary protective coating” means a specialty coating applied to provide scratch or corrosion protection during manufacturing, storage, or transportation. Two types include peelable protective coatings and alkaline removable coatings. These materials are not intended to protect against strong acid or alkaline solutions. Coatings that provide this type of protection from chemical processing are not included in this category.

“Thermal control coating” means a specialty coating formulated with specific thermal conductive or radiative properties to permit temperature control of the substrate.

“Topcoat” means a coating that is applied over a primer on an aerospace vehicle or component for appearance, identification, camouflage, or protection. Topcoats that are defined as specialty coatings are not included under this definition.

“Touch-up and repair coating” means a coating used to cover minor coating imperfections appearing after the main coating operation.

“Touch-up and repair operation” means that portion of the coating operation that is the incidental application of coating used to cover minor imperfections in the coating finish or to achieve complete coverage. This definition includes out-of-sequence or out-of-cycle coating. Touch-up and repair operations are not to exceed an area of 4 square feet per aerospace vehicle.

“Type II etchant” or **“Type II chemical milling etchant”** means a Chemical milling etchant that is a strong sodium hydroxide solution containing amines (Type I etchants do not contain amines).

“Volatile Organic Compound (VOC)” means any compound defined as VOC in Regulation 24, Section 2 2.0 of this regulation - Definitions.

“VOC composite vapor pressure” means the sum of the partial pressures of the compounds defined as VOCs and is determined by the following calculation:

$$PP_c = \sum_{i=1}^n \frac{(W_i)(VP_i)}{MW_i} \frac{MW_w}{\frac{W_w}{MW_w} + \sum_{e=1}^n \frac{W_e}{MW_e} + \sum_{i=1}^n \frac{W_i}{MW_i}} \quad (10-1)$$

where

W_i = Weight of the i th VOC compound, grams

W_w = Weight of water, grams

W_e = Weight of nonwater, non-VOC compound, grams

MW_i = Molecular weight of the i th VOC compound, g/g-mole

MW_w = Molecular weight of water, g/g-mole

MW_e = Molecular weight of exempt compound, g/g-mole

PP_c = VOC composite partial pressure at 20°C, mm Hg

VP_i = Vapor pressure of the i th VOC compound at 20°C, mm Hg

“Wet fastener installation coating” means a specialty coating primer or sealant applied by dipping, brushing, or daubing to fasteners that are installed before the coating is cured.

“Wing coating” means a corrosion-resistant specialty coating topcoat that is resilient enough to withstand the flexing of the wings.

10.3 ~~e~~-Standards

10.3.1 ~~4~~-Hand-Wipe Cleaning Operations

10.3.1.1 ~~i~~-Except as exempted in ~~paragraph (c)(1)(ii)~~ 10.3.1.2 of this regulation, no person subject to ~~this Section~~ 10.0 of this regulation shall cause or allow the use of any cleaning solvent in any hand-wipe cleaning operation that does not comply with one of the following limits:

10.3.1.1.1 ~~A~~-VOC composite vapor pressure should be less than 45 millimeters (mm) mercury (Hg) (1.8 inches [in] Hg) at 20 degrees Celsius (°C) (68 degrees Fahrenheit [°F]).

10.3.1.1.2 ~~B~~-Cleaning solvent shall be an aqueous cleaning solvent (i.e., a solvent in which water is at least 80% ~~percent~~ of the solvent, as applied).

10.3.1.2 ~~ii~~-The requirements of ~~paragraph (c)(1)(i)~~ 10.3.1.1 of this ~~Section~~ regulation shall not apply to the following hand-wipe cleaning operations:

10.3.1.2.1 ~~A~~-Cleaning during the manufacture, assembly, installation, maintenance, or testing of components of

breathing oxygen systems that are exposed to the breathing oxygen.

10.3.1.2.2 ~~B~~—Cleaning during the manufacture, assembly, installation, maintenance, or testing of parts, subassemblies, or assemblies that are exposed to strong oxidizers or reducers (e.g., nitrogen tetroxide, liquid oxygen, and hydrazine).

10.3.1.2.3 ~~C~~—Cleaning and surface activation prior to adhesive bonding.

10.3.1.2.4 ~~D~~—Cleaning of electronics and assemblies containing electronics.

10.3.1.2.5 ~~E~~—Cleaning of aircraft fluid system and ground support equipment fluid systems that are exposed to the fluid, including air-to-air heat exchangers and hydraulic fluid systems.

10.3.1.2.6 ~~F~~—Cleaning of fuel cells, fuel tanks, and limited-access spaces.

10.3.1.2.7 ~~G~~—Surface cleaning of solar cells, coated optics, and thermal control surfaces.

10.3.1.2.8 ~~H~~—Cleaning during fabrication, assembly, installation, and maintenance of upholstery, curtains, carpet, and other textile materials used on the interior of the aircraft.

10.3.1.2.9 ~~I~~—Cleaning of metallic and non-metallic materials used in honeycomb cores during the manufacture or maintenance of these cores, and cleaning of the completed cores used in the manufacture of aerospace vehicles or components.

10.3.1.2.10 ~~J~~—Cleaning of aircraft transparencies.

10.3.1.2.11 ~~K~~—Cleaning associated with research and development, quality control, and laboratory testing.

10.3.2 ~~2~~—Spray Gun Cleaning Operations

10.3.2.1 ~~i~~—No person subject to this ~~Section 10.0~~ Section 10.0 of this regulation shall cause or allow the use of any *spray gun* cleaning techniques that does not comply with one of the following:

10.3.2.1.1 ~~A~~—Use of an enclosed *spray gun* cleaning system that is kept closed when not in use.

10.3.2.1.2 ~~B.~~ Non-atomized discharge of solvent into a waste container that is kept closed when not in use.

10.3.2.1.3 ~~C.~~ Disassembly of the spray gun and placing the parts for cleaning in a vat that is kept closed when not in use.

10.3.2.1.4 ~~D.~~ Atomized spray into a waste container that is fitted with a device that captures atomized solvent emissions.

10.3.2.1.5 ~~E.~~ Any alternative technique that has been demonstrated to, and accepted by the Department as producing emissions that are equal to or less than the emissions from the techniques specified in ~~paragraph (c)(2)(i)(A) through (D)~~ 10.3.2.1.1 through 10.3.2.1.4 of this ~~Section~~ regulation. Emissions from any alternative technique shall be demonstrated pursuant to test protocols that are approved in advance by the Department.

10.3.2.2 ~~ii.~~ Any enclosed *spray gun* cleaner shall be visually inspected for leaks at least once per month. Such inspection shall occur while the enclosed *spray gun* cleaner is in operation.

10.3.2.3 ~~iii.~~ Leaks from any enclosed spray gun cleaner shall be repaired as soon as practicable, but no later than 15 days from when the leak is first discovered.

10.3.2.4 ~~iv.~~ If any leak is not repaired by the 15th day after detection, the solvent shall be removed and the enclosed cleaner shall be shut down until the leak is repaired.

10.3.3 ~~3.~~ Flush Cleaning. Any cleaning solvents used during flush cleaning operations shall be handled pursuant to ~~paragraph (c)(8)~~ 10.3.8 of this ~~Section~~ regulation.

10.3.4 ~~4.~~ Primer, Topcoat, and Self-Priming Topcoat Application.

10.3.4.1 ~~i.~~ Except as provided for in ~~paragraph (c)(4)(ii), (d) and (e)~~ 10.3.4.2, 10.4 and 10.5 of this ~~Section~~ regulation, no person subject to this ~~Section~~ 10.0 of this regulation shall cause or allow the application of any primer, topcoat, and/or self-priming topcoat with a VOC content that does not comply with the following limits:

10.3.4.1.1 ~~A.~~ Primers shall have a VOC content equal to or less than 350 g/L (2.9 lb/gal), as applied, excluding water and exempt compounds.

10.3.4.1.2 B.—Topcoats and self-priming topcoats shall have a VOC content equal to or less than 420 g/L (3.5 lb/gal), as applied, excluding water and exempt compounds.

10.3.4.2 ii.—The requirements of ~~paragraphs (c)(4)(i)(B)~~ 10.3.4.1.2 of this ~~Section~~ regulation shall not apply to facilities that use less than 50 gallons per consecutive rolling 12-month period of a particular formulation of topcoat, or self-priming topcoat provided:

10.3.4.2.1 A.—Each topcoat and self-priming topcoat shall have a VOC content equal to or less than 720 g/L (6.0 lb/gal), as applied, excluding water and exempt compounds.

10.3.4.2.2 B.—A total of not more than 200 gallons per consecutive rolling 12-month period of all such high VOC coatings are used at the facility.

10.3.4.3 iii.—Except as provided for in ~~paragraph (c)(4)(iv)~~ 10.3.4.4 of this ~~Section~~ regulation, no person subject to ~~this Section~~ 10.0 of this regulation shall cause or allow the use of any application technique to apply any primer, topcoat, or self-priming topcoat other than the following:

10.3.4.3.1 A.—flow/curtain coat, roll coat, brush coat, dip coat, cotton-tip swab application, electrostatic spray, electrodeposition, or high volume low pressure (HVLP) spray guns;

10.3.4.3.2 B.—Any alternate technique that has been demonstrated to and accepted by the Department as providing emissions that are less than or equal to the emissions from HVLP or electrostatic spray application techniques. Emissions from any alternate techniques shall be demonstrated pursuant to test protocols that are approved in advance by the Department. Such tests shall, at a minimum, compare the emission levels determined using an initial 90-day period of HVLP or electrostatic spray attraction techniques with the emission levels determined using the alternate technique for a period of time necessary to coat the equivalent amount of parts with the same coatings.

10.3.4.4 iv.—The equipment standards and application techniques in ~~paragraph (c)(4)(iii)~~ 10.3.4.3 of this ~~Section~~ regulation shall not apply to the following primer, topcoat and self-priming topcoat application operations:

10.3.4.4.1 A.—The application of coatings in any limited access space.

10.3.4.4.2 ~~B.~~ The application of coatings that contain fillers that adversely affect atomization with HVLP spray guns and cannot be applied by any of the application techniques specified in ~~paragraph (c)(4)(iii)~~ 10.3.4.3 of this ~~Section~~ regulation.

10.3.4.4.3 ~~C.~~ The application of coatings that normally have a dried film thickness of less than 0.0005 inches and cannot be applied by any of the application techniques specified in ~~paragraph (c)(4)(iii)~~ 10.3.4.3 of this ~~Section~~ regulation.

10.3.4.4.4 ~~D.~~ The use of airbrush application methods for stenciling, lettering, and other identification markings.

10.3.4.4.5 ~~E.~~ Any touch-up and repair operation.

10.3.4.5 ~~v.~~ All application equipment shall be operated according to the manufacturer's specifications at all times, even if it is exempt from the equipment standards specified in ~~paragraph (c)(4)(iii)~~ 10.3.4.3 of this ~~Section~~ regulation.

10.3.5 ~~5.~~ Depainting Operation. No person subject to ~~this Section~~ 10.0 of this regulation shall cause or allow the use of any stripper that does not comply with one of the following limits:

10.3.5.1 ~~i.~~ VOC composite vapor pressure shall be less than 10 mm Hg (0.4 in. Hg) at 20°C (68°F).

10.3.5.2 ~~ii.~~ VOC content shall be less than 400 g/L (3.3 lb/gal), as applied, excluding water and exempt compounds.

10.3.6 ~~6.~~ Chemical Milling Maskant Application. Except as provided for in ~~paragraph (d) or (e)~~ 10.4 or 10.5 of this ~~Section~~ regulation, no person subject to ~~this Section~~ 10.0 of this regulation shall cause or allow the application of any chemical milling maskant with a VOC content that does not comply with the following emission limits:

10.3.6.1 ~~i.~~ For any Type I maskant, VOC content shall be equal to or less than 622 g/L (5.2 lbs/gal), as applied, excluding water and exempt compounds; or

10.3.6.2 ~~ii.~~ For any Type II maskant, VOC content shall be equal to or less than 160 g/L (1.3 lbs/gal), as applied, excluding water and exempt compounds.

10.3.7 ~~7.~~ Specialty Coatings. Except as provided for in ~~paragraph (d) or (e)~~ 10.4 or 10.5 of this ~~Section~~ regulation, no person subject to ~~this Section~~ 10.0 of this regulation shall cause or allow the application of any specialty coating that has a VOC content, as applied, excluding water and

exempt compounds, that is greater than the limits specified in Table 7-4 10-1 of this regulation:

Coating Type	Limit	Coating Type	Limit
Ablative Coating	600	Flight-Test Coatings: Missile or Single Use Aircraft All other	420 840
Adhesives:		<i>Fuel-Tank Coating</i>	720
<i>Commercial Interior Adhesive</i>	760	<i>High-Temperature Coating</i>	850
<i>Cyanoacrylate Adhesive</i>	1,020	<i>Insulation Covering</i>	740
<i>Fuel Tank Adhesive</i>	620	<i>Intermediate Release Coating</i>	750
<i>Nonstructural Adhesive</i>	360	<i>Lacquer</i>	830
<i>Rocket Motor Bonding Adhesive</i>	890	Maskants (excluding Type I and Type II):	
<i>Rubber-based Adhesive</i>	850	<i>Bonding maskant</i>	1,230
<i>Structural Autoclavable Adhesive</i>	60	<i>Critical Use and Line Sealer</i>	
<i>Structural Nonautoclavable Adhesive</i>	850	<i>Maskant</i>	1,020
<i>Adhesion Promoter</i>	890	<i>Seal Coat Maskant</i>	1,230
<i>Adhesive Bonding Primers:</i> Cured at 250°F or below Cured above 250°F	850 1,030	<i>Metalized Epoxy Coating</i>	740
<i>Antichafe Coating</i>	660	<i>Mold Release</i>	780
<i>Bearing Coating</i>	620	<i>Optical Anti-Reflective Coating</i>	750
<i>Caulking and Smoothing Compounds</i>	850	<i>Part Marking Coating</i>	850
<i>Chemical Agent-Resistant Coating</i>	550	<i>Pretreatment Coating</i>	780
<i>Clear Coating</i>	720	<i>Rain Erosion-Resistant Coating</i>	850
<i>Commercial Exterior Aerodynamic Structure Primer</i>	650	<i>Rocket Motor Nozzle Coating</i>	660
<i>Compatible Substrate Primer</i>	780	<i>Scale Inhibitor</i>	880
<i>Corrosion Prevention Compound</i>	710	Screen Print Ink	840
<i>Cryogenic Flexible Primer</i>	645	Sealants:	
<i>Cryoprotective Coating</i>	600	Extrudable/Rollable/Brushable Sealant	280
<i>Dry Lubricative Material</i>	880	Sprayable Sealant	600
<i>Electric or Radiation-Effect Coating</i>	800	<i>Silicone Insulation Material</i>	850
<i>Electrostatic Discharge and Electromagnetic Interference (EMI) Coating</i>	800	<i>Solid Film Lubricant</i>	880
<i>Elevated-Temperature Skydrol-Resistant Commercial Primer</i>	740	<i>Specialized Function Coating</i>	890
<i>Epoxy Polyamide Topcoat</i>	660	<i>Temporary Protective Coating</i>	320
<i>Fire-Resistant (interior) Coating</i>	800	<i>Thermal Control Coating</i>	800
<i>Flexible Primer</i>	640	<i>Wet Fastener Installation Coating</i>	675
		<i>Wing Coating</i>	850

^a Coating limits expressed in terms of mass (grams) of VOC per volume (liters) of coating less water and less exempt solvent. To convert from g/L to lbs/gallon multiply by 0.00835.

10.3.8 8-VOC Handling and Storage.

10.3.8.1 i. Except as provided in paragraph (c)(8)(ii) 10.3.8.2 of this Section regulation, any person subject to this Section 10.0 of

this regulation shall use good house keeping measures when handling any VOC and any VOC-containing material at the facility. Such measures shall include:

10.3.8.1.1 A.—Handling and transferring all fresh and spent cleaning solvent and other VOC-containing material to or from any container, tank, vat, vessel, or piping system, etc. in such a manner that minimizes losses.

10.3.8.1.2 B.—All fresh and spent solvents and VOC-containing material shall be stored in closed containers at all times except during filling or emptying.

10.3.8.1.3 C.—All solvent-laden cloths, papers, or other absorbent materials shall be placed in closed containers immediately after use.

10.3.8.2 ii.—The requirements in ~~paragraph (c)(8)(i)~~ 10.3.8.1 of this ~~Section~~ regulation shall not apply to wastes that are determined to be hazardous wastes under the Resource Conservation and Recovery Act of 1976 (PL 94-580) (RCRA), as implemented by 40 Code of Federal Regulations (CFR) Parts 260 and 261, and that are subject to RCRA requirements, as implemented in 40 CFR Parts 262 through 268.

10.4 d.—Daily-Weighted Average Limitations. As an alternative to complying with the individual limits specified in ~~paragraphs (c)(4)(i)(A), (c)(4)(i)(B), (c)(6)(i), (c)(6)(ii), and (c)(7)~~ 10.3.4.1.1, 10.3.4.1.2, 10.3.6.1, 10.3.6.2 and 10.3.7 of this ~~Section~~ regulation, coatings in any primer, topcoat, chemical milling maskant, or specialty coating application operation shall not be applied at the facility whose daily-weighted average VOC content, calculated in accordance with the procedure specified in **Appendix C** of ~~Regulation 24~~ this regulation and the provisions listed below, exceeds the applicable emission limits in ~~paragraphs (c)(4)(i)(A), (c)(4)(i)(B), (c)(6)(i), (c)(6)(ii), and (c)(7)~~ 10.3.4.1.1, 10.3.4.1.2, 10.3.6.1, 10.3.6.2 and 10.3.7 of this ~~Section~~ regulation, as applicable.

10.4.1 1.—Averaging between primers, topcoats, self-priming topcoats, chemical milling maskants ~~and/or~~ specialty coatings is prohibited.

10.4.2 2.—Averaging between coatings used in operations where air emissions are not captured and controlled and coatings used in operations where air emissions are captured and controlled is prohibited.

10.5 e.—Control Devices.

10.5.1 4.—As an alternative to complying with the individual limits specified in ~~paragraphs (c)(4)(i)(A), (c)(4)(i)(B), (c)(6)(i), (c)(6)(ii), and (c)(7)~~ 10.3.4.1.1, 10.3.4.1.2, 10.3.6.1, 10.3.6.2 and 10.3.7 of this regulation, any person subject to ~~this Section~~ 10.0 of this regulation shall,

for any primer, topcoat, self-priming topcoat, chemical milling maskant, and/or specialty coating application operation:

10.5.1.1 i.—Install, test, calibrate, operate, maintain, and monitor according to the manufacturer’s specifications, as approved by the Department, an air pollution control device consisting of a capture and control system on that operation; and

10.5.1.2 ii.—Demonstrate that the overall emission reduction efficiency achieved is equal to or greater than 81 weight % percent.

10.5.2 2.—The procedures in **Appendix D** and **Appendix E** of Regulation 24 this regulation shall be used to demonstrate compliance with paragraph ~~(e)(1)(ii)~~ 10.5.1.2 of this ~~Section~~ regulation. The method in **Appendix I** of Regulation 24 this regulation may be used to determine an alternative multi-day rolling period when calculating the efficiency of any carbon absorption system.

10.6 f.—Test Methods.

10.6.1 4.—The VOC composite vapor pressure specified in paragraph ~~(c)(1)(i)(A)~~ and paragraph ~~(c)(5)(i)~~ 10.3.1.1.1 and 10.3.5.1 of this ~~Section~~ regulation shall be determined either by using ASTM Method E 260-91, manufacturer’s supplied data, or standard engineering reference text values.

10.6.2 2.—The water content specified in paragraph ~~(c)(1)(i)(B)~~ 10.3.1.1.2 of this ~~Section~~ regulation shall be determined using the test methods found in **Appendix A** and **Appendix B** of Regulation 24 this regulation.

10.6.3 3.—The VOC content specified in paragraph ~~(c)(4)(i)(A)~~ and ~~(c)(4)(i)(B)~~ 10.3.4.1.1 and 10.3.4.1.2 of this regulation shall be determined by using the test method found in **Appendix A** and **Appendix B** of Regulation 24 this regulation.

10.7 g.—Recordkeeping. Any person subject to ~~this Section~~ 10.0 of this regulation shall maintain at the facility for a minimum period of 5 years from the information’s date of record, all of the following information. Such information shall be immediately submitted to the Department upon written or verbal request.

10.7.1 4.—For any person subject to the requirements of paragraph ~~(c)(1)~~ 10.3.1 of this ~~Section~~ regulation (i.e., hand-wipe cleaning operations):

10.7.1.1 i.—Identification of each hand-wipe cleaning solvent used at the facility;

10.7.1.2 ii.—The composite vapor pressure of each hand-wipe cleaning solvent complying with paragraph ~~(c)(1)(i)(A)~~ 10.3.1.1.1 of this regulation, and all supporting documentation, to include any test reports and/or calculations.

10.7.1.3 ~~iii.~~—The water content of each hand-wipe cleaning solvent complying with ~~paragraph (c)(1)(i)(B)~~ 10.3.1.1.2 of this regulation, and all supporting documentation, to include any test reports and/or calculations.

10.7.1.4 ~~iv.~~—Identification of each hand-wipe cleaning solvent used at the facility pursuant to ~~paragraph (c)(1)(ii)~~ 10.3.1.2 of this Section regulation, and a list of the parts, assemblies, or subassemblies cleaned with each such hand-wipe cleaning solvent.

10.7.2 ~~2.~~—For any person subject to ~~paragraph (c)(2)~~ 10.3.2 of this Section regulation (i.e., spray gun cleaning):

10.7.2.1 ~~i.~~—A description of each method used to clean spray guns.

10.7.2.2 ~~ii.~~—Records of the inspections conducted pursuant to ~~paragraph (c)(2)(ii)~~ 10.3.2.2 of this regulation.

10.7.2.3 ~~iii.~~—For any leak found pursuant to ~~paragraph (c)(2)(ii)~~ 10.3.2.2 of this regulation, records indicating the source of the leak, the date the leak was discovered, and the date the leak was repaired.

10.7.3 ~~3.~~—For any person subject to ~~paragraph (c)(4)~~ 10.3.4 of this Section regulation (i.e., primer, topcoat, and self-priming topcoat application):

10.7.3.1 ~~i.~~—For each coating applied pursuant to ~~paragraph (c)(4)(ii)~~ 10.3.4.2 of this Section regulation.

10.7.3.1.1 ~~A.~~—Not later than the 5th day of each month, identification of each coating used at the facility pursuant to ~~paragraph (c)(4)(ii)~~ 10.3.4.2 of this Section regulation during the preceding month.

10.7.3.1.2 ~~B.~~—The volume used of each coating identified in ~~paragraph (g)(3)(i)(A)~~ 10.7.3.1.1 of this Section regulation.

10.7.3.1.3 ~~C.~~—The summation of the volumes recorded pursuant to ~~paragraph (g)(3)(i)(B)~~ 10.7.3.1.2 of this regulation for the preceding twelve (12) months.

10.7.3.1.4 ~~D.~~—The records required by ~~paragraph (e) of Section 4 of Regulation 24~~ 4.5 of this regulation.

10.7.3.2 ~~ii.~~—A description of the proper operation of all coating application equipment used at the facility.

10.7.3.3 ~~iii.~~ Documentation associated with any alternate coating application techniques approved pursuant to ~~paragraph (c)(4)(iii)(B)~~ 10.3.4.3.2 of this Section regulation.

10.7.4 ~~4.~~ For any person subject to ~~paragraph (c)(4), (c)(6), and (c)(8)~~ 10.3.4, 10.3.6 and 10.3.8 of this Section regulation (i.e., primer, topcoat, self-priming topcoat, chemical milling maskant, and specialty coating application):

10.7.4.1 ~~i.~~ Identification of the control strategy employed (i.e., the combination of complying coatings, daily-weighted averaging, and control devices used at the facility).

10.7.4.2 ~~ii.~~ Where complying coatings are used, the records required by ~~paragraph (c) of Section 4 of Regulation 24~~ 4.3 of this regulation.

10.7.4.3 ~~iii.~~ Where daily-weighted averaging pursuant to ~~paragraph (d)~~ 10.4 of this Section regulation is used, the records required by ~~paragraph (d) of Section 4 of Regulation 24~~ 4.4 of this regulation.

10.7.4.4 ~~iv.~~ Where a control device~~(s)~~ or devices pursuant to ~~paragraph (e)~~ 10.5 of this Section regulation is used, the records required by ~~paragraph (e) of Section 4 of Regulation 24~~ 4.5 of this regulation.

10.7.5 ~~5.~~ For any person subject to ~~paragraph (c)(5)~~ 10.3.5 of this Section regulation:

10.7.5.1 ~~i.~~ If complying with ~~paragraph (c)(5)(i)~~ 10.3.5.1 of this regulation, the name, VOC composite vapor pressure, and method and supporting documentation used to determine the VOC composite vapor pressure of each stripper used at the facility.

10.7.5.2 ~~ii.~~ If complying with ~~paragraph (c)(5)(ii)~~ 10.3.5.2 of this regulation, the name, VOC content, and method and supporting documentation used to determine the VOC content of each stripper used at the facility.

10.7.5.3 ~~iii.~~ A description of any non-chemical-based depainting equipment used at the facility, to include the name and type of equipment or technique.

10.7.5.4 ~~iv.~~ Records and a description of all malfunctions of non-chemical-based depainting equipment used at the facility, to include the dates and alternative depainting method~~(s)~~ or methods used.

10.7.5.5 ~~v.~~—A list of any parts, assemblies, or subassemblies normally removed during depainting operations.

10.7.6 ~~6.~~—For any person subject to ~~paragraph (c)(8)~~ 10.3.8 of this ~~Section~~ regulation, a description of the procedures used to ensure that containers are kept closed when not in use and that solvents and other VOC-containing materials are stored in closed containers.

10.8 ~~h.~~—Reporting. Notification of any non-compliance with any requirement of this Section shall be reported to the Department in accordance with ~~Section 4 and 5 of Regulation 24~~ 4.0 and 5.0 of this regulation, as applicable and any other applicable Federal or State reporting requirements.

~~Section 11—~~

11.0 Mobile Equipment Repair and Refinishing.

11/11/2001

11.1 ~~a.~~ Applicability

11.1.1 ~~4.~~ ~~This Section applies~~ The provisions of 11.0 of this regulation apply to any person who applies coatings, for the purpose of protection ~~and/or~~ beautification, to mobile equipment or mobile equipment components in the State of Delaware, except:

11.1.1.1 ~~i.~~—The surface coating process at any automobile assembly plant.

11.1.2.2 ~~ii.~~—Persons who do not receive compensation for the application of the coatings.

11.1.3.3 ~~iii.~~—The application of coatings sold in non-refillable aerosol cans.

11.1.2 ~~2.~~—Any person subject to the requirements of ~~this Section~~ 11.0 of this regulation shall be in compliance on or after October 31, 2003.

11.1.3 ~~3.~~—Any person who is currently subject to a state or federal rule promulgated pursuant to the Clean Air Act Amendments of 1977 by exceeding an applicability threshold is and shall remain subject to those provisions.

11.1.4 ~~4.~~—Compliance with the requirements of ~~this section~~ 11.0 of this regulation are in addition to all other state and federal requirements, to include the requirements of 40 CFR 59, Subpart B, “National Volatile Organic Compound Emission Standards for Automobile Refinish Coatings”.

11.2 ~~b.~~ Definitions. As used in ~~this Section~~ 11.0 of this regulation, all terms not defined herein shall have the meaning given them in the November 15, 1990 Clean Air Act Amendments (CAAA), or in ~~Section 2 of Regulation 24~~ 2.0 of this regulation.

“**Airless Spray**” means a spray coating method in which the coating is atomized by forcing it through a small nozzle at high pressure. The coating is not mixed with air before exiting from the nozzle opening.

“**Electrostatic spray**” means the application of charged atomized paint droplets that are deposited by electrostatic attraction.

“**High Volume Low Pressure**” ~~or “(HVL P)”~~ means a method of spraying a coating, that improves the transfer efficiency while maintaining the air pressure between 0.1 and 10 pounds per square inch gauge (psig).

“Mobile equipment” means any equipment that is physically capable of being driven or drawn upon a highway including, but not limited to, the following types of equipment: automobiles; trucks, truck cabs, truck bodies; buses; motorcycles; ground support vehicles, used in support of aircraft activities at airports; construction vehicles (such as mobile cranes, bulldozers, concrete mixers); farming equipment (such as wheel tractors, plows, and pesticide sprayers); hauling equipment (such as truck trailers, utility bodies, and camper shells); and miscellaneous equipment (such as street cleaners and golf carts).

11.3 ~~e~~-Standards

11.3.1 ~~4~~-Any person subject to the requirements of ~~this Section~~ 11.0 of this regulation shall use only the following application techniques:

11.3.1.1 ~~i~~-Any non-atomized application technique (e.g., Flow/curtain coating, Dip coating, Roller coating, Brush coating, Cotton-tipped swab application coating, Electro-deposition coating, etc.)

11.3.1.2 ~~ii~~-High Volume Low Pressure (HVLP) spraying;

11.3.1.3 ~~iii~~-Electrostatic spray;

11.3.1.4 ~~iv~~-Airless spray;

11.3.1.5 ~~v~~-Any other coating application technique that the person has demonstrated and the Department has determined achieves emission reductions equivalent to HVLP or electrostatic spray.

11.3.2 ~~2~~-The following are exempt from the requirements of ~~paragraph (e)(1)~~ 11.3.1 of this Section regulation:

11.3.2.1 ~~i~~-The use of airbrush application methods for graphics, stenciling, lettering, and other identification markings;

11.3.2.2 ~~ii~~-The applications of coatings to cover finish imperfections equal to or less than 1 inch in diameter.

11.3.3 ~~3~~-Spray guns used to apply coatings to mobile equipment or mobile equipment components shall be cleaned by one of the following methods:

11.3.3.1 ~~i~~-Use of an enclosed spray gun cleaning system that is kept closed when not in use.

11.3.3.2 ~~ii~~-The unatomized discharge of solvent into a paint waste container that is kept closed when not in use.

11.3.3.3 ~~iii~~—The disassembly of the spray gun and cleaning in a vat that is kept closed when not in use.

11.3.3.3 ~~iv~~—The atomized spray into a paint waste container that is fitted with a device designed to capture atomized solvent emissions.

11.3.4 ~~4~~—Any person subject to the provisions of ~~this Section 11.0 of this regulation~~ shall implement the following housekeeping and pollution prevention measures:

11.3.4.1 ~~i~~—Fresh and used coatings, solvent, and cleaning solvents shall be stored in non-absorbent, nonleaking containers. The containers shall be kept closed at all times except when filling or emptying.

11.3.4.2 ~~ii~~—Cloth and paper, or other absorbent applicators, moistened with coatings, solvents, or cleaning solvents shall be stored in closed, non-absorbent, non-leaking containers.

11.3.4.3 ~~iii~~—Handling and transfer procedures shall minimize spills during the transfer of coatings, solvents, and cleaning solvents.

11.3.5 ~~5~~—Any person subject to the requirements of ~~this Section 11.0 of this regulation~~ shall be trained in the proper use and handling of coatings, solvents and waste products in order to minimize the emission of air contaminants.

11.3.5.1 ~~i~~—Proof of training for any person subject to the requirements of ~~this Section 11.0 of this regulation~~ shall be maintained on the facility premises.

11.3.5.2 ~~ii~~—Acceptable forms of training include equipment or paint manufacturer's seminars, classes, workshops, or any other training approved by the Department.

Section 12—

12.0 Surface Coating of Plastic Parts.

11/29/1994

12.1 a. Applicability

12.1.1 ~~1. This Section applies~~ The provisions of 12.0 of this regulation apply to any facility that coats plastic components for the following uses:

12.1.1.1 ~~i. Automotive or other transportation equipment including interior and/or exterior parts for automobiles, trucks (light-, medium-, or heavy-duty), large and small farm machinery, motorcycles, construction equipment, vans, buses, lawnmowers, and other mobile, motorized mobilized equipment.~~

12.1.1.2 ~~ii. Housing and exterior parts for business and commercial machines including, but not limited to, computers, copy machines, typewriters, medical equipment, and entertainment equipment.~~

12.1.2 ~~2. This Section applies~~ The provisions of 12.0 of this regulation apply to in-house coating processes conducted at original equipment manufacturer (OEM) sites, as well as to coating processes conducted by contractors specializing in molding and coating plastic parts, and by job-shops performing OEM coating only. ~~This Section applies~~ The provisions of 12.0 of this regulation apply to coating operations that include coating application (e.g., spraying, dipping, and flow-coating), flash-off areas, and curing ovens.

12.1.3 ~~3. If a metal component that is permanently attached to a plastic part is coated in a spray booth or on a process line where plastic parts are being coated, this Section~~ the 12.0 of this regulation applies to the coating of both the plastic part and the attached metal component.

12.1.4 ~~4. This Section applies~~ does The provisions of 12.0 of this regulation do not apply to the following operations:

12.1.4.1 ~~i. Coating of interior and exterior parts of aircraft.~~

12.1.4.2 ~~ii. Coating of exterior of completely assembled marine vessels.~~

12.1.4.3 ~~iii. Refinishing of aftermarket automobiles, trucks, and other transportation equipment.~~

12.1.4.4 ~~iv. Coating of internal electrical components of business and commercial machines.~~

12.1.4.5 ~~v. Coating of a metal component in a spray booth or on a process line that is permanently attached to a plastic part where~~

both the attached metal component and the plastic part are coated subject to the requirements of ~~Section 13~~ 13.0 of this regulation (Auto and Light-Duty Truck Coating Operations) or to ~~Section 22~~ 22.0 of this regulation (Coating of Miscellaneous Metal Parts).

12.1.5 ~~5.~~—The requirements in ~~paragraph (e)~~ 12.3 of this ~~Section~~ regulation do not apply to plastic parts coating facilities whose plant-wide actual emissions, without control devices, from all plastic parts coating operations, are less than 6.8 kilograms (kg) (15 pounds [lb]) of volatile organic compounds (VOCs) per day.

12.1.6 ~~6.~~—An owner operator of a facility whose emissions are below the applicability threshold in ~~paragraph (a)(5)~~ 12.1.5 of this ~~Section~~ regulation shall comply with the certification, recordkeeping, and reporting requirements listed in ~~Section 4(b) of Regulation 24~~ 4.2 of this regulation.

12.1.7 ~~7.~~—Existing sources affected by ~~this Section~~ 12.0 of this regulation shall comply with the provisions of ~~this Section~~ 12.0 of this regulation as soon as practicable, but no later than April 1, 1996. New, modified, or reconstructed sources affected by ~~this Section~~ 12.0 of this regulation shall comply with the provisions of ~~this Section~~ 12.0 of this regulation upon startup.

12.1.8 ~~8.~~—Any facility that becomes or is currently subject to the provisions of ~~this Section~~ 12.0 of this regulation by exceeding the applicability threshold in ~~paragraph (a)(5)~~ 12.1.5 of this ~~Section~~ regulation shall remain subject to these provisions even if its emissions later fall below the applicability threshold.

12.1.9 ~~9.~~—Any facility that is currently subject to a state or federal rule promulgated pursuant to the Clean Air Act Amendments of 1977 by exceeding an applicability threshold is and shall remain subject to these provisions, even if its throughput or emissions later fall below the applicability threshold.

12.2 ~~b.~~—Definitions. As used in ~~this Section~~ 12.0 of this regulation, all terms not defined herein shall have the meaning given them in the November 15, 1990 Clean Air Act Amendments (CAAA), or in ~~Section 2 of Regulation 24~~ 2.0 of this regulation.

“Add-on control device” means an air pollution control device, such as a carbon adsorber or an incinerator, which reduces the pollution in an exhaust gas. The control device usually does not affect the process being controlled and is thus considered to be an "add-on" technology, as opposed to a reduction in pollution through an alteration to the basic process.

“Adhesion promoter (primer)” means a coating that is applied to thermoplastic olefin (TPO) parts to promote adhesion of subsequent coatings.

“Affected facility” means any apparatus, subject to a standard, that is involved in the coating of plastic parts.

“Aftermarket automobile” means a vehicle that has been purchased from the original equipment manufacturer.

“Basecoat/clearcoat” means a two-step topcoat system in which a highly pigmented, often metallic, basecoat is followed by a clearcoat, resulting in a finish with high-gloss characteristics. It is often used on automotive plastic parts.

“Electromagnetic interference/radio frequency interference (EMI/RFI) coating” means a coating that is used in a plastic business machine housing to attenuate electromagnetic and radio frequency interference signals that would otherwise pass through the plastic housing.

“Flexible coating” means a paint that can withstand dimensional changes.

“High-bake coating” means a coating that is designed to cure at temperatures above 90 degrees Celsius (°C) (194 degrees Fahrenheit [°F]).

“Higher-solids coating” means a coating that contains greater amounts of pigment and binder than a conventional coating. Solids are the non-solvent, non-water ingredients in the coating. A higher-solids coating usually contains more than 60% percent solids by volume.

“Low-bake coating” means a coating that is designed to cure at temperatures lower than 90°C (194°F).

“Nonflexible coating” means a paint that cannot withstand dimensional changes.

“Overspray” means the solids portion of a coating which, when sprayed, fails to adhere to the part being coated. The applied solids plus the overspray solids equal the total coating solids delivered by the spray application system.

“Plastic part” means a piece made from a substance that has been formed from resin through the application of pressure and/or heat.

“Solids content” means the non-solvent, non-water ingredients in the coating, which consist of pigments and binders, that do not evaporate and have the potential to form a cured (dry) film. The solids content can be expressed in terms of volume percent or weight percent.

“Specialty coating” means a coating that is used for unusual job performance requirements, usually in small amounts. These products include but are not limited to adhesion primers, resist coatings, soft coatings, reflective coatings, electrostatic prep coatings, headlamp lens coatings, ink pad printing coatings, stencil coatings, texture coatings (automotive), vacuum metalizing coatings, and gloss flatteners.

“Two-component paint” means a coating that is manufactured in two components that are mixed shortly before use. When mixed, the two liquids rapidly crosslink to form a solid composition.

“Waterborne coating” means a coating that contains greater than ~~5~~ five weight % percent water in its volatile fraction.

12.3 ~~e~~–Standards

12.3.1 ~~4~~–Automotive/Transportation Sector. The VOC content of any automotive/transportation plastic parts surface coating, as applied, shall not exceed the applicable limitations specified in Table 4 12-1 of this regulation.

12.3.2 ~~2~~–Business Machine Sector. The VOC content of any business machine parts surface coating, as applied, shall not exceed the applicable limitations specified in Table ~~2~~ 12-2 of this regulation.

12.3.3 ~~3~~–As an alternative to compliance with the emission limits in paragraphs ~~(c)(1) and (c)(2)~~ 12.3.1 and 12.3.2 of this Section regulation, an owner or operator may meet the requirements of paragraph ~~(d) or (e)~~ 12.4 or 12.5 of this Section regulation.

TABLE 4 12-1. VOC CONTROL LEVELS FOR AUTOMOTIVE/TRANSPORTATION COATINGS

Coating Category	Control Level ^a	
	(lb VOC/gal)	(kg VOC/L)
I. Auto Interiors		
1) High-Bake Colorcoats	4.1	0.49
2) High-Bake Primers	3.8	0.46
3) Low-Bake Colorcoats	3.2	0.38
4) Low-Bake Primers	3.5	0.42
II. Auto Exteriors (Flexible and Non-Flexible)		
1) High-Bake Coatings		
a) Colorcoats	4.6	0.55
b) Clearcoats	4.3	0.52
c) Primers	5.0	0.60
d) Primers-Non-Flexible	4.5	0.54
2) Low-Bake Coatings		
a) Primers	5.5	0.66
b) Red and Black Colorcoats	5.6	0.67
c) Colorcoats - All Other Colors	5.1	0.61
d) Clearcoats	4.5	0.54
III. Auto Specialty		
1) Group (A) Coatings ^b	5.5	0.66
2) Group (B) Coatings ^c	5.9	0.71
3) Group (C) Coatings ^d	6.4	0.77
4) Group (D) Coatings ^e	6.8	0.81
5) Headlamp Lens Coatings	7.4	0.89

- ^a The VOC content values are expressed in units of mass of VOC (pounds [lb] or kilograms [kg]) per volume of coating (gallons [gal] or liters [L]), excluding water and exempt compounds, as applied.
- ^b Group (A) coatings consist of Vacuum Metalizing Basecoats and Texture Coatings.
- ^c Group (B) coatings consist of Black and Reflective Argent Coatings, Soft Specialty Coatings, and Air Bag Cover Coatings.
- ^d Group (C) coatings consist of Gloss Flatteners, Vacuum Metalizing Topcoats, and Texture Topcoat.
- ^e Group (D) coatings consist of Stencil Coatings, Adhesion Primers, Ink Pad Printing Coatings, Electrostatic Prep Coats, and Resist Coatings.

TABLE 2- ~~12-2~~. VOC CONTROL LEVELS FOR BUSINESS MACHINE COATINGS

Coating Category	Control Level ^a	
	(lb VOC/gal)	(kg VOC/L)
I. Primers	1.2	0.14
II. Clearcoats	2.3	0.28
III. Colorcoats/ Texture coats	2.3	0.28
IV. EMI/RFI Coatings	4.0	0.48
V. Specialty Coatings		
1) Soft Coatings	4.3	0.52
2) Plating Resist Coatings	5.9	0.71
3) Plating Sensitizer Coatings	7.1	0.85

^a The VOC content values are expressed in units of mass of VOC (pounds [lb] or kilograms [kg]) per volume of coating (gallons [gal] or liters [L]), excluding water and exempt compounds, as applied.

12.4 ~~d~~—Daily-Weighted Average Limitation. An owner or operator of a plastic parts coating operation in which multiple coatings are applied, all of which are subject to the same numerical emission limits listed in ~~paragraphs (c)(1) or (c)(2) above~~ 12.3.1 or 12.3.2 of this regulation, shall not apply, during the same day, coatings on any operation whose daily-weighted average VOC content, calculated in accordance with the procedure specified in **Appendix C** of ~~Regulation 24~~ this regulation, exceeds the coating VOC content limit for the corresponding coating category.

12.5 ~~e~~—Control Devices

12.5.1 ~~4~~—An owner or operator of a plastic parts coating operation subject to ~~this Section 12.0 of this regulation~~ may comply with ~~this Section 12.0 of this regulation~~ by doing all of the following:

12.5.1.1 ~~i~~—Installing and operating a capture system on that operation.

12.5.1.2 ~~ii~~—Installing and operating a control device on that operation.

12.5.1.3 ~~iii.~~—Determining for each day the overall emission reduction efficiency need to demonstrate compliance. The overall emission reduction needed for a day is the lesser of the value calculated according to the procedure in **Appendix C** of ~~Regulation 24~~ this regulation for that day, or 95% percent.

12.5.1.4 ~~iv.~~—Demonstrating each day that the overall emission reduction efficiency achieved for that day, as determined in **Appendix C** of ~~Regulation 24~~ this regulation, is greater than or equal to the overall emission reduction efficiency required for that day.

12.5.2 ~~2.~~—An owner or operator of a plastic parts coating operation subject to ~~this Section 12.0~~ f this regulation shall ensure that:

12.5.2.1 ~~i.~~—A capture system and a control device are operated at all times the coating operation is in use, and that compliance with ~~this Section 12.0~~ of this regulation is demonstrated through the use of the applicable coating analysis and capture system and control device efficiency test methods specified in **Appendix B**, **Appendix D**, and **Appendix E** of ~~Regulation 24~~ this regulation.

12.5.2.2 ~~ii.~~—The control device is equipped with the applicable monitoring equipment specified in **Appendix D** of ~~Regulation 24~~ this regulation, and that the monitoring equipment is installed, calibrated, operated, and maintained according to the vendor's specifications at all times the control device is in use.

12.6 ~~f.~~—Test Methods. The test methods found in **Appendices A** through **C** of ~~Regulation 24~~ this regulation shall be used to determine compliance with ~~paragraphs (c)(1) and (c)(2)~~ 12.3.1 and 12.3.2 of this ~~Section~~ regulation.

12.7 ~~g.~~—Compliance Certification, Recordkeeping, and Reporting Requirements.

12.7.1 ~~4.~~—An owner or operator of a plastic parts surface coating operation that is exempt from the emission limits listed in ~~paragraphs (c)(1) and (c)(2)~~ 12.3.1 and 12.3.2 of this ~~Section~~ regulation shall comply with the certification, recordkeeping, and reporting requirements listed in ~~Section 4(b) of Regulation 24~~ 4.2 of this regulation.

12.7.2 ~~2.~~—An owner or operator of a plastic parts surface coating operation that is subject to ~~this Section 12.0~~ of this regulation and that is complying with ~~paragraphs (c)(1) and (c)(2)~~ 12.3.1 and 12.3.2 of this ~~Section~~ regulation through the use of compliant coatings shall comply with the certification, recordkeeping, and reporting requirements listed in ~~Section 4(c) of Regulation 24~~ 4.3 of this regulation.

12.7.3 ~~3.~~—An owner or operator of a plastic parts surface coating operation that is subject to ~~this Section 12.0~~ of this regulation and that is

complying with ~~paragraphs (c)(1) and (c)(2)~~ 12.3.1 and 12.3.2 of this ~~Section~~ regulation through the use of daily-weighted averaging shall comply with the certification, recordkeeping, and reporting requirements listed in ~~Section 4(d) of Regulation 24~~ 4.4 of this regulation.

12.7.4 4.—An owner or operator of a plastic parts surface coating operation that is subject to ~~this Section~~ 12.0 of this regulation and that is complying with ~~paragraphs (c)(1) and (c)(2)~~ 12.3.1 and 12.3.2 of this ~~Section~~ regulation through the use of control devices shall comply with the certification, reporting, and recordkeeping requirements listed in ~~Section 4(e) of Regulation 24~~ 4.5 of this regulation.

Section 13—

13.0 Automobile and Light-Duty Truck Coating Operations

01/11/1993

13.1 a. Applicability

13.1.1 4. ~~This Section applies~~ The provisions of 13.0 of this regulation apply to the following coating operations in an automobile or light-duty truck assembly plant: each prime coat operation, each electro-deposition (EDP) prime coat operation, each primer surfacer operation, each topcoat operation, and each final repair operation.

13.1.2 2. ~~The requirements in paragraphs (c)(4), (f), and (i)~~ 13.3.4 and 13.6 and 13.9 of this Section regulation also apply to heavy-duty trucks that use EDP to apply prime coat.

13.1.3 3. ~~Anti-chip coatings, as applied to automobile and light-duty truck components such as, but not limited to, rocker panels, the bottom edge of doors and fenders, and the leading edge of the hood or roof, are considered primer surfacers.~~

13.1.4 4. ~~Application to metal parts of underbody anti-chip coatings (e.g., underbody plastisol) and coatings other than prime, primer surfacer, topcoat, and final repair shall be subject to the requirements of Section 22.2.0 of this regulation (Miscellaneous Metal Parts).~~

13.1.5 5. ~~The requirements in paragraph (c)~~ 13.3 of this Section regulation do not apply to automobile and light-duty truck assembly plants whose plant-wide, actual emissions without control devices are less than 6.8 kilograms (kg) (15 pounds [lb]) of volatile organic compounds (VOCs) per day.

13.1.6 6. ~~An owner or operator of a facility whose emissions are below the applicability threshold in paragraph (a)(5)~~ 13.1.5 of this Section regulation shall comply with the certification, recordkeeping, and reporting requirements in ~~Section 4(b)~~ 4.2 of this regulation.

13.1.7 7. ~~Any facility that becomes or is currently subject to all of the provisions of this Section~~ 13.0 of this regulation by exceeding the applicability threshold in ~~paragraph (a)(5)~~ 13.1.5 of this Section regulation will remain subject to these provisions even if its emissions later fall below the applicability threshold.

13.1.8 8. ~~Any facility that is currently subject to a state or federal rule promulgated pursuant to the Clean Air Act Amendments of 1977 by exceeding an applicability threshold is and will remain subject to these provisions, even if its throughput or emissions later fall below the applicability threshold.~~

13.2 ~~b.~~ Definitions. As used in ~~this Section~~ 13.0 of this regulation, all terms not defined herein shall have the meaning given them in this regulation or in the Clean Air Act Amendments (CAAA) of November 15, 1990, or in ~~Section 2~~ 2.0 of this regulation.

“Application area” means the area where a coating is applied by dipping or spraying.

“Automobile” means a motor vehicle capable of carrying no more than 12 passengers.

“Automobile and light-duty truck body” means the exterior and interior surfaces of an automobile or light-duty truck including, but not limited to, hoods, fenders, cargo boxes, doors, grill opening panels, engine compartment, all or portions of the passenger compartment, and trunk interior.

“Electro-deposition (EDP)” means a method of applying a prime coat by which the automobile or 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.

“EDP prime coat operation” means the application area(~~s~~) or areas, flashoff area(~~s~~) or areas, and oven(~~s~~) or ovens that are used to apply and dry or cure the EDP prime coat on components of automobile and truck bodies on a single assembly line.

“Final repair operation” means the application area(~~s~~) or areas, flashoff area(~~s~~) or areas, and oven(~~s~~) or ovens used to apply and dry or cure coatings that are used to repair topcoat on fully assembled automobiles or light-duty truck bodies from a single assembly line.

“Light-duty truck” means any motor vehicle rated at 3,864 kg (8,500 lb) gross weight or less designed primarily to transport property.

“Prime coat operation” means the application area(~~s~~) or areas, flashoff area(~~s~~) or areas, and oven(~~s~~) or ovens that are used to apply and dry or cure the prime coat on components of automobile and light-duty truck bodies on a single assembly line.

“Primer surfacer operation” means the application area(~~s~~) or areas, flashoff area(~~s~~) or areas, and oven(~~s~~) or ovens that are used to apply and dry or cure primer surfacer between the prime coat and the topcoat operations on components of automobile and light-duty truck bodies on a single assembly line. The primer surfacer coat is also referred to as the "guidecoat."

“Solids turnover ratio (R_T)” means the ratio of total volume of coating solids that is added to the EDP system in a calendar month divided by the total volume design capacity of the EDP system.

“Topcoat” means the final coating(s) or coatings on components of automobile and light-duty truck bodies.

“Topcoat operation” means the application area(s) or areas, flashoff area(s) or areas, and oven(s) or ovens used to apply and dry or cure topcoat on components of automobile and light-duty truck bodies on a single assembly line.

“Topcoat protocol” means the EPA document "Protocol for Determining the Daily VOC Emission Rate of Automobile and Light-Duty Truck Topcoat Operations," EPA 450/3-88-018, December 1988.

“Volume design capacity” means for the EDP system the total liquid volume that is contained in the EDP system (tanks, pumps, recirculating lines, filters, etc.) at the system's designed liquid operating level. The EDP system volume design capacity is designated LE.

13.3 ~~e~~-Standards

13.3.1 ~~4~~—No owner or operator of an automobile or light-duty truck prime coat operation or final repair operation subject to ~~this Section 13.0 of this regulation~~ shall cause or allow on any day the application of any coating on that operation with VOC content, as applied, that does not comply with one (~~4~~) of the following emission limits:

13.3.1.1 ~~i~~—0.14 kilograms per liter (kg/L) (1.2 pounds per gallon [lb/gal]) of coating, excluding water and exempt compounds, as applied, from any prime coat operation.

13.3.1.2 ~~ii~~—0.58 kg/L (4.8 lb/gal) of coating, excluding water and exempt compounds, as applied, from any final repair operation.

13.3.1.3 ~~iii~~—4.10 kg/L (34.2 lb/gal) of solids deposited from any final repair operation.

13.3.2 ~~2~~—No owner or operator of an automobile or light-duty truck topcoating operation subject to ~~this Section 13.0 of this regulation~~ shall cause or allow on any day VOC emissions that do not comply with one (1) of the following:

13.3.2.1 ~~i~~—1.8 kg/L (15.1 lb/gal) of solids deposited.

13.3.2.2 ~~ii~~—0.34 kg/L (2.8 lb/gal) of coating, excluding water and exempt compounds, as applied.

13.3.3 ~~3~~—No owner or operator of an automobile or light-duty truck primer surface operation subject to ~~this Section 13.0 of this regulation~~ shall cause or allow on any day VOC emissions which do not comply with one (~~4~~) of the following:

13.3.3.1 ~~i~~—1.8 kg/L (15.1 lb/gal) of solids deposited.

13.3.3.2 ~~ii.~~ 0.34 kg/L (2.8 lb/gal) of coating, excluding water and exempt compounds, as applied.

13.3.4 ~~4.~~ No owner or operator of an EDP prime coat operation subject to ~~this Section 13.0 of this regulation~~ shall cause or allow on any day the application of any coating on that operation with VOC content, as applied, that exceeds either of the following:

13.3.4.1 ~~i.~~ 0.17 kg/L (1.4 lb/gal) of coating solids from any EDP prime coat operation when the solids turnover ratio (R_T) is 0.16 or greater. ~~RT~~ R_T shall be calculated as follows:

$$R_T = \frac{T_V}{L_E} \quad (13-1)$$

where:

T_V = Total volume of coating solids that is added to the EDP system in a calendar month (liters).

L_E = Volume design capacity of the EDP system (liters).

13.3.4.2 ~~ii.~~ 0.17 x 350 (0.160 - R_T) kg VOC/L of applied coating solids from any EDP prime coat operation when R_T , calculated according to the equation in ~~paragraph (c)(4)(i)~~ 13.3.4.1 of this ~~Section regulation~~, is greater than or equal to 0.040 and less than 0.160.

13.3.4.3 ~~iii.~~ When R_T , calculated according to the equation in ~~paragraph (c)(4)(i)~~ 13.3.4.1 of this ~~Section regulation~~, is less than 0.040 for any EDP prime coat operation, there is no emission limit.

13.3.5 ~~5.~~ As an alternative to compliance with the emission limits in ~~paragraphs (c)(1)(i), (c)(1)(ii), (c)(2)(ii) and (c)(3)(ii)~~ 13.3.1.1, 13.3.1.2, 13.3.2.2 and 13.3.3.2 of this ~~Section regulation~~, an owner or operator may meet the requirements of ~~paragraph (d) or (e)~~ 13.4 or 13.5 of this ~~Section regulation~~.

13.4 ~~d.~~ Daily-weighted average limitation. No owner or operator subject to ~~this Section 13.0 of this regulation~~ shall apply, during any day, coatings in any non-electro-deposition (non-EDP) prime coat, final repair, topcoat, or primer surfacer operation whose daily-weighted average VOC content, calculated in accordance with the procedure specified in **Appendix C** of this regulation, exceeds the applicable emission limits in ~~paragraphs (c)(1), (c)(2)(ii), and (c)(3)(ii)~~ 13.3.1, 13.3.2.2 and 13.3.3.2 of this ~~Section regulation~~.

13.5 ~~e.~~ Control devices

13.5.1 ~~4.~~ An owner or operator subject to ~~this Section 13.0 of this regulation~~ shall comply with the applicable emission limits for any non-EDP prime coat, final repair, topcoat, or primer surfacer operation by:

13.5.1.1 i.—Installing and operating a capture system on that operation.

13.5.1.2 ii.—Installing and operating a control device on that operation.

13.5.1.3 iii.—Determining for each day the overall emission reduction efficiency needed to demonstrate compliance. The overall emission reduction needed for a day is the lesser of the value calculated according to the procedure in 3.0 of Appendix C (e) of this regulation for that day or 95% percent.

13.5.1.4 iv.—Demonstrating each day that the overall emission reduction efficiency achieved for that day, as determined in 3.0 of Appendix D (e) of this regulation, is greater than or equal to the overall emission reduction efficiency required for that day.

13.5.2 2.—An owner or operator subject to ~~this Section~~ 13.0 of this regulation shall ensure that:

13.5.2.1 i.—A capture system and control device are operated at all times the coating operation is in use, and the owner or operator demonstrates compliance with ~~this Section~~ 13.0 of this regulation through the applicable coating analysis and capture system and control device efficiency test methods specified in **Appendix B, Appendix D** and **Appendix E** of this regulation and in accordance with the capture efficiency test methods in **Appendix D of this regulation**.

13.5.2.2 ii.—The control device is equipped with the applicable monitoring equipment specified in 2.0 of Appendix D (b) of this regulation, and the monitoring equipment is installed, calibrated, operated, and maintained according to the vendor's specifications at all times the control device is in use.

13.6 f.—Compliance procedures for EDP prime coat operations

13.6.1 4.—The owner or operator of an EDP prime coat operation subject to ~~this Section~~ 13.0 of this regulation shall use the procedures in 40 CFR 60.393(c)(1) (July 1, 1992) to determine compliance if a capture system and a control device are not used to comply with the emission limits in ~~paragraph (c)(4)(i) or (ii)~~ 13.3.4.1 or 13.3.4.2 of this Section regulation.

13.6.2 2.—The owner or operator of an EDP prime coat operation subject to ~~this Section~~ 13.0 of this regulation shall use the procedures in 40 CFR 60.393(c)(2) (July 1, 1992) to determine compliance if a capture system and a control device that destroys VOC (e.g., incinerator) are used to comply with the emission limits in ~~paragraph (c)(4)(i) or (ii)~~ 13.3.4.1 or 13.3.4.2 of this Section regulation.

13.6.3 3.—The owner or operator of an EDP prime coat operation subject to ~~this Section 13.0 of this regulation~~ shall use the procedures in 40 CFR 60.393(c)(3) (July 1, 1992) to determine compliance if a capture system and a control device that recovers the VOC (e.g., carbon adsorber) are used to comply with the emission limits in ~~paragraph (c)(4)(i) or (ii)~~ 13.3.4.1 or 13.3.4.2 of this Section regulation.

13.7 g.—Test methods

13.7.1 4.—The test methods found in **Appendix A** through **Appendix D** of this regulation shall be used to determine compliance with ~~paragraphs (c)(1), (c)(2)(ii), (c)(3)(ii), and (c)(5)~~ 13.3.1, 13.3.2.2, 13.3.3.2 and 13.3.5 of this Section regulation.

13.7.2 2.—An owner or operator shall use the topcoat protocol to determine compliance with ~~paragraphs (c)(1)(iii), (c)(2)(i) and (c)(3)(i)~~ 13.3.1.3, 13.3.2.1 and 13.3.3.1 of this Section regulation.

13.8 h.—Recordkeeping and reporting for non-EDP prime coat and final repair operations.

13.8.1 4.—An owner or operator of an automobile or light-duty truck coating operation that is exempt from the emission limitations in ~~paragraph (c)(4)~~ 13.3.1 of this ~~Section~~ regulation shall comply with the certification, recordkeeping, and reporting requirements in ~~Section 4(b)~~ 4.2 of this regulation.

13.8.2 2.—An owner or operator of an automobile or light-duty truck coating operation subject to ~~this Section 13.0 of this regulation~~ and complying with ~~paragraph (c)(1)~~ 13.3.1 of this ~~Section~~ regulation by the use of complying coatings shall comply with the certification, recordkeeping, and reporting requirements in ~~Section 4(c)~~ 4.3 of this regulation.

13.8.3 3.—An owner or operator of an automobile or light-duty truck coating operation subject to ~~this Section 13.0 of this regulation~~ and complying with ~~paragraph (c)(1)~~ 13.3.1 of this ~~Section~~ regulation by daily-weighted averaging shall comply with the certification, recordkeeping, and reporting requirements in ~~Section 4(d)~~ 4.4 of this regulation.

13.8.4 4.—An owner or operator of an automobile or light-duty truck coating operation subject ~~this Section 13.0 of this regulation~~ and complying with ~~paragraph (c)(1)~~ 13.3.1 of this ~~Section~~ regulation by the use of control devices shall comply with the testing, reporting, and recordkeeping requirements in ~~Section 4(e)~~ 4.5 of this regulation.

13.9 i.—Recordkeeping and reporting for EDP prime coat operations. An owner or operator of an EDP prime coat operation subject to ~~this Section 13.0 of this regulation~~ and complying with the requirements in ~~paragraph (c)(4)(i), (ii), and~~

(iii) 13.3.4.1, 13.3.4.2 and 13.3.4.3 of this ~~Section~~ regulation shall comply with the following:

13.9.1 ~~4.~~Certification. By November 15, 1993 or upon startup of a new EDP prime coat operation, the owner or operator shall certify to the Department that the coating operation is and will be in compliance with the requirements in ~~paragraph (c)(4)(i) or (ii)~~ 13.3.4.1 or 13.3.4.2 of this ~~Section~~ regulation on and after November 15, 1993, or on and after the initial startup date. Such certification shall include:

13.9.1.1 ~~i.~~The name and location of the facility.

13.9.1.2 ~~ii.~~The address and telephone number of the person responsible for the facility.

13.9.1.3 ~~iii.~~Identification of subject sources.

13.9.1.4 ~~iv.~~A copy of the calculations performed to determine R_T and the calculations performed pursuant to ~~paragraph (f)~~ 13.6 of this ~~Section~~ regulation to demonstrate compliance for the EDP prime coat operation for the month prior to submittal of the certification.

13.9.2 ~~2.~~Recordkeeping. On and after November 15, 1993 or on and after the initial startup date of a new EDP prime coat operation, the owner or operator shall collect and record the following information for each EDP prime coat operation. These records shall be maintained at the facility for at least ~~5~~ five years and shall be made available to the Department upon verbal or written request:

13.9.2.1 ~~i.~~For each day, the total daily volume of coating solids that is added to the EDP system.

13.9.2.2 ~~ii.~~For each month, calculation of R_T using the equation in ~~paragraph (c)(4)(i)~~ 13.3.4.1 of this ~~Section~~ regulation.

13.9.2.3 ~~iii.~~For each month, the calculations used in the compliance determinations specified in ~~paragraph (f)~~ 13.6 of this ~~Section~~ regulation.

13.9.3 ~~3.~~Reporting. On and after November 15, 1993, the owner or operator of an EDP prime coat operation subject to ~~this Section~~ 13.0 of ~~this regulation~~ shall notify the Department in either of the following instances:

13.9.3.1 ~~i.~~Any record showing noncompliance with the appropriate emission limit for the EDP prime coat operation.

13.9.3.2 ~~ii.~~At least 30 calendar days before changing the method of compliance from one of the procedures in ~~paragraph (f)~~ 13.6 of

this ~~Section regulation~~ to another of the procedures in ~~paragraph (f) 13.6 of this regulation~~, the owner or operator shall comply with the certification requirements in ~~paragraph (i)(1) 13.9.1 of this Section regulation~~.

13.10 j.—Reporting and recordkeeping for topcoat and primer surfacer operations.

13.10.1 4.—An owner or operator of an automobile or light-duty truck coating operation subject to this ~~Section 13.0 of this regulation~~ and complying with ~~paragraph (c)(1)(iii), (c)(2)(i) or (c)(3)(i) 13.3.1.3, 13.3.2.1 or 13.3.3.1 of this Section regulation~~ shall comply with the following:

13.10.1.1 i.—Certification. At least 120 days prior to the initial compliance date, the owner or operator of a coating operation subject to the topcoat and primer surfacer limit in ~~paragraphs (c)(1)(iii), (c)(2)(i) and (c)(3)(i) 13.3.1.3, 13.3.2.1 and 13.3.3.1 of this Section regulation~~ shall submit to the Department a detailed proposal specifying the method of demonstrating how the compliance test will be conducted according to the topcoat protocol. The proposal shall include a comprehensive plan (including a rationale) for determining the transfer efficiency at each booth through the use of in-plant or pilot testing; the selection of coatings to be tested (for the purpose of determining transfer efficiency), including the rationale for coating groupings; and a method for tracking coating usage during the transfer efficiency test. Upon approval by the Department, the owner or operator may proceed with the compliance demonstration.

13.10.1.2 ii.—Recordkeeping

13.10.1.2.1 A.—The owner or operator shall maintain at the facility for a period of 5 years all test results, data, and calculations used to determine VOC emissions from each topcoat and each primer surfacer operation according to the topcoat protocol.

13.10.1.2.2 B.—If control devices are used to control emissions from an automobile or light-duty truck topcoat or primer surfacer operation, the owner or operator shall maintain records according to ~~Section 4(e)(2)(vi) through (xi) 4.5.2.6 through 4.5.2.11 of this regulation~~.

13.10.1.3 iii.—Reporting. Any instance of noncompliance with the emission limit in ~~paragraph (c)(1)(iii), (c)(2)(i) or (c)(3)(i) 13.3.1.3, 13.3.2.1 or 13.3.3.1 of this regulation~~ shall be reported to the Department within 45 calendar days.

13.10.2 2.—An owner or operator of an automobile or light-duty truck coating operation subject to this ~~Section 13.0 of this regulation~~ and

complying with paragraphs (c)(2)(ii) and (c)(3)(ii) 13.3.2.2 and 13.3.3.2 of this ~~Section~~ regulation by the use of complying coatings shall comply with the certification, recordkeeping, and reporting requirements in ~~Section 4(c)~~ 4.3 of this regulation.

13.10.3 ~~3~~—An owner or operator of an automobile or light-duty truck coating operation subject to ~~this Section 13.0~~ of this regulation and complying with paragraphs (c)(2)(ii) and (c)(3)(ii) 13.3.2.2 and 13.3.3.2 of this ~~Section~~ regulation by daily-weighted averaging shall comply with the certification, recordkeeping, and reporting requirements in ~~Section 4(d)~~ 4.4 of this regulation.

13.10.4 ~~4~~—An owner or operator of an automobile or light-duty truck coating operation subject to ~~this Section 13.0~~ of this regulation and complying with paragraphs (c)(2)(ii) and (c)(3)(ii) 13.3.2.2 and 13.3.3.2 of this ~~Section~~ regulation by the use of control devices shall comply with the testing, reporting and recordkeeping requirements in ~~Section 4(e)~~ 4.5 of this regulation.

Section 14—
14.0 Can Coating
01/11/1993

14.1 a. Applicability

14.1.1 1. ~~This Section applies~~ The provisions of 14.0 of this regulation apply to any can coating unit used to apply the following coatings: sheet base coat, exterior base coat, interior body spray coat, overvarnish, side seam spray coat, exterior end coat, and end sealing compound coat.

14.1.2 2. ~~The emission limits of this Section 14.0 of this regulation~~ do not apply to can coating units within any facility whose actual emissions without control devices from all can coating units within the facility are less than 6.8 kilograms (kg) (15 pounds [lb]) of volatile organic compounds (VOCs) per day.

14.1.3 3. ~~An owner or operator of a facility whose emissions are below the applicability threshold in paragraph (a)(2) 14.1.2 of this Section regulation shall comply with the certification, recordkeeping, and reporting requirements of paragraph (g)(1) 14.7.1 of this Section regulation.~~

14.1.4 4. ~~Any facility that becomes or is currently subject to the provisions of this Section 14.0 of this regulation by exceeding the applicability threshold in paragraph (a)(2) 14.1.2 of this Section regulation will remain subject to these provisions, even if its emissions later fall below the applicability threshold.~~

14.1.5 5. ~~Any facility that is currently subject to a state or federal rule promulgated pursuant to the Clean Air Act Amendments of 1977 by exceeding an applicability threshold is and will remain subject to these provisions, even if its throughput or emissions have fallen or later fall below the applicability threshold.~~

14.2 b. Definitions. As used in ~~this Section 14.0 of this regulation~~, all terms not defined herein shall have the meaning given them in the November 15, 1990 Clean Air Act Amendments (CAAA), or in ~~Section 2 2.0~~ of this regulation.

“Can” means any cylindrical single-walled container, with or without a top, cover, spout, and/or handle, that is manufactured from metal sheets thinner than 29 gauge (0.0141 in.) and into which solid or liquid materials may be packaged.

“Can coating unit” means a coating unit in which any coating is applied onto the surface of cans or can components.

“End sealing compound coat” means a compound applied onto can ends that functions as a gasket when the end is assembled onto the can.

“**Exterior base coat**” means a coating applied to the exterior of a two-piece can body to provide protection to the metal or to provide background for any lithographic or printing operation.

“**Interior body spray coat**” means a coating applied to the interior of the can body to provide a protective film between the product and the can.

“**Overvarnish**” means a coating applied directly over a design coating or directly over ink to reduce the coefficient of friction, to provide gloss, and to protect the finish against abrasion and corrosion.

“**Sheet basecoat**” means a coating applied to metal in sheet form to serve as either the exterior or interior of two-piece or three-piece can bodies or can ends.

“**Side-seam spray coat**” means a coating applied to the seam of a three-piece can.

“**Three-piece can**” means a can that is made by rolling a rectangular sheet of metal into a cylinder that is soldered, welded, or cemented at the seam and attaching two ends.

“**Two-piece can**” means a can whose body and one end are formed from a shallow cup and to which the other end is later attached.

“**Two-piece can exterior end coat**” means a coating applied by roller coating or spraying to the exterior end of a two-piece can to provide protection to the metal.

14.3 ~~e~~-Standards

14.3.1 ~~4~~—No owner or operator of a can coating unit subject to ~~this Section~~ 14.0 of this regulation shall cause or allow the application of any coating on that unit with VOC content, as applied, that exceeds the limits in ~~paragraphs (c)(1)(i) through (c)(1)(vi)~~ 14.3.1.1 through 14.3.1.6 of this ~~Section~~ regulation.

		kg/L ^a	lb/gal ^a
<u>14.3.1.1</u> (i)	Sheet basecoat and sheet overvarnish	0.34	2.8
<u>14.3.1.2</u> (ii)	Exterior basecoat and overvarnish (two-piece can)	0.34	2.8
<u>14.3.1.3</u> (iii)	Interior body spray coat	0.51	4.2
<u>14.3.1.4</u> (iv)	Two-piece can exterior end coat	0.51	4.2
<u>14.3.1.5</u> (v)	Side seam spray coat	0.66	5.5
<u>14.3.1.6</u> (vi)	End-sealing compound coat	0.44	3.7

^a VOC content values are expressed in units of mass of VOC (kg, lb) per volume of coating (liter [L], gallon [gal]), excluding water and exempt compounds, as applied.

14.3.2 ~~2~~—As an alternative to compliance with the emission limits in ~~paragraph (c)(1)~~ 14.3.1 of this ~~Section~~ regulation, an owner or operator of a can coating unit may comply with the requirements of ~~this Section~~ 14.0

of this regulation by meeting the requirements of ~~paragraph (d) or (e)~~ 14.4 or 14.5 of this Section regulation.

14.4 ~~d.~~ Daily-weighted average limitations

14.4.1 ~~1.~~ No owner or operator of a can coating unit subject to ~~this Section 14.0 of this regulation~~ shall apply, during any day, coatings on that unit whose daily-weighted average VOC content, calculated in accordance with the procedure specified in **Appendix C** of this regulation, exceeds the emission limits in ~~paragraph (e)(1)~~ 14.3.1 of this ~~Section~~ regulation.

14.4.2 ~~2.~~ Notwithstanding any other provision of this regulation, an owner or operator may use the compliance program described in the December 8, 1980, FEDERAL REGISTER (45 FR 80024). This program allows a daily weighted average of coatings between can coating units without a requirement to submit a FIP or SIP revision and without the requirement to meet the provisions of the Emissions Trading Policy Statement (51 FR 43815, December 4, 1986).

14.5 ~~e.~~ Control devices

14.5.1 ~~1.~~ An owner or operator of a can coating unit subject to ~~this Section 14.0 of this regulation~~ may comply with ~~paragraph (e)(2)~~ 14.3.2 of this ~~Section~~ regulation by:

14.5.1.1 ~~i.~~ Installing and operating a capture system on that unit.

14.5.1.2 ~~ii.~~ Installing and operating a control device on that unit.

14.5.1.3 ~~iii.~~ Determining for each day the overall emission reduction efficiency needed to demonstrate compliance. The overall emission reduction needed for a day is the lesser of the value calculated according to the procedure in 3.0 of Appendix C ~~(e)~~ of this regulation for that day or 95% percent.

14.5.1.4 ~~iv.~~ Demonstrating each day that the overall emission reduction efficiency achieved for that day, as determined in 3.0 of Appendix D ~~(e)~~ of this regulation, is greater than or equal to the overall emission reduction efficiency required for that day.

14.5.2 ~~2.~~ An owner or operator of a can coating unit subject to ~~this Section 14.0 of this regulation~~ shall ensure that:

14.5.2.1 ~~i.~~ A capture system and control device are operated at all times that the unit is in operation, and the owner or operator demonstrates compliance with ~~this Section 14.0 of this regulation~~ through the applicable coating analysis and capture system and control device efficiency test methods specified in **Appendix B**, **Appendix D** and **Appendix E** of this regulation and in accordance

with the capture efficiency test methods in **Appendix D** of this regulation.

14.5.2.2 ~~ii~~—The control device is equipped with the applicable monitoring equipment specified in 2.0 of Appendix D ~~(b)~~ of this regulation, and the monitoring equipment is installed, calibrated, operated, and maintained according to the vendor's specifications at all times the control device is in use.

14.6 ~~f~~—Test methods. The test methods found in **Appendix A** through **Appendix D** of this regulation shall be used to determine compliance with ~~this Section~~ 14.0 of this regulation.

14.7 ~~g~~—Recordkeeping and reporting

14.7.1 ~~1~~—An owner or operator of a can coating unit that is exempt from the emission limitations in ~~paragraph (e)~~ 14.3 of this Section regulation shall comply with the certification, recordkeeping, and reporting requirements in ~~Section 4(b)~~ 4.2 of this regulation.

14.7.2 ~~2~~—An owner or operator of a can coating unit subject to ~~this Section~~ 14.0 of this regulation and complying with ~~paragraph (e)~~ 14.3 of this Section regulation by using complying coatings shall comply with the certification, recordkeeping, and reporting requirements in ~~Section 4(c)~~ 4.3 of this regulation.

14.7.3 ~~3~~—An owner or operator of a can coating unit subject to ~~this Section~~ 14.0 of this regulation and complying with ~~paragraph (d)~~ 14.4 of this Section regulation by daily-weighted averaging shall comply with the certification, recordkeeping, and reporting requirements in ~~Section 4(d)~~ 4.4 of this regulation.

14.7.4 ~~4~~—An owner or operator of a can coating unit subject to ~~this Section~~ 14.0 of this regulation and complying with ~~paragraph (e)~~ 14.5 of this Section regulation by using control devices shall comply with the testing, reporting, and recordkeeping requirements in ~~Section 4(e)~~ 4.5 of this regulation.

Section 15—
15.0 Coil Coating
01/11/1993

15.1 a—Applicability

15.1.1 4.—~~This Section applies~~ The provisions of 15.0 of this regulation apply to any coil coating unit.

15.1.2 2.—~~This Section does~~ The provisions of 15.0 of this regulation do not apply to any coil coating unit within a facility whose actual emissions without control devices from all coil coating units within the facility are less than 6.8 kilograms (kg) (15 pounds [lb]) of volatile organic compounds (VOCs) per day.

15.1.3 3.—An owner or operator of a facility whose emissions are below the applicability threshold in ~~paragraph (a)(2)~~ 15.1.2 of this ~~Section~~ regulation shall comply with the certification, recordkeeping, and reporting requirements of ~~paragraph (g)(1)~~ 15.7 of this ~~Section~~ regulation.

15.1.4 4.—Any facility that becomes or is currently subject to the provisions of ~~this Section~~ 15.0 of this regulation by exceeding the applicability threshold in ~~paragraph (a)(2)~~ 15.1.2 of this ~~Section~~ regulation will remain subject to these provisions even if its emissions later fall below the applicability threshold.

15.1.5 5.—Any facility that is currently subject to a state or federal rule promulgated pursuant to the Clean Air Act Amendments of 1977 by exceeding an applicability threshold is and will remain subject to these provisions, even if its throughput or emissions have fallen or later fall below the applicability threshold.

15.2 b—Definitions. As used in ~~this Section~~ 15.0 of this regulation, all terms not defined herein shall have the meaning given them in the November 15, 1990 Clean Air Act Amendments (CAAA), or in ~~Section 2~~ 2.0 of this regulation.

“**Coil**” means any continuous metal strip with thickness of 0.15 millimeter (mm) (0.006 inch [in.]) or more that is packaged in a roll or coil.

“**Coil coating line**” means a web coating line where coating is applied to coil.

“**Coil coating unit**” means a coating application station and its associated flashoff area, drying area, ~~and/or~~ drying oven wherein coating is applied and dried or cured on a coil coating line. A coil coating line may include more than one coil coating unit.

15.3 e—Standards

15.3.1 4.—No owner or operator of a coil coating unit subject to ~~this Section~~ 15.0 of this regulation shall cause or allow the application of any

coating on that unit with VOC content in excess of 0.31 kilograms per liter (kg/L) (2.6 pounds per gallon [lb/gal]) of coating, excluding water and exempt compounds, as applied.

15.3.2 ~~2~~—As an alternative to compliance with the emission limit in ~~paragraph (c)(1)~~ 15.3.1 of this ~~Section~~ regulation, an owner or operator of a coil coating unit may meet the requirements of ~~paragraph (d) or (e)~~ 15.4 or 15.5 of this ~~Section~~ regulation.

15.4 ~~d~~—Daily-weighted average limitation. No owner or operator of a coil coating unit subject to ~~this Section~~ 15.0 of this regulation shall apply, during any day, coatings on that unit whose daily-weighted average VOC content, calculated in accordance with the procedure specified in **Appendix C** of this regulation, exceeds the emission limit in ~~paragraph (c)(1)~~ 15.3.1 of this ~~Section~~ regulation.

15.5 ~~e~~—Control devices

15.5.1 ~~4~~—An owner or operator of a coil coating unit subject to ~~this Section~~ 15.0 of this regulation may comply with ~~this Section~~ 15.0 of this regulation by:

15.5.1.1 ~~i~~—Installing and operating a capture system on that unit.

15.5.1.2 ~~ii~~—Installing and operating a control device on that unit.

15.5.1.3 ~~iii~~—Determining for each day the overall emission reduction efficiency needed to demonstrate compliance. The overall emission reduction needed for a day is the lesser of the value calculated according to the procedure in 3.0 of **Appendix C** ~~(c)~~ of this regulation for that day or 95% ~~percent~~.

15.5.1.4 ~~iv~~—Demonstrating each day that the overall emission reduction efficiency achieved for that day, as determined in 3.0 of **Appendix D** ~~(c)~~ of this regulation, is greater than or equal to the overall emission reduction efficiency required for that day.

15.5.2 ~~2~~—An owner or operator of a coil coating unit subject to ~~this Section~~ 15.0 of this regulation shall ensure that:

15.5.2.1 ~~i~~—A capture system and control device are operated at all times the coating unit is in operation, and the owner or operator demonstrates compliance with ~~this Section~~ 15.0 of this regulation through the applicable coating analysis and capture system and control device efficiency test methods specified in **Appendix B**, **Appendix D** and **Appendix E** of this regulation and in accordance with the capture efficiency test methods in **Appendix D** of this regulation.

15.5.2.2 ~~ii~~—The control device is equipped with the applicable monitoring equipment specified in 2.0 of **Appendix D** ~~(b)~~ of this

regulation, and the monitoring equipment is installed, calibrated, operated, and maintained according to the vendor's specifications at all times the control device is in use.

15.6 ~~f.~~—Test methods. The test methods found in **Appendix A** through **Appendix D** of this regulation shall be used to determine compliance with ~~this Section 15.0~~ of this regulation.

15.7 ~~g.~~—Recordkeeping and reporting

15.7.1 ~~1.~~—An owner or operator of a coil coating unit that is exempt from the emission limitations in ~~paragraph (e) 15.3~~ of this ~~Section regulation~~ shall comply with the certification, recordkeeping, and reporting requirements in ~~Section 4(b)~~ 4.2 of this regulation.

15.7.2 ~~2.~~—An owner or operator of a coil coating unit subject to ~~this Section 15.0 of this regulation~~ and complying with ~~paragraph (e) 15.3~~ of this ~~Section regulation~~ by the use of complying coatings shall comply with the certification, recordkeeping, and reporting requirements in ~~Section 4(e)~~ 4.3 of this regulation.

15.7.3 ~~3.~~—An owner or operator of a coil coating unit subject to ~~this Section 15.0 of this regulation~~ and complying with ~~paragraph (d) 15.4~~ of this ~~Section regulation~~ by daily-weighted averaging shall comply with the certification, recordkeeping, and reporting requirements in ~~Section 4(d)~~ 4.4 of this regulation.

15.7.4 ~~4.~~—An owner or operator of a coil coating unit subject to ~~this Section 15.0 of this regulation~~ and complying with ~~paragraph (e) 15.5~~ of this ~~Section regulation~~ by the use of control devices shall comply with the testing, reporting, and recordkeeping requirements in ~~Section 4(e)~~ 4.5 of this regulation.

Section 16—
16.0 Paper Coating
01/11/1993

16.1 a—Applicability

16.1.1 1.—~~This Section applies~~ The provisions of 16.0 of this regulation apply to any paper coating unit.

16.1.2 2.—~~This Section does~~ The provisions of 16.0 of this regulation do not apply to any paper coating unit within a facility whose actual emissions without control devices from all paper coating units within the facility are less than 6.8 kilograms (kg) (15 pounds [lb]) of volatile organic compounds (VOCs) per day.

16.1.3 3.—An owner or operator of a facility whose emissions are below the applicability threshold in ~~paragraph (a)(2)~~ 16.1.2 of this ~~Section~~ regulation shall comply with the certification, recordkeeping, and reporting requirements of ~~paragraph (g)(1)~~ 16.7.1 of this ~~Section~~ regulation.

16.1.4 4.—Any facility that becomes or is currently subject to the provisions of ~~this Section~~ 16.0 of this regulation by exceeding the applicability threshold in ~~paragraph (a)(2)~~ 16.1.2 of this ~~Section~~ regulation will remain subject to these provisions even if its emissions later fall below the applicability threshold.

16.1.5 5.—Any facility that is currently subject to a state or federal rule promulgated pursuant to the Clean Air Act Amendments of 1977 by exceeding an applicability threshold is and will remain subject to these provisions, even if its throughput or emissions have fallen or later fall below the applicability threshold.

16.2 b—Definitions. As used in ~~this Section~~ 16.0 of this regulation, all terms not defined herein shall have the meaning given them in the November 15, 1990 Clean Air Act Amendments (CAAA), or in ~~Section 2~~ 2.0 of this regulation.

“Paper coating line” means a web coating line where coating is applied to paper. Printing presses are not considered paper coating lines. Products produced on a paper coating line include, but are not limited to, adhesive tapes and labels, book covers, post cards, office copier paper, drafting paper, and pressure sensitive tapes. Paper coating lines include, but are not limited to, application by impregnation or saturation or by the use of roll, knife, or rotogravure coating.

“Paper coating unit” means a coating application station and its associated flashoff area, drying area, and/or oven wherein coating is applied and dried or cured on a paper coating line. A paper coating line may include more than one paper coating unit.

16.3 e—Standards

16.3.1 4.—No owner or operator of a paper coating unit subject to ~~this Section 16.0 of this regulation~~ shall cause, allow, or permit the application of any coating on that unit with VOC content in excess of 0.35 kilograms per liter (kg/L) (2.9 pounds per gallon [lb/gal]) of coating, excluding water and exempt compounds, as applied.

16.3.2 2.—As an alternative to compliance with the emission limit in ~~paragraph (c)(1) 16.3.1 of this Section regulation~~, an owner or operator of a paper coating unit subject to ~~this Section 16.0 of this regulation~~ may meet the requirements of ~~paragraph (d) or (e) 16.4 or 16.5 of this Section regulation~~.

16.4 ~~d.~~—Daily-weighted average limitation. No owner or operator of a paper coating unit subject to ~~this Section 16.0 of this regulation~~ shall apply, during any day, coatings on that unit whose daily-weighted average VOC content, calculated in accordance with the procedure specified in **Appendix C** of this regulation, exceeds the emission limit in ~~paragraph (c)(1) 16.3.1 of this Section regulation~~.

16.5 ~~e.~~—Control devices

16.5.1 4.—An owner or operator of a paper coating unit subject to ~~this Section 16.0 of this regulation~~ may comply with ~~this Section 16.0 of this regulation~~ by:

16.5.1.1 ~~i.~~—Installing and operating a capture system on that unit.

16.5.1.2 ~~ii.~~—Installing and operating a control device on that unit.

16.5.1.3 ~~iii.~~—Determining for each day the overall emission reduction efficiency needed to demonstrate compliance. The overall emission reduction needed for a day is the lesser of the value calculated according to the procedure in 3.0 of Appendix C ~~(c)~~ of this regulation for that day or 95% percent.

16.5.1.4 ~~iv.~~—Demonstrating each day that the overall emission reduction efficiency achieved for that day, as determined in 3.0 of Appendix D ~~(c)~~ of this regulation, is greater than or equal to the overall emission reduction efficiency required for that day.

16.5.2 2.—An owner or operator of a paper coating unit subject to ~~this Section 16.0 of this regulation~~ shall ensure that:

16.5.2.1 ~~i.~~—A capture system and control device are operated at all times the coating unit is in operation, and the owner or operator demonstrates compliance with ~~this Section 16.0 of this regulation~~ through the applicable coating analysis and capture system and control device efficiency test methods specified in **Appendix B**, **Appendix D** and **Appendix E** of this regulation and in accordance

with the capture efficiency test methods in **Appendix D** of this regulation.

16.5.2.2 ~~ii~~—The control device is equipped with the applicable monitoring equipment specified in 2.0 of Appendix D ~~(b)~~ of this regulation, and the monitoring equipment is installed, calibrated, operated, and maintained according to the vendor's specifications at all times the control device is in use.

16.6 ~~f~~—Test methods. The test methods found in **Appendix A** through **Appendix D** of this regulation shall be used to determine compliance with ~~this Section~~ 16.0 of this regulation.

16.7 ~~g~~—Recordkeeping and reporting

16.7.1 ~~4~~—An owner or operator of a paper coating unit that is exempt from the emission limitations in ~~paragraph (c)~~ 16.3 of this ~~Section~~ regulation shall comply with the certification, recordkeeping, and reporting requirements in ~~Section 4(b)~~ 4.2 of this regulation.

16.7.2 ~~2~~—An owner or operator of a paper coating unit subject to ~~this Section~~ 16.0 of this regulation and complying with ~~paragraph (c)~~ 16.3 of this ~~Section~~ regulation by the use of complying coatings shall comply with the certification, recordkeeping, and reporting requirements in ~~Section 4(c)~~ 4.3 of this regulation.

16.7.3 ~~3~~—An owner or operator of a paper coating unit subject to ~~this Section~~ 16.0 of this regulation and complying with ~~paragraph (d)~~ 16.4 of this ~~Section~~ regulation by daily-weighted averaging shall comply with the certification, recordkeeping, and reporting requirements in ~~Section 4(d)~~ 4.4 of this regulation.

16.7.4 ~~4~~—An owner or operator of a paper coating unit subject to ~~this Section~~ 16.0 of this regulation and complying with ~~paragraph (e)~~ 16.5 of this ~~Section~~ regulation by the use of control devices shall comply with the testing, reporting, and recordkeeping requirements in ~~Section 4(e)~~ 4.5 of this regulation.

Section 17—

17.0 Fabric Coating

01/11/1993

17.1 a. Applicability

17.1.1 4. ~~This Section applies~~ The provisions of 17.0 of this regulation apply to any fabric coating unit.

17.1.2 2. ~~This Section does~~ The provisions of 17.0 of this regulation do not apply to any fabric coating unit within a facility whose actual emissions without control devices from all fabric coating units within the facility are less than 6.8 kilograms (kg) (15 pounds [lb]) of volatile organic compounds (VOCs) per day.

17.1.3 3. ~~An owner or operator of a facility whose emissions are below the applicability threshold in paragraph (a)(2)~~ 17.1.2 of this Section regulation shall comply with the certification, recordkeeping, and reporting requirements of paragraph (g)(1) 17.7.1 of this Section regulation.

17.1.4 4. ~~Any facility that becomes or is currently subject to the provisions of this Section~~ 17.0 of this regulation by exceeding the applicability threshold in ~~paragraph (a)(2)~~ 17.1.2 of this Section regulation will remain subject to these provisions even if its emissions later fall below the applicability threshold.

17.1.5 5. ~~Any facility that is currently subject to a state or federal rule promulgated pursuant to the Clean Air Act Amendments of 1977 by exceeding an applicability threshold is and will remain subject to these provisions, even if its throughput or emissions have fallen or later fall below the applicability threshold.~~

17.2 b. ~~Definitions. As used in this Section~~ 17.0 of this regulation, all terms not defined herein shall have the meaning given them in the November 15, 1990 Clean Air Act Amendments (CAAA), or in ~~Section 2~~ 2.0 of this regulation.

“Fabric coating line” means a web coating line where coating is applied to fabric. A fabric printing line is not considered a fabric coating line.

“Fabric coating unit” means a coating application station and its associated flashoff area, drying area, and/or oven wherein coating is applied and dried or cured in a fabric coating line. A fabric coating line may include more than one fabric coating unit.

17.3 e. Standards

17.3.1 4. ~~No owner or operator of a fabric coating unit subject to this Section~~ 17.0 of this regulation shall cause or allow the application of any coating on that unit with VOC content in excess of 0.35 kilogram per liter

(kg/L) (2.9 pounds per gallon [lb/gal]) of coating, excluding water and exempt compounds, as applied.

17.3.2 ~~2.~~ As an alternative to compliance with the emission limit in ~~paragraph (c)(1)~~ 17.3.1 of this ~~Section~~ regulation, an owner or operator of a fabric coating unit subject to ~~this Section~~ 17.0 of this regulation may meet the requirements of ~~paragraph (d) or (e)~~ 17.4 or 17.5 of this ~~Section~~ regulation.

17.4 ~~d.~~ Daily-weighted average limitation. No owner or operator of a fabric coating unit subject to ~~this Section~~ 17.0 of this regulation shall apply, during any day, coatings on that unit whose daily-weighted average VOC content, calculated in accordance with the procedure specified in **Appendix C** of this regulation, exceeds the emission limit in ~~paragraph (c)(1)~~ 17.3.1 of this ~~Section~~ regulation.

17.5 ~~e.~~ Control devices

17.5.1 ~~4.~~ An owner or operator of a fabric coating unit subject to ~~this Section~~ 17.0 of this regulation may comply with ~~this Section~~ 17.0 of this regulation by:

17.5.1.1 ~~i.~~ Installing and operating a capture system on that unit.

17.5.1.2 ~~ii.~~ Installing and operating a control device on that unit.

17.5.1.3 ~~iii.~~ Determining for each day the overall emission reduction efficiency needed to demonstrate compliance. The overall emission reduction needed for a day is the lesser of the value calculated according to the procedure in 3.0 of Appendix C ~~(c)~~ of this regulation for that day or 95% percent.

17.5.1.4 ~~iv.~~ Demonstrating each day that the overall emission reduction efficiency achieved for that day, as determined in 3.0 of Appendix D ~~(c)~~ of this regulation, is greater than or equal to the overall emission reduction efficiency required for that day.

17.5.2 ~~2.~~ An owner or operator of a fabric coating unit subject to ~~this Section~~ 17.0 of this regulation shall ensure that:

17.5.2.1 ~~i.~~ A capture system and control device are operated at all times the coating unit is in operation, and the owner or operator demonstrates compliance with ~~this Section~~ 17.0 of this regulation through the applicable coating analysis and capture system and control device efficiency test methods specified in **Appendix B**, **Appendix D** and **Appendix E** of this regulation and in accordance with the capture efficiency test methods in **Appendix D** of this regulation.

17.5.2.2 ~~ii.~~ The control device is equipped with the applicable monitoring equipment specified in 2.0 of Appendix D ~~(b)~~ of this

regulation, and the monitoring equipment is installed, calibrated, operated, and maintained according to the vendor's specifications at all times the control device is in use.

17.6 ~~f.~~—Test methods. The test methods found in **Appendix A** through **Appendix D** of this regulation shall be used to determine compliance with ~~this Section 17.0~~ of this regulation.

17.7 ~~g.~~—Recordkeeping and reporting

17.7.1 ~~4.~~—An owner or operator of a fabric coating unit that is exempt from the emission limitations in ~~paragraph (c) 17.3~~ of this Section regulation shall comply with the certification, recordkeeping, and reporting requirements in ~~Section 4(b) 4.2~~ of this regulation.

17.7.2 ~~2.~~—An owner or operator of a fabric coating unit subject to ~~this Section 17.0 of this regulation~~ and complying with ~~paragraph (c) 17.3~~ of this Section regulation by the use of complying coatings shall comply with the certification, recordkeeping, and reporting requirements in ~~Section 4(c) 4.3~~ of this regulation.

17.7.3 ~~3.~~—An owner or operator of a fabric coating unit subject to ~~this Section 17.0 of this regulation~~ and complying with ~~paragraph (d) 17.4~~ of this Section regulation by daily-weighted averaging shall comply with the certification, recordkeeping, and reporting requirements in ~~Section 4(d) 4.4~~ of this regulation.

17.7.4 ~~4.~~—An owner or operator of a fabric coating unit subject to ~~this Section 17.0 of this regulation~~ and complying with ~~paragraph (e) 17.5~~ of this Section regulation by the use of control devices shall comply with the testing, reporting, and recordkeeping requirements in ~~Section 4(e) 4.5~~ of this regulation.

Section 18—
18.0 Vinyl Coating
01/11/1993

18.1 a—Applicability

18.1.1 4.—~~This Section applies~~ The provisions of 18.0 of this regulation apply to any vinyl coating line.

18.1.2 2.—~~This Section does~~ The provisions of 18.0 of this regulation do not apply to:

18.1.2.1 i.—Application of vinyl plastisol to fabric to form the substrate that is subsequently coated.

18.1.2.2 ii.—Any vinyl coating line within a facility whose actual emissions without control devices from all vinyl coating lines within the facility are less than 6.8 kilograms (kg) (15 pounds [lb]) of volatile organic compounds (VOCs) per day.

18.1.3 3.—An owner or operator of a facility whose emissions are below the applicability threshold in ~~paragraph (a)(2)(ii)~~ 18.1.2.2 of this ~~Section~~ regulation shall comply with the certification, recordkeeping, and reporting requirements of ~~paragraph (g)(1)~~ 18.7.1 of this ~~Section~~ regulation.

18.1.4 4.—Any facility that becomes or is currently subject to the provisions of ~~this Section~~ 18.0 of this regulation by exceeding the applicability threshold in ~~paragraph (a)(2)(ii)~~ 18.1.2.2 of this ~~Section~~ regulation will remain subject to these provisions even if its emissions later fall below the applicability threshold.

18.1.5 5.—Any facility that is currently subject to a state or federal rule promulgated pursuant to the Clean Air Act Amendments of 1977 by exceeding an applicability threshold is and will remain subject to these provisions, even if its throughput or emissions have fallen or later fall below the applicability threshold.

18.2 b—Definitions. As used in ~~this Section~~ 18.0 of this regulation, all terms not defined herein shall have the meaning given them in the November 15, 1990 Clean Air Act Amendments (CAAA), or in ~~Section 2~~ 2.0 of this regulation.

“Vinyl coating line” means a web coating line where a decorative, functional, or protective coating is applied to a continuous web of vinyl or vinyl-coated fabric. Lines used for coating ~~and/or~~ printing on vinyl and coating ~~and/or~~ printing on urethane are considered vinyl coating lines.

18.3 e—Standards

18.3.1 4.—No owner or operator of a vinyl coating line subject to ~~this Section~~ 18.0 of this regulation shall cause or allow the application of any

coating on that line with VOC content in excess of 0.45 kilograms per liter (kg/L) (3.8 pounds per gallon [lb/gal]) of coating, excluding water and exempt compounds, as applied.

18.3.2 2.—As an alternative to compliance with the emission limit in ~~paragraph (e)(1)~~ 18.3.1 of this ~~Section~~ regulation, an owner or operator of a vinyl coating line subject to ~~this Section~~ 18.0 of this regulation may meet the requirements of ~~paragraph (d) or (e)~~ 18.4 or 18.5 of this ~~Section~~ regulation.

18.4 ~~d.~~—Daily-weighted average limitation. No owner or operator of a vinyl coating line subject to ~~this Section~~ 18.0 of this regulation shall apply, during any day, coatings on any such line whose daily-weighted average VOC content, calculated in accordance with the procedure specified in **Appendix C** of this regulation, exceeds the emission limit in ~~paragraph (e)(1)~~ 18.3.1 of this ~~Section~~ regulation.

18.5 ~~e.~~—Control devices

18.5.1 4.—An owner or operator of a vinyl coating line subject to ~~this Section~~ 18.0 of this regulation may comply with ~~this Section~~ 18.0 of this regulation by:

18.5.1.1 ~~i.~~—Installing and operating a capture system on that line.

18.5.1.2 ~~ii.~~—Installing and operating a control device on that line.

18.5.1.3 ~~iii.~~—Determining for each day the overall emission reduction efficiency needed to demonstrate compliance. The overall emission reduction needed for a day is the lesser of the value calculated according to the procedure in 3.0 of Appendix C ~~(e)~~ of this regulation for that day or 95% percent.

18.5.1.4 ~~iv.~~—Demonstrating each day that the overall emission reduction efficiency achieved for that day, as determined in 3.0 of Appendix D ~~(e)~~ of this regulation, is greater than or equal to the overall emission reduction efficiency required for that day.

18.5.2 2.—An owner or operator of a vinyl coating line subject to ~~this Section~~ 18.0 of this regulation shall ensure that:

18.5.2.1 ~~i.~~—A capture system and control device are operated at all times that the line is in operation, and the owner or operator demonstrates compliance with ~~this Section~~ 18.0 of this regulation through the applicable coating analysis and capture system and control device efficiency test methods specified in **Appendix B**, **Appendix D** and **Appendix E** of this regulation and in accordance with the capture efficiency test methods in **Appendix D** of this regulation.

18.5.2.2 ~~ii.~~—The control device is equipped with the applicable monitoring equipment specified in 2.0 of Appendix D ~~(b)~~ of this regulation, and the monitoring equipment is installed, calibrated, operated, and maintained according to the vendor's specifications at all times the control device is in use.

18.6 ~~f.~~—Test methods. The test methods found in **Appendix A** through **Appendix D** of this regulation shall be used to determine compliance with ~~this Section~~ 18.0 of this regulation.

18.7 ~~g.~~—Recordkeeping and reporting

18.7.1 ~~4.~~—An owner or operator of a vinyl coating line that is exempt from the emission limitations in ~~paragraph (c)~~ 18.3 of this Section regulation shall comply with the certification, recordkeeping, and reporting requirements in ~~Section 4(b)~~ 4.2 of this regulation.

18.7.2 ~~2.~~—An owner or operator of a vinyl coating line subject to ~~this Section~~ 18.0 of this regulation and complying with ~~paragraph (c)~~ 18.3 of this ~~Section~~ regulation by the use of complying coatings shall comply with the certification, recordkeeping, and reporting requirements in ~~Section 4(e)~~ 4.3 of this regulation.

18.7.3 ~~3.~~—An owner or operator of a vinyl coating line subject to ~~this Section~~ 18.0 of this regulation and complying with ~~paragraph (d)~~ 18.4 of this ~~Section~~ regulation by daily-weighted averaging shall comply with the certification, recordkeeping, and reporting requirements in ~~Section 4(d)~~ 4.4 of this regulation.

18.7.4 ~~4.~~—An owner or operator of a vinyl coating line subject to ~~this Section~~ 18.0 of this regulation and complying with ~~paragraph (e)~~ 18.5 of this ~~Section~~ regulation by the use of control devices shall comply with the testing, reporting, and recordkeeping requirements in ~~Section 4(e)~~ 4.5 of this regulation.

~~Section 19—~~

19.0 Coating of Metal Furniture

01/11/1993

19.1 ~~a~~—Applicability

19.1.1 ~~1.~~ ~~This Section applies~~ The provisions of 19.0 of this regulation apply to any metal furniture coating unit.

19.1.2 ~~2.~~ ~~This Section does~~ The provisions of 19.0 of this regulation do not apply to any metal furniture coating unit within a facility whose actual emissions without control devices from all metal furniture coating units within the facility are less than 6.8 kilograms (kg) (15 pounds [lb]) of volatile organic compounds (VOCs) per day.

19.1.3 ~~3.~~ ~~An owner or operator of a facility whose emissions are below the applicability threshold in paragraph (a)(2)~~ 19.1.2 of this ~~Section~~ regulation shall comply with the certification, recordkeeping, and reporting requirements of ~~paragraph (g)(4)~~ 19.7.1 of this ~~Section~~ regulation.

19.1.4 ~~4.~~ ~~Any facility that becomes or is currently subject to the provisions of this Section~~ 19.0 of this regulation by exceeding the applicability threshold in ~~paragraph (a)(2)~~ 19.1.2 of this ~~Section~~ regulation will remain subject to these provisions even if its emissions later fall below the applicability threshold.

19.1.5 ~~5.~~ ~~Any facility that is currently subject to a state or federal rule promulgated pursuant to the Clean Air Act Amendments of 1977 by exceeding an applicability threshold is and will remain subject to these provisions, even if its throughput or emissions have fallen or later fall below the applicability threshold.~~

19.2 ~~b.~~ ~~Definitions.~~ As used in ~~this Section~~ 19.0 of this regulation, all terms not defined herein shall have the meaning given them in the November 15, 1990 Clean Air Act Amendments, or in ~~Section 2~~ 2.0 of this regulation.

“Metal furniture” means any furniture piece made of metal or any metal part that will be assembled with other metal, wood, fabric, plastic, or glass parts to form a furniture piece including, but not limited to, tables, chairs, waste baskets, beds, desks, lockers, benches, shelving, file cabinets, and room dividers. This definition shall not apply to the coating of miscellaneous metal parts or products pursuant to ~~Section 22~~ 22.0 of this regulation.

“Metal furniture coating unit” means a coating unit in which a protective, decorative, or functional coating is applied onto the surface of metal furniture.

19.3 ~~e.~~—Standards

19.3.1 ~~4.~~ ~~No owner or operator of a metal furniture coating unit subject to this Section~~ 19.0 of this regulation shall cause or allow the application

of any coating on that unit with VOC content in excess of 0.36 kilograms per liter (kg/L) (3.0 pounds per gallon [lb/gal]) of coating, excluding water and exempt compounds, as applied.

19.3.2 ~~2.~~—As an alternative to compliance with the emission limit in ~~paragraph (c)(1)~~ 19.3.1 of this ~~Section~~ regulation, an owner or operator of a metal furniture coating unit may meet the requirements of ~~paragraph (d)~~ or (e) 19.4 or 19.5 of this ~~Section~~ regulation.

19.4 ~~d.~~—Daily-weighted average limitation. No owner or operator of a metal furniture coating unit subject to ~~this Section~~ 19.0 of this regulation shall apply, during any day, coatings on that unit whose daily-weighted average VOC content, calculated in accordance with the procedure specified in **Appendix C** of this regulation, exceeds the emission limit in ~~paragraph (c)(1)~~ 19.3.1 of this ~~Section~~ regulation.

19.5 ~~e.~~—Control devices

19.5.1 ~~4.~~—An owner or operator of a metal furniture coating unit subject to ~~this Section~~ 19.0 of this regulation may comply with ~~this Section~~ 19.0 of this regulation by:

19.5.1.1 ~~i.~~—Installing and operating a capture system on that unit.

19.5.1.2 ~~ii.~~—Installing and operating a control device on that unit.

19.5.1.3 ~~iii.~~—Determining for each day the overall emission reduction efficiency needed to demonstrate compliance. The overall emission reduction needed for a day is the lesser of the value calculated according to the procedure in 3.0 of Appendix C ~~(c)~~ of this regulation for that day or 95% ~~percent~~.

19.5.1.4 ~~iv.~~—Demonstrating each day that the overall emission reduction efficiency achieved for that day, as determined in 3.0 of Appendix D ~~(c)~~ of this regulation, is greater than or equal to the overall emission reduction efficiency required for that day.

19.5.2 ~~2.~~—An owner or operator of a metal furniture coating unit subject to ~~this Section~~ 19.0 of this regulation shall ensure that:

19.5.2.1 ~~i.~~—A capture system and control device are operated at all times that the unit is in operation, and the owner or operator demonstrates compliance with ~~this Section~~ 19.0 of this regulation through the applicable coating analysis and capture system and control device efficiency test methods specified in **Appendix B**, **Appendix D** and **Appendix E** of this regulation and in accordance with the capture efficiency test methods in **Appendix D** of this regulation.

19.5.2.2 ii.—The control device is equipped with the applicable monitoring equipment specified in 2.0 of Appendix D ~~(b)~~ of this regulation, and the monitoring equipment is installed, calibrated, operated, and maintained according to the vendor's specifications at all times the control device is in use.

19.6 f.—Test methods. The test methods found in **Appendix A** through **Appendix D** of this regulation shall be used to determine compliance with ~~this Section~~ 19.0 of this regulation.

19.7 g.—Recordkeeping and reporting

19.7.1 4.—An owner or operator of a metal furniture coating unit that is exempt from the emission limitations in ~~paragraph (c)~~ 19.3 of this Section regulation shall comply with the certification, recordkeeping, and reporting requirements in ~~Section 4(b)~~ 4.2 of this regulation.

19.7.2 2.—An owner or operator of a metal furniture coating unit subject to ~~this Section~~ 19.0 of this regulation and complying with ~~paragraph (c)~~ 19.3 of this Section regulation by the use of complying coatings shall comply with the certification, recordkeeping, and reporting requirements in ~~Section 4(c)~~ 4.3 of this regulation.

19.7.3 3.—An owner or operator of a metal furniture coating unit subject to ~~this Section~~ 19.0 of this regulation and complying with ~~paragraph (d)~~ 19.4 of this Section regulation by daily-weighted averaging shall comply with the certification, recordkeeping, and reporting requirements in ~~Section 4(d)~~ 4.4 of this regulation.

19.7.4 4.—An owner or operator of a metal furniture coating unit subject to ~~this Section~~ 19.0 of this regulation and complying with ~~paragraph (e)~~ 19.5 of this Section regulation by the use of control devices shall comply with the testing, reporting, and recordkeeping requirements in ~~Section 4(e)~~ 4.5 of this regulation.

Section 20—
20.0 Coating of Large Appliances
01/11/1993

20.1 a. Applicability

20.1.1 1. ~~This Section applies~~ The provisions of 20.0 of this regulation apply to any large appliance coating unit.

20.1.2 2. ~~This Section does~~ The provisions of 20.0 of this regulation do not apply to:

20.1.2.1 i. ~~Any large appliance coating unit within a facility whose actual emissions without control devices from all large appliance coating units within the facility are less than 6.8 kilograms (kg) (15 pounds [lb]) of volatile organic compounds (VOCs) per day.~~

20.1.2.2 ii. ~~The use of quick-drying lacquers for repair of scratches and nicks that occur during assembly, provided that the volume of coating does not exceed 0.95 liter (L) (0.25 gallon [gal]) in any one 8-hour period.~~

20.1.3 3. ~~An owner or operator of a facility whose emissions are below the applicability threshold in paragraph (a)(2) 20.1.2 of this Section regulation shall comply with the certification, recordkeeping, and reporting requirements of paragraph (g)(1) 20.7.1 of this Section regulation.~~

20.1.4 4. ~~Any facility that becomes or is currently subject to the provisions of this Section 20.0 of this regulation by exceeding the applicability threshold in paragraph (a)(2) 20.1.2 of this Section regulation will remain subject to these provisions even if its emissions or coating volume used later fall below the applicability thresholds.~~

20.1.5 5. ~~Any facility that is currently subject to a state or federal rule promulgated pursuant to the Clean Air Act Amendments of 1977 by exceeding an applicability threshold is and will remain subject to these provisions, even if its throughput or emissions have fallen or later fall below the applicability threshold.~~

20.2 b. Definitions. As used in ~~this Section 20.0 of this regulation~~, all terms not defined herein shall have the meaning given them in the November 15, 1990 Clean Air Act Amendments (CAAA), or in ~~Section 2 2.0~~ of this regulation.

“Large appliance” means any residential or commercial washer, dryer, range, refrigerator, freezer, water heater, dishwasher, trash compactor, air conditioner, or other similar products under Standard Industrial Classification Code 363.

“Large appliance coating unit” means a coating unit in which any protective, decorative, or functional coating is applied onto the surface of component metal

parts (including, but not limited to, doors, cases, lids, panels, and interior parts) of large appliances.

20.3 ~~e~~-Standards

20.3.1 ~~4~~-No owner or operator of a large appliance coating unit subject to ~~this Section 20.0 of this regulation~~ shall cause or allow the application of any coating on that unit with VOC content in excess of 0.34 kilograms per liter (kg/L) (2.8 pounds per gallon [lb/gal]) of coating, excluding water and exempt compounds, as applied.

20.3.2 ~~2~~-As an alternative to compliance with the emission limit in ~~paragraph (c)(1) 20.3.1 of this Section regulation~~, an owner or operator of a large appliance coating unit subject to ~~this Section 20.0 of this regulation~~ may meet the requirements of ~~paragraph (d) or (e) 20.4 or 20.5 of this Section regulation~~.

20.4 ~~d~~-Daily-weighted average limitation. No owner or operator of a large appliance coating unit subject to ~~this Section 20.0 of this regulation~~ shall apply, during any day, coatings on that unit whose daily-weighted average VOC content, calculated in accordance with the procedure specified in **Appendix C** of this regulation, exceeds the emission limit in ~~paragraph (c)(1) 20.3.1 of this Section regulation~~.

20.5 ~~e~~-Control devices

20.5.1 ~~4~~-An owner or operator of a large appliance coating unit subject to ~~this Section 20.0 of this regulation~~ may comply with ~~this Section 20.0 of this regulation~~ by:

20.5.1.1 ~~i~~-Installing and operating a capture system on that unit.

20.5.1.2 ~~ii~~-Installing and operating a control device on that unit.

20.5.1.3 ~~iii~~-Determining for each day the overall emission reduction efficiency needed to demonstrate compliance. The overall emission reduction needed for a day is the lesser of the value calculated according to the procedure in 3.0 of Appendix C ~~(c)~~ of this regulation for that day or 95% percent.

20.5.1.4 ~~iv~~-Demonstrating each day that the overall emission reduction efficiency achieved for that day, as determined in 3.0 of Appendix D ~~(c)~~ of this regulation, is greater than or equal to the overall emission reduction efficiency required for that day.

20.5.2 ~~2~~-An owner or operator of a large appliance coating unit subject to ~~this Section 20.0 of this regulation~~ shall ensure that:

20.5.2.1 ~~i~~-A capture system and control device are operated at all times that the unit is in operation, and the owner or operator

demonstrates compliance with ~~this Section 20.0 of this regulation~~ through the applicable coating analysis and capture system and control device efficiency test methods specified in **Appendix B**, **Appendix D** and **Appendix E** of this regulation and in accordance with the capture efficiency test methods in **Appendix D** of this regulation.

20.5.2.2 ii.—The control device is equipped with the applicable monitoring equipment specified in 2.0 of Appendix D ~~(b)~~ of this regulation, and the monitoring equipment is installed, calibrated, operated, and maintained according to the vendor's specifications at all times the control device is in use.

20.6 f.—Test methods. The test methods found in **Appendix A** through **Appendix D** of this regulation shall be used to determine compliance with ~~this Section 20.0 of this regulation~~.

20.7 g.—Recordkeeping and reporting

20.7.1 1.—An owner or operator of a large appliance coating unit that is exempt from the emission limitations in ~~paragraph (c) 20.3~~ of this ~~Section regulation~~ shall comply with the certification, recordkeeping, and reporting requirements in ~~Section 4(b) 4.2~~ of this regulation.

20.7.2 2.—An owner or operator of a large appliance coating unit subject to ~~this Section 20.0 of this regulation~~ and complying with ~~paragraph (c) 20.3~~ of this ~~Section regulation~~ by the use of complying coatings shall comply with the certification, recordkeeping, and reporting requirements in ~~Section 4(c) 4.3~~ of this regulation.

20.7.3 3.—An owner or operator of a large appliance coating unit subject to ~~this Section 20.0 of this regulation~~ and complying with ~~paragraph (d) 20.4~~ of this ~~Section regulation~~ by daily-weighted averaging shall comply with the certification, recordkeeping, and reporting requirements in ~~Section 4(d) 4.4~~ of this regulation.

20.7.4 4.—An owner or operator of a large appliance coating unit subject to ~~this Section 20.0 of this regulation~~ and complying with ~~paragraph (e) 20.5~~ of this ~~Section regulation~~ by the use of control devices shall comply with the testing, reporting, and recordkeeping requirements in ~~Section 4(e) 4.5~~ of this regulation.

Section 21—

21.0 Coating of Magnet Wire

11/29/1994

21.1 a. ~~Applicability~~

21.1.1 4. ~~This Section applies~~ The provisions of 21.0 of this regulation apply to any magnet wire coating unit.

21.1.2 2. ~~This Section does~~ The provisions of 21.0 of this regulation do not apply to any magnet wire coating unit within a facility whose emissions without control devices from all magnet wire coating units within the facility are less than 6.8 kilograms (kg) (15 pounds [lb]) of volatile organic compounds (VOCs) per day.

21.1.3 3. ~~An owner or operator of a facility whose emissions are below the applicability threshold in paragraph (a)(2)~~ 21.1.2 of this Section regulation shall comply with the certification, recordkeeping, and reporting requirements of paragraph (g)(1) 21.7.1 of this Section regulation.

21.1.4 4. ~~Any facility that becomes or is currently subject to the provisions of this Section~~ 21.0 of this regulation by exceeding the applicability threshold in paragraph (a)(2) 21.1.2 of this Section regulation will remain subject to these provisions even if its emissions later fall below the applicability threshold.

21.1.5 5. ~~Any facility that is currently subject to a state or federal rule promulgated pursuant to the Clean Air Act Amendments of 1977 by exceeding an applicability threshold is and will remain subject to these provisions, even if its throughput or emissions have fallen or later fall below the applicability threshold.~~

21.2 b. ~~Definitions. As used in this Section~~ 21.0 of this regulation, all terms not defined herein shall have the meaning given them in the November 15, 1990 Clean Air Act Amendments (CAAA), or in Section 2 2.0 of this regulation.

“Magnet wire coating unit” means a coating unit in which an electrically insulating varnish or enamel is applied onto the surface of wire for use in electrical machinery.

21.3 e. ~~Standards~~

21.3.1 4. ~~No owner or operator of a magnet wire coating unit subject to this Section~~ 21.0 of this regulation shall cause or allow the use of any coating with VOC content in excess of 0.20 kilograms per liter (kg/L) (1.7 pounds per gallon [lb/gal]) of coating, excluding water and exempt compounds, as applied.

21.3.2 2. ~~As an alternative to compliance with the emission limit in paragraph (c)(1)~~ 21.3.1 of this Section regulation, an owner or operator of

a magnet wire coating unit subject to ~~this Section 21.0 of this regulation~~ may meet the requirements of ~~paragraph (d) or (e) 21.4 or 21.5 of this Section regulation.~~

21.4 ~~d.~~ Daily-weighted average limitation. No owner or operator of a magnet wire coating unit subject to ~~this Section 21.0 of this regulation~~ shall apply, during any day, coatings on that unit whose daily-weighted average VOC content, calculated in accordance with the procedure specified in **Appendix C** of this regulation, exceeds the emission limit in ~~paragraph (c)(1) 21.3.1 of this Section regulation.~~

21.5 ~~e.~~ Control devices

21.5.1 ~~4.~~ An owner or operator of a magnet wire coating unit subject to ~~this Section 21.0 of this regulation~~ may comply with ~~this Section 21.0 of this regulation~~ by:

21.5.1.1 ~~i.~~ Installing and operating a capture system on that unit.

21.5.1.2 ~~ii.~~ Installing and operating a control device on that unit.

21.5.1.3 ~~iii.~~ Determining for each day the overall emission reduction efficiency needed to demonstrate compliance. The overall emission reduction needed for a day is the lesser of the value calculated according to the procedure in 3.0 of Appendix C ~~(c)~~ of this regulation for that day or 95% percent.

21.5.1.4 ~~iv.~~ Demonstrating each day that the overall emission reduction efficiency achieved for that day, as determined in 3.0 of Appendix D ~~(c)~~ of this regulation, is greater than or equal to the overall emission reduction efficiency required for that day.

21.5.2 ~~2.~~ An owner or operator of a magnet wire coating unit subject to ~~this Section 21.0 of this regulation~~ shall ensure that:

21.5.2.1 ~~i.~~ A capture system and control device are operated at all times that the unit is in operation, and the owner or operator demonstrates compliance with ~~this Section 21.0 of this regulation~~ through the applicable coating analysis and capture system and control device efficiency test methods specified in **Appendix B**, **Appendix D** and **Appendix E** of this regulation and in accordance with the capture efficiency test methods in **Appendix D** of this regulation.

21.5.2.2 ~~ii.~~ The control device is equipped with the applicable monitoring equipment specified in 2.0 of Appendix D ~~(b)~~ of this regulation, and the monitoring equipment is installed, calibrated, operated, and maintained according to the vendor's specifications at all times the control device is in use.

21.6 ~~f.~~—Test methods. The test methods found in **Appendix A** through **Appendix D** of this regulation shall be used to determine compliance with ~~this Section 21.0 of this regulation.~~

21.7 ~~g.~~—Recordkeeping and reporting

21.7.1 ~~4.~~—An owner or operator of a magnet wire coating unit that is exempt from the emission limitations in ~~paragraph (c) 21.3~~ of this ~~Section regulation~~ shall comply with the certification, recordkeeping, and reporting requirements in ~~Section 4(b) 4.2~~ of this regulation.

21.7.2 ~~2.~~—An owner or operator of a magnet wire coating unit subject to ~~this Section 21.0 of this regulation~~ and complying with ~~paragraph (c) 21.3~~ of this ~~Section regulation~~ by the use of complying coatings shall comply with the certification, recordkeeping, and reporting requirements in ~~Section 4(e) 4.3~~ of this regulation.

21.7.3 ~~3.~~—An owner or operator of a magnet wire coating unit subject to ~~this Section 21.0 of this regulation~~ and complying with ~~paragraph (d) 21.4~~ of this ~~Section regulation~~ by daily-weighted averaging shall comply with the certification, recordkeeping, and reporting requirements in ~~Section 4(d) 4.4~~ of this regulation.

21.7.4 ~~4.~~—An owner or operator of a magnet wire coating unit subject to ~~this Section 21.0 of this regulation~~ and complying with ~~paragraph (e) 21.5~~ of this ~~Section regulation~~ by the use of control devices shall comply with the testing, reporting, and recordkeeping requirements in ~~Section 4(e) 4.5~~ of this regulation.

Section 22—
22.0 Coating of Miscellaneous Metal Parts
01/11/1993

22.1 a. ~~Applicability~~

22.1.1 1. ~~This Section applies~~ The provisions of 22.0 of this regulation apply to any miscellaneous metal parts and products coating unit.

22.1.2 2. ~~This Section does~~ The provisions of 22.0 of this regulation do not apply to the coating of the following metal parts and products that are covered by other sections of this regulation:

22.1.2.1 i. ~~Automobiles and light-duty trucks.~~

22.1.2.2 ii. ~~Metal cans.~~

22.1.2.3 iii. ~~Flat metal sheets and strips in the form of rolls or coils.~~

22.1.2.4 iv. ~~Magnet wire for use in electrical machinery.~~

22.1.2.5 v. ~~Metal furniture.~~

22.1.2.6 vi. ~~Large appliances.~~

22.1.2.7 vii. ~~Heavy-duty trucks that use electrode position (EDP) to apply prime coat, which are covered under paragraphs (c)(4), (f), and (i) of Section 13 13.3.4, 13.6 and 13.9 of this regulation.~~

22.1.3 3. ~~This Section~~ The 22.0 of this regulation does not apply to:

22.1.3.1 i. ~~Exterior of completely assembled aircraft.~~

22.1.3.2 ii. ~~Exterior of major aircraft subassemblies, if approved by the Department as part of a State Implementation Plan (SIP) revision.~~

22.1.3.3 iii. ~~Automobile, light-duty truck, and heavy-duty truck refinishing.~~

22.1.3.4 iv. ~~Customized top coating of automobiles and trucks, if production is less than 35 vehicles per day.~~

22.1.3.5 v. ~~Exterior of completely assembled marine vessels.~~

22.1.3.6 vi. ~~Exterior of major marine vessel subassemblies if approved by the Department as part of a SIP revision.~~

22.1.4 4. ~~The emission limits in this Section~~ 22.0 of this regulation do not apply to any coating unit within a facility whose actual emissions

without control devices from all miscellaneous metal part and products coating units within the facility are less than 6.8 kilograms (kg) (15 pounds [lb]) of volatile organic compounds (VOCs) per day.

22.1.5 ~~5~~—An owner or operator of a facility whose emissions are below the applicability threshold in ~~paragraph (a)(4) 22.1.4~~ of this ~~Section regulation~~ shall comply with the certification, recordkeeping, and reporting requirements of ~~paragraph (g)(1) 22.7.1~~ of this ~~Section regulation~~.

22.1.6 ~~6~~—Any facility that becomes or is currently subject to the provisions of ~~this Section 22.0 of this regulation~~ by exceeding the applicability threshold in ~~paragraph (a)(4) 22.1.4~~ of this ~~Section regulation~~ will remain subject to these provisions even if its emissions later fall below the applicability threshold.

22.1.7 ~~7~~—Any facility that is currently subject to a state or federal rule promulgated pursuant to the Clean Air Act Amendments of 1977 by exceeding an applicability threshold is and will remain subject to these provisions, even if its throughput or emissions have fallen or later fall below the applicability threshold.

22.2 ~~b~~—Definitions. As used in ~~this Section 22.0 of this regulation~~, all terms not defined herein shall have the meaning given them in the November 15, 1990 Clean Air Act Amendments (CAAA), or in ~~Section 2 2.0~~ of this regulation.

“Air-dried coating” means a coating that is dried by the use of air or forced warm air at temperatures up to 90°C (194°F).

“Clear coating” means a coating that (1) either lacks color and opacity or is transparent and (2) uses the surface to which it is applied as a reflective base or undertone color.

“Drum” means any cylindrical metal shipping container of 13 to 110 gallon capacity.

“Extreme environmental conditions” means any of the following: the weather all of the time, temperatures frequently above 95°C (203°F), detergents, abrasive and scouring agents, solvents, corrosive atmospheres, or similar environmental conditions.

“Extreme performance coatings” means coatings intended for exposure to extreme environmental conditions.

“Miscellaneous metal parts and products coating unit” means a coating unit in which a coating is applied to any miscellaneous metal parts and products.

“Miscellaneous parts and products” means any metal part or metal product, even if attached to or combined with a nonmetal part or product. Miscellaneous metal parts and products include, but are not limited to:

1. Large farm machinery (harvesting, fertilizing and planting machines, tractors, combines, etc.).
2. Small farm machinery (lawn and garden tractors, lawn mowers, rototillers, etc.).
3. Small appliances (fans, mixers, blenders, crock pots, dehumidifiers, vacuum cleaners, etc.).
4. Commercial machinery (office equipment, computers and auxiliary equipment, typewriters, calculators, vending machines, etc.).
5. Industrial machinery (pumps, compressors, conveyor components, fans, blowers, transformers, etc.).
6. Fabricated metal products (metal covered doors, frames, etc.).
7. Any other metal part or product that is within one of the following Standard Industrial Classification Codes: Major Group 33 (primary metal industries), Major Group 34 (fabricated metal products), Major Group 35 (nonelectric machinery), Major Group 36 (electrical machinery), Major Group 37 (transportation equipment), Major Group 38. (miscellaneous instruments), and Major Group 39 (miscellaneous manufacturing industries).
8. Application of underbody anti-chip materials (e.g., underbody plastisol) and coating application operations other than prime, primer surfacer, topcoat, and final repair operations at automobile and light-duty truck assembly plants.

“**Pail**” means any cylindrical metal shipping container of 1- to 12-gallon capacity and constructed of 29-gauge and heavier material.

“**Refinishing**” means repainting used equipment.

22.3 e-Standards

22.3.1 4.—No owner or operator of a miscellaneous metal parts and products coating unit subject to ~~this Section 22.0 of this regulation~~ shall cause or allow the application of any coating with VOC content in excess of the emission limits in ~~paragraphs (c)(1)(i) through (c)(1)(v)~~ 22.3.1.1 through 22.3.1.5 of this Section regulation.

		kg/L ^a	lb/gal ^a
<u>22.3.1.1</u>	(i) Clear coating	0.52	4.3
<u>22.3.1.2</u>	(ii) Steel pail and drum interior coating	0.52	4.3
<u>22.3.1.3</u>	(iii) Air-dried coating	0.42	3.5
<u>22.3.1.4</u>	(iv) Extreme performance coating	0.42	3.5
<u>22.3.1.5</u>	(v) All other coatings	0.36	3.0

^a VOC content values are expressed in units of mass of VOC (kg, lb) per volume of coating (liter [L], gallon [gal]), excluding water and exempt compounds, as applied.

22.3.2 2.—If more than one emission limit in ~~paragraph (c)(1)~~ 22.3.1 of this regulation applies to a specific coating, then the least stringent emission limit shall be applied.

22.3.3 ~~3.~~—As an alternative to compliance with the emission limits in ~~paragraph (c)(1)~~ 22.3.1 of this ~~Section~~ regulation, an owner or operator of a miscellaneous metal parts and products coating unit may meet the requirements of ~~paragraphs (d) or (e)~~ 22.4 or 22.5 of this ~~Section~~ regulation.

22.4 ~~d.~~—Daily-weighted average limitations. No owner or operator of a miscellaneous metal parts and products coating unit that applies multiple coatings, all of which are subject to the same numerical emission limitation within ~~paragraph (c)(1)~~ above 22.3.1 of this regulation, during the same day (e.g., all coatings used on the unit are subject to 0.42 kg/L [3.5 lb/gal]), shall apply, during any day, coatings on that unit whose daily weighted average VOC content calculated in accordance with the procedure specified in **Appendix C** of this regulation exceeds the coating VOC content limit corresponding to the category of coating used.

22.5 ~~e.~~—Control devices

22.5.1 ~~1.~~—An owner or operator of a miscellaneous metal parts and products coating unit subject to ~~this Section~~ 22.0 of this regulation may comply with ~~t22.0~~ of this regulation by:

22.5.1.1 ~~i.~~—Installing and operating a capture system on that unit.

22.5.1.2 ~~ii.~~—Installing and operating a control device on that unit.

22.5.1.3 ~~iii.~~—Determining for each day the overall emission reduction efficiency needed to demonstrate compliance. The overall emission reduction needed for a day is the lesser of the value calculated according to the procedure in 3.0 of **Appendix C** ~~(c)~~ of this regulation for that day or 95% ~~percent~~.

22.5.1.4 ~~iv.~~—Demonstrating each day that the overall emission reduction efficiency achieved for that day, as determined in 3.0 of **Appendix D** ~~(c)~~ of this regulation, is greater than or equal to the overall emission reduction efficiency required for that day.

22.5.2 ~~2.~~—An owner or operator of a miscellaneous metal parts and products coating unit subject to ~~this Section~~ 22.0 of this regulation shall ensure that:

22.5.2.1 ~~i.~~—A capture system and control device are operated at all times that the unit is in operation, and the owner or operator demonstrates compliance with ~~this Section~~ 22.0 of this regulation through the applicable coating analysis and capture system and control device efficiency test methods specified in **Appendix B**, **Appendix D** and **Appendix E** of this regulation and in accordance with the capture efficiency test methods in **Appendix D** of this regulation.

22.5.2.2 ii.—The control device is equipped with the applicable monitoring equipment specified in 2.0 of Appendix D (b) of this regulation, and the monitoring equipment is installed, calibrated, operated, and maintained according to the vendor's specifications at all times the control device is in use.

22.6 f.—Test methods. The test methods found in **Appendix A** through **Appendix D** of this regulation shall be used to determine compliance with ~~this Section 22.0~~ of this regulation.

22.7 g.—Recordkeeping and reporting

22.7.1 1.—An owner or operator of a miscellaneous metal parts and products coating unit that is exempt from the emission limitations in ~~paragraph (c) 22.3~~ of this Section regulation shall comply with the certification, recordkeeping, and reporting requirements in ~~Section 4(b) 4.2~~ of this regulation.

22.7.2 2.—An owner or operator of a miscellaneous metal parts and products coating unit subject to ~~this Section 22.0~~ of this regulation and complying with ~~paragraph (c) 22.3~~ of this Section regulation by the use of complying coatings shall comply with the certification, recordkeeping, and reporting requirements in ~~Section 4(e) 4.3~~ of this regulation.

22.7.3 3.—An owner or operator of a miscellaneous metal parts and products coating unit subject to ~~this Section 22.0~~ of this regulation and complying with ~~paragraph (d) 22.4~~ of this Section regulation by daily-weighted averaging shall comply with the certification, recordkeeping, and reporting requirements in ~~Section 4(d) 4.4~~ of this regulation.

22.7.4 4.—An owner or operator of a miscellaneous metal parts and products coating unit subject to ~~this Section 22.0~~ of this regulation and complying with ~~paragraph (e) 22.5~~ of this Section regulation by the use of control devices shall comply with the testing, reporting, and recordkeeping requirements in ~~Section 4(e) 4.5~~ of this regulation.

Section 23—

23.0 Coating of Flat Wood Panelling

01/11/1993

23.1 a. Applicability

23.1.1 1. ~~This Section applies~~ The provisions of 23.0 of this regulation apply to any flat wood paneling coating line.

23.1.2 2. ~~This Section does~~ The provisions of 23.0 of this regulation do not apply to:

23.1.2.1 i. ~~Any flat wood paneling coating line within any facility whose actual emissions without control devices from all flat wood paneling coating lines within the facility are less than 6.8 kilograms (kg) (15 pounds [lb]) of volatile organic compounds (VOCs) per day.~~

23.1.2.2 ii. ~~Class I hardboard paneling finishes, particle board used in furniture, insulation board, exterior siding, tileboard, and softwood plywood coating lines.~~

23.1.3 3. ~~An owner or operator of a facility whose emissions are below the applicability threshold in paragraph (a)(2)(i) 23.1.2.1 of this Section regulation shall comply with the certification, recordkeeping, and reporting requirements of paragraph (g)(1) 23.7.1 of this Section regulation.~~

23.1.4 4. ~~Any facility that becomes or is currently subject to the provisions of this Section 23.0 of this regulation by exceeding the applicability threshold in paragraph (a)(2)(i) 23.1.2.1 of this Section regulation will remain subject to these provisions even if its emissions later fall below the applicability threshold.~~

23.1.5 5. ~~Any facility that is currently subject to a state or federal rule promulgated pursuant to the Clean Air Act Amendments of 1977 by exceeding an applicability threshold is and will remain subject to these provisions, even if its throughput or emissions have fallen or later fall below the applicability threshold.~~

23.2 b. Definitions. As used in ~~this Section 23.0 of this regulation~~, all terms not defined herein shall have the meaning given them in the November 15, 1990 Clean Air Act Amendments (CAAA), or in ~~Section 2 2.0~~ of this regulation.

“Class I hardboard paneling finish” means finishes that meet the specifications for Class I of Voluntary Product Standard PS-59-73 as approved by the American National Standards Institute.

“Class II hardboard paneling finish” means finishes that meet the specifications for Class II of Voluntary Product Standard PS-59-73 as approved by the American National Standards Institute.

“Flat wood paneling coating line” means a coating line used to apply and dry or cure coatings applied to one of the following flat wood paneling product categories: printed interior panels made of hardwood plywood and thin particle board (i.e., less than or equal to 0.64 centimeter (cm) (0.25 inch [in.]) in thickness); natural finish hardwood plywood panels; and hardwood paneling with Class II finishes.

“Hardboard” is a panel manufactured primarily from inter-felted ligno-cellulosic fibers that are consolidated under heat and pressure in a hot press.

“Hardwood plywood” is plywood whose surface layer is a veneer of hardwood.

“Natural finish hardwood plywood panels” means panels whose original grain pattern is enhanced by essentially transparent finishes frequently supplemented by fillers and toners.

“Printed interior panels” means panels whose grain or natural surface is obscured by fillers and basecoats upon which a simulated grain or decorative pattern is printed.

“Thin particleboard” is a manufactured board that is 0.64 cm (0.25 in.) or less in thickness made of individual wood particles that have been coated with a binder and formed into flat sheets by pressure.

“Tileboard” means paneling that has a colored, waterproof surface coating.

23.3 ~~e~~ Standards

23.3.1 ~~4.~~ No owner or operator of a flat wood paneling coating line subject to ~~this Section 23.0 of this regulation~~ shall cause or allow, on any day, VOC emissions from the coating of any one of the following flat wood paneling product categories in excess of the emission limits in ~~paragraphs (c)(1)(i) through (iii)~~ 23.3.1.1 through 23.3.1.2 of this ~~Section~~ regulation:

Flat wood paneling product category	kg/100m ² ^a	lb/1,000ft ² ^a
<u>23.3.1.1</u> (i) Printed interior panels	2.9	6.0
<u>23.3.1.2</u> (ii) Natural finish hardwood plywood panels	5.8	12.0
<u>23.3.1.3</u> (iii) Class II finish on hardboard panels	4.8	10.0

^a VOC content values are expressed in units of mass of VOC (kg, lb) per area of coated finished product (100 square meters [m²], 1,000 square feet [ft²])

23.3.2 ~~2.~~ As an alternative to compliance with the emission limits in ~~paragraph (c)(1)~~ 23.3.1 of this ~~Section~~ regulation, an owner or operator of a flat wood paneling coating line may meet the requirements of ~~paragraph (e)~~ 23.5 of this ~~Section~~ regulation.

23.4 ~~d.~~[Reserved]

23.5 ~~e.~~Control devices

23.5.1 ~~1.~~An owner or operator of a flat wood paneling coating line subject to ~~this Section~~ 23.0 of this regulation may comply with ~~this Section~~ 23.0 of this regulation by:

23.5.1.1 ~~i.~~Installing and operating a capture system on that line.

23.5.1.2 ~~ii.~~Installing and operating a control device on that line.

23.5.1.3 ~~iii.~~Determining for each day the overall emission reduction efficiency needed to demonstrate compliance. The overall emission reduction needed for a day is the lesser of the value calculated according to the procedure in ~~paragraph (f)(2)~~ 23.6.2 of this Section regulation for that day or 95% percent.

23.5.1.4 ~~iv.~~Demonstrating each day that the overall emission reduction efficiency achieved for that day, as determined in 5.0 of Appendix D (e) of this regulation, is greater than or equal to the overall emission reduction efficiency required for that day.

23.5.2 ~~2.~~An owner or operator of a flat wood paneling coating line subject to ~~this Section~~ 23.0 of this regulation shall ensure that:

23.5.2.1 ~~i.~~A capture system and control device are operated at all times that the line is in operation, and the owner or operator demonstrates compliance with ~~this Section~~ 23.0 of this regulation through the applicable coating analysis and capture system and control device efficiency test methods specified in **Appendix B**, **Appendix D** and **Appendix E** of this regulation and in accordance with the capture efficiency test methods in **Appendix D of this regulation**.

23.5.2.2 ~~ii.~~The control device is equipped with the applicable monitoring equipment specified in 2.0 of Appendix D (b) of this regulation, and the monitoring equipment is installed, calibrated, operated, and maintained according to the vendor's specifications at all times the control device is in use.

23.6 ~~f.~~

23.6.1 ~~1.~~Test methods. The test methods found in ~~this paragraph~~ 23.6 of this regulation and in **Appendix A**, **Appendix B** and **Appendix D** of this regulation shall be used to determine compliance.

23.6.2 ~~2.~~Overall emission reduction efficiency for control systems. The required overall emission reduction efficiency of the control system for the day shall be calculated according to the following equation:

$$E = \left[\frac{(\text{VOC}_a - S)}{\text{VOC}_a} \right] \times 100 \quad (23-1)$$

where:

E = The required overall emission reduction efficiency of the control system for the day.

VOC_a = The maximum VOC content of the coatings, as applied, used each day on a coating line in units of kg VOC/100 m² of coated finished product (lb VOC/1,000 ft²), as determined by the applicable test methods and procedures specified in **Appendix B** of this regulation.

S = VOC emission limitation in terms of kg VOC/100 m² of coated finished product (lb VOC/1,000 ft²).

23.7 ~~g~~—Recordkeeping and reporting

23.7.1 ~~4~~—Requirements for coating sources exempt from emission limitations. An owner or operator of a flat wood paneling coating line that is exempt from the emission limitations of ~~paragraph (c)~~ 23.3 of this ~~Section~~ regulation because combined VOC emissions on any day from all flat wood paneling coating lines at the facility are below the applicability threshold specified in ~~paragraph (a)(2)(i)~~ 23.1.2.1 of this ~~Section~~ regulation, before the application of capture systems and control devices, shall comply with the following:

23.7.1.1 ~~i~~—Certification. By November 15, 1993, the owner or operator of a facility referenced in ~~paragraph (g)(1)~~ 23.7.1 of this ~~Section~~ regulation shall certify to the Department that the facility is exempt by providing the following:

23.7.1.1.1 ~~A~~—The name and location of the facility.

23.7.1.1.2 ~~B~~—The address and telephone number of the person responsible for the facility.

23.7.1.1.3 ~~C~~—A declaration that the facility is exempt from the emission limitations of ~~paragraph (c)~~ 23.3 of this ~~Section~~ regulation because combined VOC emissions on any day from all flat wood paneling coating lines at the facility are below the applicability threshold before the application of capture systems and control devices. The following equation shall be used to calculate total VOC emissions for that day:

$$T = \sum_{i=1}^n C_i D_i a \quad (23-2)$$

where:

T = Total VOC emissions from coating lines at the facility for each category of flat wood paneling (as specified in ~~paragraph (c)(1)~~ 23.3.1 of this ~~Section~~ regulation) before the application of capture systems and control devices in units of kg VOC/day (lb VOC/day).

n = Number of different coatings applied on each coating line at the facility.

i = Subscript denoting an individual coating.

C = Mass of VOC per area of coated finished product in units of kg VOC/100 m² (lb VOC/1,000 ft²).

D = The surface area coated at the facility each day in units of m²/day (ft²/day).

a = Constant = 100 m² if using metric units.
= 1,000 ft² if using English units.

23.7.1.2 ~~ii.~~ Recordkeeping. On and after November 15, 1993, the owner or operator of a facility referenced in ~~paragraph (g)(1)~~ 23.7.1 of this ~~Section~~ regulation shall collect and record all of the following information each day and maintain the information at the facility for a period of ~~5~~ five years:

23.7.1.2.1 ~~A.~~ The name and identification number of each coating, as applied, used to coat each type of flat wood paneling product.

23.7.1.2.2 ~~B.~~ The volume of coating (i) (excluding water and exempt compounds), as applied, used each day to coat each type of flat wood paneling product (specified in ~~paragraph (c)(1)~~ 23.3.1 of the ~~Section~~ this regulation), and the surface area coated each day of each type of flat wood paneling product.

23.7.1.2.3 ~~C.~~ The total VOC emissions at the facility, as calculated using the equation under ~~paragraph (g)(1)(i)(C)~~ 23.7.1.1.3 of this ~~Section~~ regulation.

23.7.1.3 ~~iii.~~ Reporting. On and after November 15, 1993, the owner or operator of a facility referenced in ~~paragraph (g)(1)~~ 23.7.1 of this ~~Section~~ regulation shall notify the Department of any record showing that combined VOC emissions from all coating lines at the coating facility exceed 6.8 kg (15 lb) on any day, before the application of capture systems and control devices. A copy of such record shall be sent to the Department within 45 calendar days after the exceedance occurs. This requirement is in addition to any other exceedance reporting requirements mandated by the State of Delaware.

23.7.2 ~~2.~~ Requirements for coating sources using complying coatings. An owner or operator of a flat wood paneling coating line subject to ~~this Section~~ 23.0 of this regulation and complying with ~~paragraph (e)~~ 23.3 of

this ~~Section~~ regulation by means of the use of complying coatings shall comply with the following:

23.7.2.1 ~~i~~-Certification. By November 15, 1993, or upon startup of a new coating line, or upon changing the method of compliance for an existing coating line from control devices to the use of complying coatings, the owner or operator of a coating line referenced in ~~paragraph (g)(2)~~ 23.7.2 of this ~~Section~~ regulation shall certify to the Department that the coating line is or will be in compliance with the requirements of the applicable section of this regulation on and after November 15, 1993, or on and after the initial startup date. Such certification shall include:

23.7.2.1.1 ~~A~~-The name and location of the facility.

23.7.2.1.2 ~~B~~-The address and telephone number of the person responsible for the facility.

23.7.2.1.3 ~~C~~-Identification of subject sources.

23.7.2.1.4 ~~D~~-The name and identification number of each coating, as applied, used to coat each type of flat wood paneling product.

23.7.2.1.5 ~~E~~-The mass of VOC per area of coated finished product for each type of flat wood paneling product (specified in ~~paragraph (e)(1)~~ 23.3.1 of this ~~Section~~ regulation) in terms of kg VOC/100 m² (lb VOC/1,000 ft²) and the surface area coated each day of each type of flat wood paneling product.

23.7.2.2 ~~ii~~-Recordkeeping. On and after November 15, 1993, or on and after the initial startup date, the owner or operator of a coating line referenced in ~~paragraph (g)(2)~~ 23.7.2 of this ~~Section~~ regulation and complying by the use of complying coatings shall collect and record all of the following information each day for each coating line and maintain the information at the facility for a period of ~~5~~ five years:

23.7.2.2.1 ~~A~~-The name and identification number of each coating, as applied, used to coat each type of flat wood paneling product.

23.7.2.2.2 ~~B~~-The mass of VOC per area of coated finished product for each type of flat wood paneling product (specified in ~~paragraph (e)(1)~~ 23.3.1 of this ~~Section~~ regulation) for each coating used each day in terms of kg VOC/100 m² (lb VOC/1,000 ft²) and the surface area coated each day of each type of flat wood paneling product.

23.7.2.3 ~~iii~~—Reporting. On and after November 15, 1993, the owner or operator of a flat wood paneling coating line referenced in ~~paragraph (g)(2)~~ 23.7.2 of this ~~Section~~ regulation shall notify the Department in either of the following instances:

23.7.2.3.1 ~~A~~—Any record showing use of any noncomplying coatings shall be reported by sending a copy of such record to the Department within 45 calendar days following that use. This reporting requirement is in addition to any other exceedance reporting mandated by the State of Delaware.

23.7.2.3.2 ~~B~~—At least 30 calendar days before changing the method of compliance from the use of complying coatings to control devices, the owner or operator shall comply with all requirements of ~~paragraph (g)(3)(i)~~ 23.7.3.1 of this ~~Section~~ regulation, as well as ~~Regulation No. 2~~ **7 DE Admin Code 1102**. Upon changing the method of compliance from the use of complying coatings to control devices, the owner or operator shall comply with all requirements of the section applicable to the coating line referenced in ~~paragraph (g)(3)~~ 23.7.3 of this ~~Section~~ regulation.

23.7.3 ~~3~~—Requirements for coating sources using control devices. Any owner or operator of a flat wood paneling coating line subject to this ~~Section~~ 23.0 of this regulation and complying with ~~paragraph (e)~~ 23.3 of this ~~Section~~ regulation by the use of control devices shall comply with the following:

23.7.3.1 ~~i~~—Testing of control equipment. By November 15, 1993, or upon startup of a new coating line, or upon changing the method of compliance for an existing coating line from the use of complying coatings to control devices, the owner or operator of the subject coating line shall perform a compliance test. Testing shall be performed within ninety (90) days of startup, and pursuant to the procedures in **Appendix A, Appendix B and Appendix D** of this regulation and ~~paragraph (f)~~ 23.6 of this ~~Section~~ regulation. The owner or operator of the subject coating line shall submit to the Department the results of all tests and calculations necessary to demonstrate that the subject coating line is or will be in compliance with the applicable section of this regulation on and after November 15, 1993, or on and after the initial startup date.

23.7.3.2 ~~ii~~—Recordkeeping. On and after November 15, 1993, or on and after the initial startup date, the owner or operator of a coating line referenced in ~~paragraph (g)(3)~~ 23.7.3 of this ~~Section~~ regulation shall collect and record all of the following information each day for each coating line and maintain the information at the facility for a period of ~~5~~ five years:

23.7.3.2.1 ~~A~~—The name and identification number of each coating used on each coating line, as applied, used to coat each type of flat wood paneling product.

23.7.3.2.2 ~~B~~—The mass of VOC per area of coated finished product for each type of flat wood paneling product (specified in ~~paragraph (c)(1)~~ 23.3.1 of this ~~Section~~ regulation) in terms of kg VOC/100 m² (lb VOC/1,000 ft²), and the surface area coated each day of each type of flat wood paneling product.

23.7.3.2.3 ~~C~~—The maximum VOC content of the coatings, as applied, used each day (mass of VOC per area of coated finished product in terms of kg VOC/100 m² [lb VOC/1,000 ft²]).

23.7.3.2.4 ~~D~~—The required overall emission reduction efficiency for each day for each coating line as determined in ~~paragraph (f)(2)~~ 23.6.2 of this ~~Section~~ regulation.

23.7.3.2.5 ~~E~~—The actual overall emission reduction efficiency achieved for each day for each coating line as determined in 3.0 of Appendix D ~~(e)~~ of this regulation.

23.7.3.2.6 ~~F~~—Control device monitoring data.

23.7.3.2.7 ~~G~~—A log of operating time for the capture system, control device, monitoring equipment, and the associated coating line.

23.7.3.2.8 ~~H~~—A maintenance log for the capture system, control device, and monitoring equipment detailing all routine and non-routine maintenance performed including dates and duration of any outages.

23.7.3.2.9 ~~I~~—For thermal incinerators, all 3-hour periods of operation in which the average combustion temperature was more than 28°C (50°F) below the average combustion temperature during the most recent performance test that demonstrated that the facility was in compliance. The combustion chamber set-point shall be no less than that during the most recent performance test that demonstrated that the facility was in compliance.

23.7.3.2.10 ~~J~~—For catalytic incinerators, all 3-hour periods of operation in which the average temperature of the process vent stream immediately before the catalyst bed is more than 28°C (50°F) below the average temperature of the process vent stream immediately before the catalyst

bed during the most recent performance test that demonstrated that the facility was in compliance. The set-point for the process vent stream immediately before the catalyst bed shall be no less than that during the most recent performance test that demonstrated that the facility was in compliance.

23.7.3.2.11 ~~K.~~ For carbon adsorbers, all 3-hour periods of operation during which either the average VOC concentration or the reading of organics in the exhaust gases is more than 20% percent greater than the average exhaust gas concentration 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 facility was in compliance.

23.7.3.3 ~~iii.~~ Reporting. On and after November 15, 1993, the owner or operator of a subject coating line referenced in ~~paragraph (g)(3)~~ 23.7.3 of this ~~Section~~ regulation shall notify the Department in the following instances:

23.7.3.3.1 ~~A.~~ Any record showing noncompliance with the applicable requirements for control devices shall be reported by sending a copy of the record to the Department within 45 calendar days following the occurrence. This requirement is in addition to any other exceedance reporting mandated by the State of Delaware.

23.7.3.3.2 ~~B.~~ At least 30 calendar days before changing the method of compliance from control devices to the use of complying coatings, the owner or operator shall comply with all requirements of ~~paragraph (g)(2)(i)~~ 23.7.2.1 of this ~~Section~~ regulation, and ~~Regulation No. 2~~ **7 DE Admin Code 1102**. Upon changing the method of compliance from control devices to the use of complying coatings, the owner or operator shall comply with all requirements of the Section applicable to the coating line referenced in ~~paragraph (g)(2)~~ 23.7.2 of this ~~Section~~ regulation.

Section 24—
24.0 Bulk Gasoline Plants
01/11/1993

24.1 a. ~~Applicability~~

24.1.1 1. ~~This Section applies~~ The provisions of 24.0 of this regulation apply to all unloading, loading, and storage operations at bulk gasoline plants and to any gasoline tank truck delivering or receiving gasoline at a bulk gasoline plant.

24.1.2 2.—The following are subject only to the requirements of paragraphs (c)(3)(vii), (viii), and (ix) 24.3.3.7, 24.3.3.8 and 24.3.3.9 of this ~~Section~~ regulation:

24.1.2.1 i.—Any stationary storage tank of 2,082 liters (L) (550 gallons [gal]) capacity or less notwithstanding ~~Section 8~~ 8.0 of this regulation.

24.1.2.2 ii.—Any bulk gasoline plant with an average daily throughput of gasoline of less than 15,000 L (4,000 gal) on a 30-day rolling average provided that records are maintained according to the requirements in paragraph (e)(1) 24.5.1 of this ~~Section~~ regulation. Any plant that becomes or is currently subject to all of the provisions of ~~this Section~~ 24.0 of this regulation by exceeding this applicability threshold will remain subject to these provisions even if its throughput later falls below the applicability threshold. Any facility that is currently subject to a state or federal rule promulgated pursuant to the Clean Air Act Amendments of 1977 by exceeding an applicability threshold is and will remain subject to these provisions, even if its throughput or emissions have fallen or later fall below the applicability threshold.

24.2 b. ~~Definitions.~~ As used in ~~this Section~~ 24.0 of this regulation, all terms not defined herein shall have the meaning given them in the November 15, 1990 Clean Air Act Amendments (CAAA), or in ~~Section 2~~ 2.0 of this regulation.

24.3 e. ~~Standards~~

24.3.1 1.—Each bulk gasoline plant subject to ~~this Section~~ 24.0 of this regulation shall be equipped with a vapor balance system between the gasoline storage tank and the incoming gasoline tank truck designed to capture and transfer vapors displaced during filling of the gasoline storage tank. These lines shall be equipped with fittings that are vapor-tight and that automatically and immediately close upon disconnection.

24.3.2 2.—Each bulk gasoline plant subject to ~~this Section~~ 24.0 of this regulation shall be equipped with a vapor balance system between the gasoline storage tank and the outgoing gasoline tank truck designed to capture and transfer vapors displaced during the loading of the gasoline

tank truck. The vapor balance system shall be designed to prevent any vapors collected at one loading rack from passing to another loading rack.

24.3.3 ~~3.~~ Each owner or operator of a bulk gasoline plant subject to ~~this Section 24.0 of this regulation~~ shall act to ensure that the procedures in paragraphs ~~(c)(3)(i) through (c)(3)(ix)~~ 24.3.3.1 through 24.3.3.9 of this ~~Section regulation~~ are followed during all loading, unloading, and storage operations:

24.3.3.1 ~~i.~~ The vapor balance system required by paragraphs ~~(c)(1) and (c)(2)~~ 24.3.1 and 24.3.2 of this ~~Section regulation~~ shall be connected between the tank truck and storage tank during all gasoline transfer operations.

24.3.3.2 ~~ii.~~ All storage tank openings, including inspection hatches and gauging and sampling devices, shall be vapor-tight when not in use.

24.3.3.3 ~~iii.~~ The gasoline tank truck compartment hatch covers shall not be opened during product transfer.

24.3.3.4 ~~iv.~~ All vapor balance systems shall be designed and operated at all times to prevent gauge pressure in the gasoline tank truck from exceeding 450 millimeters (mm) (18 inches [in.]) of water and vacuum from exceeding 150 mm (5.9 in.) of water during product transfers.

24.3.3.5 ~~v.~~ No pressure vacuum relief valve in the bulk gasoline plant vapor balance system shall begin to open at a system pressure of less than 450 mm (18 in.) of water or at a vacuum of less than 150 mm (5.9 in.) of water.

24.3.3.6 ~~vi.~~ All product transfers involving gasoline tank trucks at bulk gasoline plants subject to ~~this Section 24.0 of this regulation~~ shall be limited to vapor-tight gasoline tank trucks.

24.3.3.7 ~~vii.~~ Filling of storage tanks shall be restricted to submerged fill.

24.3.3.8 ~~viii.~~ Loading of outgoing gasoline tank trucks shall be limited to submerged fill.

24.3.3.9 ~~ix.~~ Owners or operators of bulk gasoline plants or owners or operators of tank trucks shall observe all parts of the transfer and shall discontinue transfer if any vapor or liquid leaks are observed.

24.3.4 ~~4.~~ Each calendar month, the vapor balance systems described in paragraphs ~~(c)(1) and (c)(2)~~ 24.3.1 and 24.3.2 of this ~~Section regulation~~ and each loading rack that loads gasoline tank trucks shall be inspected

for liquid or vapor leaks during product transfer operations. For purposes of ~~this paragraph~~ 24.3 of this regulation, detection methods incorporating sight, sound, or smell are acceptable. Each leak that is detected shall be repaired within 15 calendar days after it is detected.

24.4 ~~d.~~—Compliance provisions. A pressure measurement device (liquid manometer, magnehelic gauge, or equivalent instrument) capable of measuring 500 mm (20 in.) of water gauge pressure within a ± 2.5 mm (0.098 in.) of water precision, shall be calibrated and installed on the bulk gasoline plant vapor balance system at a pressure tap, located as close as possible to the connection with the gasoline tank truck, to allow determination of compliance with ~~paragraph (c)(3)(iv)~~ 24.3.3.4 of this Section regulation.

24.5 ~~e.~~—Recordkeeping. The owner or operator of a facility subject to this regulation shall maintain the following records in a readily accessible location for at least 5 years and shall immediately make these records available to the Department upon verbal or written request.

24.5.1 ~~1.~~—All bulk gasoline plants subject to ~~this Section~~ 24.0 of this regulation shall maintain daily records showing the quantity of all gasoline loaded into gasoline tank trucks.

24.5.2 ~~2.~~—A record of each monthly leak inspection required under ~~paragraph (c)(4)~~ 24.3.4 of this Section regulation shall be kept on file at the plant. Inspection records shall include, at a minimum, the following information:

24.5.2.1 ~~i.~~—Date of inspection.

24.5.2.2 ~~ii.~~—Findings (may indicate no leaks discovered or location, nature, and severity of each leak).

24.5.2.3 ~~iii.~~—Leak determination method.

24.5.2.4 ~~iv.~~—Corrective action (date each leak repaired and reasons for any repair interval in excess of 15 calendar days).

24.5.2.5 ~~v.~~—Inspector name and signature.

24.6 ~~f.~~—Reporting. The owner or operator of any facility containing sources subject to ~~this Section~~ 24.0 of this regulation shall comply with the requirements in ~~Section 5~~ 5.0 of this regulation.

~~Section 25—~~

25.0 Bulk Gasoline Terminals.

11/29/1994

25.1 a. ~~Applicability~~

25.1.1 4. ~~This Section applies~~ The provisions of 25.0 of this regulation apply to the total of all the loading racks at any bulk gasoline terminal that deliver liquid product into gasoline tank trucks.

25.1.2 2. ~~Any facility that becomes or is currently subject to the provisions of this Section 25.0 of this regulation by exceeding the throughput specified in the definition of bulk gasoline terminal in Section 2 2.0 of this regulation will remain subject to these provisions even if its throughput later falls below the applicability threshold. Any facility that is currently subject to a state or federal rule promulgated pursuant to the Clean Air Act Amendments of 1977 by exceeding an applicability threshold is and will remain subject to these provisions, even if its throughput or emissions have fallen or later fall below the applicability threshold.~~

25.2 b. ~~Standards for loading racks at bulk gasoline terminals.~~

25.2.1 4. ~~All the loading racks at a bulk gasoline terminal subject to this Section 25.0 of this regulation shall be equipped with a vapor collection system designed to collect the organic compound liquids or vapors displaced from gasoline tank trucks during product loading.~~

25.2.2 2. ~~Each vapor collection system shall be designed to prevent any VOC vapors collected at one loading rack from passing to another loading rack.~~

25.2.3 3. ~~Loadings of liquid product into gasoline tank trucks shall be limited to vapor-tight gasoline tank trucks using the following procedures:~~

25.2.3.1 i. ~~The owner or operator shall obtain the vapor tightness documentation described in paragraphs (d)(1) and (d)(2) 25.4.1 and 25.4.2 of this Section regulation for each gasoline tank truck that is to be loaded at the loading racks subject to this Section 25.0 of this regulation.~~

25.2.3.2 ii. ~~The owner or operator shall require the tank identification number to be recorded as each gasoline tank truck is loaded at the terminal.~~

25.2.3.3 iii. ~~The owner or operator shall cross-check each tank identification number obtained in paragraph (b)(3)(ii) 25.2.3.2 of this Section regulation with the file of tank vapor tightness documentation within 2 two weeks after the corresponding tank is loaded.~~

25.2.3.4 ~~iv.~~—The terminal owner or operator shall notify the owner or operator of each non-vapor-tight gasoline tank truck loaded at the loading racks subject to ~~this Section 25.0 of this regulation~~ that the tank truck is not vapor-tight within ~~3~~ three weeks after the loading has occurred.

25.2.3.5 ~~v.~~—The terminal owner or operator shall take steps to assure that the non-vapor-tight gasoline tank truck will not be reloaded at a loading rack subject to ~~this Section 25.0 of this regulation~~ until vapor tightness documentation for that tank truck is obtained.

25.2.4 4.—The terminal owner or operator shall act to ensure that loadings of gasoline tank trucks at the loading racks subject to ~~this Section 25.0 of this regulation~~ are made only into tank trucks equipped with vapor collection equipment that is compatible with the terminal's vapor collection system.

25.2.5 5.—The terminal owner or operator shall act to ensure that the terminal's and the tank truck's vapor collection systems are connected during each loading of a gasoline tank truck at the loading racks subject to ~~this Section 25.0 of this regulation~~.

25.2.6 6.—The vapor collection and liquid loading equipment shall be designed and operated to prevent gauge pressure in the gasoline tank truck from exceeding 4,500 Pascals (Pa) (450 millimeters [mm] of water) during product loading. This level shall not be exceeded when measured by the procedures specified in ~~paragraph (c)(1)~~ 25.3.1 of this ~~Section~~ regulation.

25.2.7 7.—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 Pa (450 mm of water).

25.2.8 8.—Each calendar month, the vapor collection system, the vapor control system, and each loading rack that loads gasoline tank trucks shall be inspected for total organic compounds liquid or vapor leaks during product transfer operations. For purposes of ~~this paragraph 25.2 of this regulation~~, 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.

25.2.9 9.—The total organic compound emissions to the atmosphere from the vapor collection system due to the loading of liquid product into gasoline tank trucks shall not exceed 80 milligrams per liter (mg/L) (4.7 grains per gallon [grain/gal]) of gasoline loaded.

25.2.10 10.—Loading of gasoline tank trucks shall be restricted to the use of submerged fill.

25.3 e. Test methods and procedures

25.3.1 1. In determining compliance with ~~paragraph (b)(6)~~ 25.2.6 of this ~~Section~~ regulation, the following procedures shall be used:

25.3.1.1 i. Calibrate and install a pressure measurement device (liquid manometer or equivalent instrument) capable of measuring up to 500 millimeters (mm) (20 inches [in.]) of water gauge pressure with ± 2.5 mm (0.098 in.) of water precision.

25.3.1.2 ii. 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.

25.3.1.3 iii. During the performance test, record the pressure every 5 minutes (min) while a gasoline tank truck is being loaded, and record the highest instantaneous pressure that occurs during each loading. Every loading position shall be tested at least once during the performance test.

25.3.2 2. In determining compliance with the mass emission limitation of ~~paragraph (b)(9)~~ 25.2.9 of this ~~Section~~ regulation, the following reference methods shall be used:

25.3.2.1 i. In determining volume at the exhaust vent:

25.3.2.1.1 A. Method 2B for combustion vapor control systems.

25.3.2.1.2 B. Method 2A for all other vapor control systems.

25.3.2.2 ii. In determining total organic compounds concentration at the exhaust vent, Method 25A or 25B. The calibration gas shall be either propane or butane.

25.3.3 3. Immediately prior to a performance test required to determine compliance with ~~paragraphs (b)(6) and (b)(9)~~ 25.2.6 and 25.2.9 of this ~~Section~~ regulation, all potential sources of vapor and liquid leakage from the terminal's vapor collection system equipment shall be monitored for leaks according to the procedures in **Appendix F** of this regulation. The monitoring shall be conducted only while a gasoline tank truck is being loaded. A reading of 10,000 parts per million by volume (ppmv) or greater as methane shall be considered a leak. All leaks shall be repaired prior to conducting the performance test.

25.3.4 4. The test procedure for determining compliance with ~~paragraphs (b)(6) and (b)(9)~~ 25.2.6 and 25.2.9 of this ~~Section~~ regulation is as follows:

25.3.4.1 ~~i~~—All testing equipment shall be prepared and installed as specified in the appropriate test methods.

25.3.4.2 ~~ii~~—The time period for a performance test shall be not less than 6 hours, during which at least 300,000 L (80,000 gal) 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.

25.3.4.3 ~~iii~~—For intermittent vapor control systems:

25.3.4.3.1 ~~A~~—The vapor holder level shall be recorded at the start of the performance test. The end of the performance test shall coincide with a time when the vapor holder is at its original level.

25.3.4.3.2 ~~B~~—At least two startups and shutdowns of the vapor processor shall occur during the performance test. If this does not occur under automatically controlled operation, the system shall be manually controlled.

25.3.4.4 ~~iv~~—The volume of gasoline dispensed during the performance test period at all loading racks whose vapor emissions are controlled by the vapor processing system being tested shall be determined. This volume may be determined from terminal records or from gasoline dispensing meters at each loading rack.

25.3.4.5 ~~v~~—An emission testing interval shall consist of each ~~5~~ five-minute period during the performance test. For each interval:

25.3.4.5.1 ~~A~~—The reading from each measurement instrument shall be recorded.

25.3.4.5.2 ~~B~~—The volume exhausted and the average total organic compounds concentration in the exhaust vent shall be determined, as specified in the appropriate test method. The average total organic compounds concentration shall correspond to the volume measurement by taking into account the sampling system response time.

25.3.4.6 ~~vi~~—The mass emitted during each testing interval shall be calculated as follows:

$$M_{ei} = 10^{-6} K V_{es} C_e \quad (25-1)$$

where:

M_{ei} = Mass of total organic compounds (milligrams [mg]) emitted during testing interval i .
 V_{es} = Volume of air-vapor mixture exhausted (cubic meters [m^3]), at standard conditions.
 C_e = Total organic compounds concentration (measured as carbon) at the exhaust vent (ppmv).
 K = Density of calibration gas (milligrams/cubic meter [mg/m^3]) at standard conditions.
 = 1.83×10^6 for propane.
 = 2.41×10^6 for butane.
 s = Standard conditions, 20°C and 760 millimeters of mercury (mm Hg).

25.3.4.7 vii.—The total organic compounds mass emissions shall be calculated as follows:

$$E = \frac{\sum_{i=1}^n M_{ei}}{L} \quad (25-2)$$

where:

E = Mass of total organic compounds emitted per volume of gasoline loaded, mg/L.

M_{ei} = Mass of total organic compounds emitted during testing interval i , mg.

L = Total volume of gasoline loaded, L.

n = Number of testing intervals.

25.3.5 5.—The owner or operator may adjust the emission results to exclude the methane and ethane content in the exhaust vent by any method approved by the Department.

25.4 d.—Recordkeeping. The owner or operator of a facility subject to the requirements of ~~this Section~~ 25.0 of this regulation shall maintain the following records in a readily accessible location for at least ~~5~~ five years and shall make these records available to the Department upon verbal or written request.

25.4.1 4.—The tank truck vapor tightness documentation required under ~~paragraph (b)(3)~~ 25.2.3 of this Section regulation shall be kept on file at the terminal in a permanent form available for inspection.

25.4.2 2.—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, at a minimum, the following information:

25.4.2.1 i.—Test title: Gasoline Delivery Tank Pressure Test EPA Reference Method 27.

25.4.2.2 ii.—Tank owner and address.

25.4.2.3 ~~iii.~~ Tank identification number.

25.4.2.4 ~~iv.~~ Testing location.

25.4.2.5 ~~v.~~ Date of test.

25.4.2.6 ~~vi.~~ Tester name and signature.

25.4.2.7 ~~vii.~~ Witnessing inspector, if any: Name, signature, and affiliation.

25.4.2.8 ~~viii.~~ Test results: Actual pressure change in ~~5~~ five min, recorded in mm of water (average for two runs).

25.4.3 ~~3.~~ A record of each monthly leak inspection required under ~~paragraph (b)(8)~~ 25.2.8 of this ~~Section~~ regulation shall be kept on file at the terminal. Inspection records shall include, at a minimum, the following information:

25.4.3.1 ~~i.~~ Date of inspection.

25.4.3.2 ~~ii.~~ Findings (may indicate no leaks discovered or location, nature, and severity of each leak).

25.4.3.3 ~~iii.~~ Leak determination method.

25.4.3.4 ~~iv.~~ Corrective action (date each leak repaired, reasons for any repair interval in excess of 15 calendar days).

25.4.3.5 ~~v.~~ Inspector name and signature.

25.4.4 ~~4.~~ The terminal owner or operator shall keep documentation of all notifications required under ~~paragraph (b)(3)(iv)~~ 25.2.3.4 of this ~~Section~~ regulation on file at the terminal.

25.4.5 ~~5.~~ Daily records shall be maintained of gasoline throughput.

25.5 ~~e.~~ Reporting. The owner or operator of any facility containing sources subject to this ~~Section~~ 25.0 of this regulation shall comply with the requirements in ~~Section 5~~ 5.0 of this regulation.

~~Section 26—~~

26.0 Gasoline Dispensing Facility Stage I Vapor Recovery.

01/11/2002

26.1 ~~a.~~ Applicability

26.1.1 ~~1.~~ ~~This Section applies~~ The provisions of 26.0 of this regulation apply to any stationary gasoline storage tank located at any gasoline dispensing facility in the State of Delaware, except:

26.1.1.1 ~~i.~~ ~~The following storage tanks shall be subject only to the requirements of paragraph (c)(1)(i)~~ 26.3.1.1 of this ~~Section~~ regulation:

26.1.1.1.1 ~~A.~~ Any stationary gasoline storage tank that is equipped with a floating roof or its equivalent that has been approved by the Administrator of the U.S. EPA as part of a State Implementation Plan (SIP) or Federal Implementation Plan (FIP) revision.

26.1.1.1.2 ~~B.~~ Any stationary gasoline storage tank with a capacity of less than 550 gallons [gal] used exclusively for the fueling of farm equipment.

26.1.1.1.3 ~~C.~~ Any stationary gasoline storage tank with a capacity of less than 2,000 gal that was constructed prior to January 1, 1979.

26.1.1.1.4 ~~D.~~ Any stationary gasoline storage tank with a capacity of less than 250 gal that was constructed after December 31, 1978.

26.1.1.2 ~~ii.~~ ~~The storage tank(s) or tanks~~ at any gasoline dispensing facility, which never has a throughput of greater than 10,000 gallons of gasoline, shall be subject only to the requirements of ~~paragraphs (c)(1)(i) and (d)~~ 26.3.1.1 and 26.4 of this ~~Section~~ regulation. The storage tank(s) ~~or tanks~~ at any gasoline dispensing facility that ever exceeds this applicability threshold shall be subject to all of the requirements of ~~this Section~~ 26.0 of this regulation, and shall remain subject to these requirements even if its throughput later falls below the exemption throughput.

26.1.2 ~~2.~~ ~~The requirements of this Section~~ 26.0 of this regulation are in addition to all other State and Federal requirements, to include the permitting requirements of ~~Regulation No. 2~~ **7 DE Admin Code 1102** of the State of Delaware "Regulations Governing the Control of Air Pollution". Any gasoline dispensing facility that is currently subject to any state or federal rule promulgated pursuant to the Clean Air Act Amendments of 1977 by exceeding an applicability threshold is and shall remain subject to those provisions.

26.1.3 ~~3~~-Compliance Schedule

Any stationary gasoline storage tank subject to the requirements of ~~this Section~~ 26.0 of this regulation shall be in compliance as follows:

26.1.3.1 ~~i~~—Storage tanks located at any facility that first commences operations:

26.1.3.1.1 ~~A~~—Before November 15, 1990 and having any throughput of at least 100,000 gallons: no later than November 15, 1993.

26.1.3.1.2 ~~B~~—Before November 15, 1990 and having any throughput of greater than 10,000 gallons but less than 100,000 gallons: no later than November 15, 1994.

26.1.3.1.3 ~~C~~—On or after November 15, 1990 and before May 15, 1993: no later than May 15, 1993.

26.1.3.1.4 ~~D~~—On or after May 15, 1993: upon commencement of operations.

26.1.3.2 ~~ii~~—The requirements of ~~paragraph(c)(1)(ii)(E)~~ 26.3.1.2.5 of this regulation are effective on and after May 1, 2003.

26.2 ~~b~~-Reserved

26.3 ~~e~~-Standards

26.3.1 ~~4~~—The owner and/or operator of any stationary storage tank that is subject to the requirements of ~~this Section~~ 26.0 of this regulation shall:

26.3.1.1 ~~i~~—Load the stationary gasoline storage tank(s) or tanks by submerged fill using a drop tube that extends to within 150 mm (5.9 in.) from the bottom of the tank.

26.3.1.2 ~~ii~~—Design, install, operate, and maintain a Stage I Vapor Recovery System that operates such that the vapors displaced by the liquid gasoline are returned to the delivery vessel and transported back to the bulk plant or terminal.

26.3.1.2.1 ~~A~~—All hoses in the Stage I Vapor Recovery system shall be properly connected.

26.3.1.2.2 ~~B~~—All vapor lines, couplers, and adapters used in the gasoline delivery shall be vaportight.

26.3.1.2.3 ~~C.~~ All adapters and couplers that attach to any vapor line on the storage vessel shall have closures that seal upon disconnect.

26.3.1.2.4 ~~D.~~ Reserved.

26.3.1.2.5 ~~E.~~ All Stage I systems shall utilize dual point vapor connections to return vapors from the storage tank to the delivery truck.

26.3.2 ~~2.~~ The filling of storage tanks subject to the requirements of ~~this Section 26.0 of this regulation~~ shall be limited to unloading by vapor-tight gasoline tank trucks or delivery trucks which:

26.3.2.1 ~~i.~~ meet all of the requirements of ~~Section 27 27.0~~ of this regulation; and

26.3.2.2 ~~ii.~~ are equipped with vapor return equipment that is compatible with the Stage I Vapor Recovery System installed on the storage tank.

26.4 ~~d.~~ Recordkeeping. The owner and/or operator of any stationary gasoline storage tank exempted from the requirements of ~~this Section 26.0 of this regulation~~ pursuant to ~~paragraph (a)(1)(ii) 26.1.1.2 of this section regulation~~ shall keep on the facility premises and in a form acceptable to the Department, records showing monthly throughput. These records shall be retained for at least 5 years from the date of record, and shall be made immediately available to the Department upon request.

26.5 ~~e.~~ Reporting. The owner and/or operator of any facility containing sources subject to ~~this Section 26.0 of this regulation~~ shall comply with the requirements of ~~Section 5 5.0~~ of this regulation.

~~Section 27~~

27.0 Gasoline Tank Trucks

01/11/1993

27.1 ~~a~~—Applicability. ~~This Section applies~~ The provisions of 27.0 of this regulation apply to any gasoline tank truck equipped for gasoline vapor collection. No exemptions are allowable based on number of gasoline tank trucks or total quantity of volatile organic compound (VOC) emissions.

27.2 ~~b~~—Standards. Each owner or operator of a gasoline tank truck subject to ~~this Section~~ 27.0 of this regulation shall ensure that the gasoline tank truck:

27.2.1 ~~1~~—Is a vapor-tight gasoline tank truck as demonstrated by Method 27 of Appendix A of 40 CFR Part 60 (July 1, 1992).

27.2.2 ~~2~~—Displays a sticker near the Department of Transportation Certification plate required by 49 CFR 178.340-10b, that:

27.2.2.1 ~~i~~—Shows the date that the gasoline tank truck last passed the test required in ~~paragraph (b)(1)~~ 27.2.1 of this ~~Section~~ regulation.

27.2.2.2 ~~ii~~—Shows the identification number of the truck tank.

27.2.2.3 ~~iii~~—Expires not more than 1 year after the date of the Method 27 test.

27.2.3 ~~3~~—Is maintained with hatches closed at all times except during measurement of product level or maintenance. Measurement of product level or maintenance shall not be performed during product loading or unloading.

27.2.4 ~~4~~—Is connected to vapor recovery equipment during loading and unloading.

27.3 ~~e~~—Monitoring gasoline tank trucks for vapor tightness

27.3.1 ~~1~~—The Department may, at any time, monitor a gasoline tank truck by the method referenced in ~~paragraph (c)(2)~~ 27.3.2 of this regulation to confirm continuing compliance with ~~this Section~~ 27.0 of this regulation.

27.3.2 ~~2~~—Monitoring to confirm the continuing existence of vapor-tight conditions shall be performed according to the procedures described in Appendix B of the OAQPS Guideline Series document, "Control of Organic Compound Leaks from Gasoline Tank Trucks and Vapor Collection Systems," EPA-450/2-78-051.

27.4 ~~d.~~—Test methods and procedures. The procedures in Method 27, 40 CFR, Part 60, Appendix A (July 1, 1992), shall be used to determine compliance with ~~paragraph (b)(1)~~ 27.2.1 of this ~~Section~~ regulation.

27.5 ~~e.~~—Recordkeeping and reporting requirements

27.5.1 ~~4.~~—The owner or operator of a gasoline tank truck subject to ~~this Section~~ 27.0 of this regulation shall maintain records of all certification, testing, and repairs. The records shall identify the gasoline tank truck, the date of the tests or repair, and, if applicable, the type of repair and the date of retest. The records shall be maintained in a legible, readily available condition for at least ~~5~~ five years after the date the testing or repair is completed. These records shall be made available to the Department immediately upon written or verbal request.

27.5.2 ~~2.~~—The records required by ~~paragraph (e)(1)~~ 27.5.1 of this ~~Section~~ regulation shall, at a minimum, contain:

27.5.2.1 ~~i.~~—The gasoline tank truck vessel tank identification number.

27.5.2.2 ~~ii.~~—The initial test pressure and the time of the reading.

27.5.2.3 ~~iii.~~—The final test pressure and the time of the reading.

27.5.2.4 ~~iv.~~—The initial test vacuum and the time of the reading.

27.5.2.5 ~~v.~~—The final test vacuum and the time of the reading.

27.5.2.6 ~~vi.~~—At the top of each report page, the company name and the date and location of the tests on that page.

27.5.2.7 ~~vii.~~—The name and the title of person conducting the test.

27.5.3 ~~3.~~—The owner or operator of a gasoline tank truck subject to ~~this Section~~ 27.0 of this regulation shall certify and report to the Department annually that the gasoline tank truck has been tested by Method 27 as specified in ~~paragraph (d)~~ 27.4 of this ~~Section~~ regulation. The certification shall include:

27.5.3.1 ~~i.~~—The name and address of the company and the name and telephone number of the responsible company representative under whose signature the certification is submitted.

27.5.3.2 ~~ii.~~—A copy of the information recorded to comply with ~~paragraph (e)(2)~~ 27.5.2 of this ~~Section~~ regulation.

27.5.4 ~~4.~~—Copies of all records and reports under ~~this Section~~ 27.0 of this regulation shall immediately be made available to the Department upon verbal or written request.

Section 28—
28.0 Petroleum Refinery Sources
01/11/1993

28.1 a. Applicability

28.1.1 1. ~~This Section applies~~ The provisions of 28.0 of this regulation apply to any vacuum-producing system, wastewater separator, and process unit turnaround at petroleum refinery sources. No exemptions are allowable based on size or throughput of a facility.

28.1.2 2. ~~This Section applies~~ The provisions of 28.0 of this regulation do not apply to segregated storm water runoff drain systems or to non-contact cooling water systems.

28.2 b. Definitions. As used in ~~this Section 28.0~~ 28.0 of this regulation, all terms not defined herein shall have the meaning given them in the November 15, 1990 Clean Air Act Amendments (CAAA), or in ~~Section 2~~ 2.0 of this regulation.

“Accumulator” means the reservoir of a condensing unit receiving the condensate from the condenser.

“Firebox” means the chamber or compartment of a boiler or furnace in which materials are burned but does not mean the combustion chamber of an incinerator.

“Forebays” means the primary sections of a wastewater separator.

“Hot well” means the reservoir of a condensing unit receiving the warm condensate from the condenser.

“Refinery process unit” means any segment of the petroleum refinery in which a specific processing operation is conducted.

“Refinery fuel gas” means any gas that is generated by a petroleum refinery process unit and that is combusted, including any gaseous mixture of natural gas and fuel gas.

“Turnaround” means the procedure of shutting a refinery unit down after a run to perform necessary maintenance and repair work and then returning the unit to operation.

“Vacuum-producing system” means any reciprocating, rotary, or centrifugal blower or compressor, or any jet ejector or device that takes suction from a pressure below atmospheric pressure and discharges against atmospheric pressure.

“Wastewater (oil/water) separator” means any device or piece of equipment that utilizes the difference in density between oil and water to remove oil and associated chemicals from water, or any device, such as a flocculation tank, clarifier, etc., that removes petroleum-derived compounds from wastewater.

28.3 ~~e~~—Standards

28.3.1 4.—Vacuum-producing systems. No person shall permit the emission of any uncondensed volatile organic compound (VOC) from the condensers, hot wells, or accumulators of any vacuum producing system at a petroleum refinery. The standard shall be achieved by either of the following:

28.3.1.1 i.—Piping the uncondensed vapors to a firebox or incinerator.

28.3.1.2 ii.—Compressing the vapors and adding them to the refinery fuel gas.

28.3.2 2.—Wastewater separators. The owner or operator of any wastewater (oil/water) separator at a petroleum refinery shall:

28.3.2.1 i.—Provide covers and seals on all separators and forebays.

28.3.2.2 ii.—Equip all openings in covers, separators, and forebays with lids or seals and keep the lids or seals in the closed position at all times except when in actual use.

28.3.3 3.—Process unit turnarounds. The owner or operator of a petroleum refinery shall provide for the following during process unit turnaround:

28.3.3.1 i.—Depressurization venting of the process unit or vessel to a vapor recovery system, flare, or firebox.

28.3.3.2 ii.—No emission of VOC from a process unit or vessel until its internal pressure is 136 kilo Pascals (kPa) (19.7 pounds per square inch atmospheric [psia]) or less.

28.3.3.3 iii.—Recordkeeping of the following items:

28.3.3.3.1 A.—Date of every process unit or vessel turnaround.

28.3.3.3.2 B.—The internal pressure of the process unit or vessel immediately prior to venting to the atmosphere.

28.4 ~~d~~—Recordkeeping. The owner or operator of a petroleum refinery shall maintain the records required by ~~paragraph (c)(3)(iii)~~ 28.3.3.3 of this ~~Section~~ regulation in a readily accessible location for at least 5 years and shall make these records available to the Department upon verbal or written request.

28.5 e-Reporting. The owner or operator of any facility containing sources subject to ~~this Section 28.0~~ of this regulation shall comply with the requirements in ~~Section 5~~ 5.0 of this regulation.

~~Section 29—~~

29.0 Leaks from Petroleum Refinery Equipment

11/29/1994

29.1 a. ~~Applicability~~

29.1.1 4. ~~This Section applies~~ The provisions of 29.0 of this regulation apply to all equipment in volatile organic compound (VOC) service in any process unit at a petroleum refinery, regardless of size or throughput.

29.1.2 2. ~~The requirements of paragraphs (d) through (h) of this Section 29.4 through 29.8 of this regulation~~ do not apply to:

29.1.2.1 i. ~~Any equipment in vacuum service.~~

29.1.2.2 ii. ~~Any pressure relief valve that is connected to an operating flare header or vapor recovery device.~~

29.1.2.3 iii. ~~Any liquid pump that has a dual mechanical pump seal with a barrier fluid system.~~

29.1.2.4 iv. ~~Any compressor with a degassing vent that is routed to an operating VOC control device.~~

29.1.2.5 v. ~~Pumps and valves in heavy liquid service except that if evidence of a leak is found by visual, audible, olfactory, or other detection method, the owner or operator shall confirm the presence of a leak using the methods specified in **Appendix F** of this regulation. If a leak is confirmed, the owner or operator shall repair the leak as specified in paragraph (g) 29.7 of this Section regulation.~~

29.2 b. ~~Definitions. As used in this Section 29.0 of this regulation,~~ all terms not defined herein shall have the meaning given them in the November 15, 1990 Clean Air Act Amendments (CAAA), or in ~~Section 2~~ 2.0 of this regulation.

“[In] gas/vapor service” means that the piece of equipment in VOC service contains process fluid that is in the gaseous state at operating conditions.

“[In] heavy liquid service” means that the piece of equipment in VOC service is not in gas/vapor service or not in light liquid service.

“[In] light liquid service” means that the piece of equipment in VOC service either (1) contains a liquid that meets all of the conditions in definition A; or (2) meets the condition specified in definition B:

Definition A--(1) the vapor pressure of one or more of the components is greater than 0.3 kiloPascals (kPa) (0.044 inches of mercury [in. Hg]) at 20°C (68°F). Standard reference tests or ASTM D-2879 shall be used to determine the vapor pressures; (2) the total concentration of the pure components having a vapor pressure greater than 0.3 kPa (0.044 in. Hg) at

20°C (68°F) is equal to or greater than ~~20%~~ percent by weight; and (3) the fluid is a liquid at operating conditions.

Definition B--Equipment is "in light liquid service" if the weight percent evaporated is greater than ~~10%~~ percent at 150°C as determined by ASTM D86.

“[In] vacuum service” means that the equipment in VOC service is operating at an internal pressure that is at least ~~5~~ five kPa (0.73 in. Hg) below ambient pressure.

“[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 ~~paragraph (i)(2) 29.9.2~~ of this ~~Section~~ regulation specify how to determine that a piece of equipment is not in VOC service.

“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.

29.3 ~~e.~~ Standards: General. The owner or operator of a petroleum refinery complex subject to ~~this Section~~ 29.0 of this regulation shall ensure that:

29.3.1 ~~4.~~ Any open-ended line or valve is sealed with a second valve, blind flange, cap, or plug except during operations requiring process fluid flow through the open-ended line or valve.

29.3.2 ~~2.~~ When a second valve is used, each open-ended line or valve equipped with a second valve is operated in such a manner that the valve on the process fluid end is closed before the second valve is closed.

29.3.3 ~~3.~~ When a double block-and-bleed system is used, the bleed valve or line is open only during operations that require venting of the line between the block valves and is closed at all other times.

29.4 ~~d.~~ Standards: Equipment inspection program. The owner or operator of a petroleum refinery shall conduct the equipment inspection program described in ~~paragraphs (d)(1) through (d)(3)~~ 29.4.1 through 29.4.3 of this ~~Section~~ regulation using the test methods specified in **Appendix F** of this regulation.

29.4.1 ~~4.~~ The owner or operator of a petroleum refinery shall conduct quarterly monitoring of each:

29.4.1.1 ~~i.~~ Compressor.

29.4.1.2 ~~ii.~~ Pump in light liquid service.

29.4.1.3 ~~iii.~~ Valve in light liquid service, except as provided in ~~paragraphs (e) and (f)~~ 29.5 and 29.6 of this ~~Section~~ regulation.

29.4.1.4 ~~iv.~~—Valve in gas/vapor service, except as provided in paragraphs (e) and (f) 29.5 and 29.6 of this Section regulation.

29.4.1.5 ~~v.~~—Pressure relief valve in gas/vapor service, except as provided in paragraphs (e) and (f) 29.5 and 29.6 of this Section regulation.

29.4.2 ~~2.~~—The owner or operator of a petroleum refinery shall conduct a weekly visual inspection of each pump in light liquid service.

29.4.3 ~~3.~~—The owner or operator of a petroleum refinery shall monitor each pressure relief valve after each overpressure relief to ensure that the valve has properly reseated and is not leaking.

29.4.4 ~~4.~~—When an instrument reading of 10,000 parts per million (ppm) or greater is measured, it shall be determined that a leak has been detected.

29.4.5 ~~5.~~—If there are indications of liquid dripping from the equipment, it shall be determined that a leak has been detected.

29.4.6 ~~6.~~—When a leak is detected, the owner or operator shall affix a weatherproof, readily visible tag in a bright color bearing the equipment identification number and the date on which the leak was detected. This tag shall remain in place until the leaking equipment is repaired. The requirements of ~~this paragraph~~ 29.4 of this regulation apply to any leak detected by the equipment inspection program and to any leak from any equipment that is detected on the basis of sight, sound, or smell.

29.5 ~~e.~~—Standards: Alternative standards for valves: Skip period leak detection and repair.

29.5.1 ~~4.~~—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 ~~paragraph (d)~~ 29.4 of this Section regulation.

29.5.2 ~~2.~~—After two 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 one of the quarterly leak detection periods for the valves in gas/vapor and light liquid service.

29.5.3 ~~3.~~—After five 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~~ three of the quarterly leak detection periods for the valves in gas/vapor and light liquid.

29.5.4 ~~4.~~—If the percent of valves leaking is greater than 2.0, the owner or operator shall comply with the requirements as described in ~~paragraph (d)~~

29.4 of this ~~Section~~ regulation but can again elect to use the requirements in ~~paragraph (e)~~ 29.5 of this ~~Section~~ regulation.

29.5.5 ~~5~~—The percent of valves leaking shall be determined by dividing the sum of valves found leaking during current monitoring and valves for which repair has been delayed by the total number of valves subject to the requirements of ~~this Section~~ 29.0 of this regulation.

29.5.6 ~~6~~—An owner or operator shall keep a record of the percent of valves found leaking during each leak detection period.

29.6 ~~f~~—Standards: Alternative standards for unsafe-to-monitor valves and difficult-to-monitor valves.

29.6.1 ~~4~~—Any valve that is designated, as described in ~~paragraph (j)(5)(i)~~ 29.10.5.1 of this ~~Section~~ regulation, as an unsafe-to-monitor valve is exempt from the requirements of ~~paragraph (d)~~ 29.4 of regulation if:

29.6.1.1 ~~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 ~~paragraph (d)~~ 29.4 of regulation.

29.6.1.2 ~~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.

29.6.2 ~~2~~—Any valve that is designated, as described in ~~paragraph (j)(5)(i)~~ 29.10.5.1 of this regulation, as a difficult-to-monitor valve is exempt from the requirements of ~~paragraph (d)~~ 29.4 of this regulation if:

29.6.2.1 ~~i~~—The owner or operator of the valve demonstrates that the valve cannot be monitored without elevating the monitoring personnel more than ~~2~~ two meters (m) (6.6 feet [ft]) above a support surface.

29.6.2.2 ~~ii~~—The owner or operator of the valve follows a written plan that requires monitoring of the valve at least once per calendar year.

29.7 ~~g~~—Standards: Equipment repair program. The owner or operator of a petroleum refinery shall:

29.7.1 ~~4~~—Make a first attempt at repair for any leak not later than ~~5~~ five calendar days after the leak is detected.

29.7.2 ~~2~~—Repair any leak as soon as practicable, but not later than 15 calendar days after it is detected except as provided in ~~paragraph (h)~~ 29.8 of this ~~Section~~ regulation.

29.8 ~~h~~–Standards: Delay of repair.

29.8.1 ~~1~~–Delay of repair of equipment for which a leak has been detected is allowed if the repair is technically infeasible without a process unit shutdown. Repair of such equipment shall occur before the end of the next process unit shutdown.

29.8.2 ~~2~~–Delay of repair of equipment is allowed for equipment that is isolated from the process and that does not remain in VOC service.

29.8.3 ~~3~~–Delay of repair beyond a process unit shutdown is 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 is not allowed unless the next process unit shutdown occurs sooner than 6 months after the first process unit shutdown.

29.9 ~~i~~–Test methods and procedures.

29.9.1 ~~1~~–In conducting the tests required to comply with ~~paragraph (d) 29.4~~ of this ~~Section~~ regulation, the owner or operator shall use the test methods specified in **Appendix F** of this regulation.

29.9.2 ~~2~~–The owner or operator shall test each piece of equipment as required under ~~paragraph (d) 29.4~~ of this ~~Section~~ regulation unless it is demonstrated that a process unit is not in VOC service, i.e., that the VOC content would never be reasonably expected to exceed 10% ~~percent~~ by weight. For purposes of this demonstration, the following methods and procedures shall be used:

29.9.2.1 ~~i~~–Procedures that conform to the general methods in ASTM E260, E168, and E169 shall be used to determine the percent VOC content in the process fluid that is contained in or contacts a piece of equipment.

29.9.2.2 ~~ii~~–Where the test methods in ~~paragraph (i)(2)(i) 29.9.2.1~~ of this regulation also measure exempt compounds, these compounds may be excluded from the total quantity of organic compounds in determining the VOC content of the process fluid.

29.9.2.3 ~~iii~~–Engineering judgment may be used to estimate the VOC content, if a piece of equipment had not been shown previously to be in VOC service. If the Department disagrees with the judgment, ~~paragraphs (i)(2)(i) and (i)(2)(ii) 29.9.2.1 and 29.9.2.2~~ of this ~~Section~~ regulation shall be used to resolve the disagreement.

29.9.3 ~~3~~–The owner or operator shall demonstrate that a piece of equipment is in light liquid service by showing one of the following:

29.9.3.1 ~~i.~~ All of the following conditions apply:

29.9.3.1.1 ~~A.~~ The vapor pressure of one or more of the components is greater than 0.3 kPa at 20°C (0.044 in. Hg at 68°F); standard reference texts or ASTM D2879 shall be used to determine the vapor pressures.

29.9.3.1.2 ~~B.~~ The total concentration of the pure components having a vapor pressure greater than 0.3 kPa at 20°C (0.044 in. Hg at 68°F) is equal to or greater than 20% ~~percent~~ by weight.

29.9.3.1.3 ~~C.~~ The fluid is a liquid at operating conditions.

29.9.3.2 ~~ii.~~ The percent VOC evaporated is greater than 10% ~~percent~~ at 150°C (302°F) as determined by ASTM D86.

29.9.4 ~~4.~~ Samples used in conjunction with ~~paragraphs (i)(2) and (i)(3)~~ 29.9.2 and 29.9.3 of this ~~Section~~ regulation shall be representative of the process fluid that is contained in or contacts the equipment.

29.10 ~~j.~~ Recordkeeping requirements

29.10.1 ~~4.~~ Each owner or operator subject to the provisions of ~~this Section~~ 29.0 of this regulation shall comply with the recordkeeping requirements of ~~this Section~~ 29.0 of this regulation. Except as noted, these records shall be maintained in a readily accessible location for a minimum of ~~5~~ five years and shall be made available to the Department immediately upon verbal or written request.

29.10.2 ~~2.~~ An owner or operator of more than one affected facility subject to the provisions of ~~this Section~~ 29.0 of this regulation may comply with the recordkeeping requirements for these facilities in one recordkeeping system if the system identifies each record by each facility.

29.10.3 ~~3.~~ When each leak is detected as specified in ~~paragraph (d)~~ 29.4 of this ~~Section~~ regulation, the following information shall be recorded in a log and shall be kept for ~~5~~ five years in a readily accessible location:

29.10.3.1 ~~i.~~ The instrument and operator identification numbers and the equipment identification number.

29.10.3.2 ~~ii.~~ The date the leak was detected and the dates of each attempt to repair the leak.

29.10.3.3 ~~iii.~~ The repair methods employed in each attempt to repair the leak.

29.10.3.4 ~~iv.~~—The notation "Above 10,000" if the maximum instrument reading measured by the methods specified in **Appendix F** of this regulation after each repair attempt is equal to or greater than 10,000 ppm.

29.10.3.5 ~~v.~~—The notation "Repair delayed" and the reason for the delay if a leak is not repaired within 15 calendar days after discovery of the leak.

29.10.3.6 ~~vi.~~—The signature of the owner or operator (or designate) whose decision it was that repair could not be effected without a process shutdown.

29.10.3.7 ~~vii.~~—The expected date of successful repair of the leak if a leak is not repaired within 15 calendar days.

29.10.3.8 ~~viii.~~—The dates of process unit shutdowns that occur while the equipment is unrepaired.

29.10.3.9 ~~ix.~~—The date of successful repair of the leak.

29.10.4 ~~4.~~—A list of identification numbers of equipment in vacuum service shall be recorded in a log that is kept in a readily accessible location.

29.10.5 ~~5.~~—The following information pertaining to all valves subject to the requirements of ~~paragraph (f) 29.6~~ of this ~~Section~~ regulation shall be recorded in a log that is kept for ~~5~~ five years in a readily accessible location:

29.10.5.1 ~~i.~~—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.

29.10.5.2 ~~ii.~~—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.

29.10.6 ~~6.~~—The following information for valves complying with ~~paragraph (e) 29.5~~ of this ~~Section~~ regulation shall be recorded in a log that is kept for ~~5~~ five years in a readily accessible location:

29.10.6.1 ~~i.~~—A schedule of monitoring.

29.10.6.2 ~~ii.~~—The percent of valves found leaking during each monitoring period as noted in ~~paragraph (e)(6) 29.5.6~~ of this ~~Section~~ regulation.

29.10.7 ~~7.~~—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 for 5 years in a readily accessible location for use in determining exemptions as provided in ~~paragraph (a)~~ 29.1 of this ~~Section~~ regulation.

29.11 ~~k.~~—Reporting. The owner or operator of any facility containing sources subject to ~~this Section~~ 29.0 of this regulation shall comply with the requirements in ~~Section 5~~ 5.0 of this regulation.

Section 30—

30.0 Petroleum Liquid Storage in External Floating Roof Tanks

11/29/1994

30.1 a. Applicability

30.1.1 ~~1. This Section applies~~ The provisions of 30.0 of this regulation apply to any petroleum liquid storage tank that is equipped with an external floating roof and that has a capacity greater than 150,000 liters (L) (40,000 gallons [gal]).

30.1.2 ~~2. This Section applies~~ The provisions of 30.0 of this regulation do not apply to any petroleum liquid storage tank that:

30.1.2.1 ~~i.~~ Is used to store waxy, heavy-pour crude oil.

30.1.2.2 ~~ii.~~ Has a capacity less than 1,600,000 L (420,000 gal) and is used to store produced crude oil and condensate prior to lease custody transfer.

30.1.2.3 ~~iii.~~ Contains a petroleum liquid with a maximum true vapor pressure less than 10.5 kiloPascals (kPa) (1.5 pounds per square inch atmospheric [psia]) provided that records are kept consistent with ~~paragraph (e)(2)~~ 30.5.2 of this Section regulation.

30.1.2.4 ~~iv.~~ Contains a petroleum liquid with a maximum true vapor pressure less than 27.6 kPa (4.0 psia) that:

30.1.2.4.1 ~~A.~~ Is of welded construction.

30.1.2.4.2 ~~B.~~ Presently possesses a metallic-type shoe seal, a liquid-mounted foam seal, a liquid-mounted liquid-filled type seal, or other closure device of demonstrated equivalence approved by the Administrator of the U.S. EPA as part of a State Implementation Plan (SIP) or Federal Implementation Plan (FIP) revision.

30.1.2.5 ~~v.~~ Is of welded construction, equipped with a metallic-type shoe primary seal and has a secondary seal from the top of the shoe seal to the tank wall (shoe-mounted secondary seal).

30.2 b. Definitions. As used in ~~this Section~~ 30.0 of this regulation, all terms not defined herein shall have the meaning given them in the November 15, 1990 Clean Air Act Amendments, or in ~~Section 2~~ 2.0 of this regulation.

“Waxy, heavy-pour crude oil” means a crude oil with a pour point of 10°C (50°F) or higher as determined by the American Society for Testing and Materials Standard D97-66, “Test for Pour Point of Petroleum Oils”.

30.3 ~~e~~–Standards. No owner of a petroleum liquid storage vessel subject to ~~this Section~~ 30.0 of this regulation shall store a petroleum liquid in that tank unless:

30.3.1 ~~1~~–The tank has been fitted with one of the following:

30.3.1.1 ~~i~~–A continuous secondary seal extending from the floating roof to the tank wall (rim-mounted secondary seal).

30.3.1.2 ~~ii~~–A closure or other device that controls VOC emissions with an effectiveness equal to or greater than a seal required under ~~paragraph (e)(1)(i)~~ 30.3.1.1 of this ~~Section~~ regulation and is approved by the Administrator of the U.S. EPA as part of a SIP or FIP revision.

30.3.2 ~~2~~–All seal closure devices meet the following requirements:

30.3.2.1 ~~i~~–There are no visible holes, tears, or other openings in the seal~~(s)~~ (or seals) or seal fabric.

30.3.2.2 ~~ii~~–The seal~~(s)~~ or seals are intact and uniformly in place around the circumference of the floating roof between the floating roof and the tank wall.

30.3.2.3 ~~iii~~–For vapor-mounted primary seals, the accumulated area of gaps exceeding 0.32 centimeter (cm) (0.125 inch [in.]) in width between the secondary seal and the tank wall shall not exceed 21.2 square centimeters per meter (cm²/m) (1.0 square inch per foot [in²/ft]) of tank diameter, as determined by the method in ~~paragraph (f)~~ 30.6 of this ~~Section~~ regulation.

30.3.3 ~~3~~–All openings in the external floating roof, except for automatic bleeder vents, rim space vents, and leg sleeves, are equipped with:

30.3.3.1 ~~i~~–Covers, seals, or lids in the closed position except when the openings are in actual use.

30.3.3.2 ~~ii~~–Projections into the tank that remain below the liquid surface at all times.

30.3.4 ~~4~~–Automatic bleeder vents are closed at all times except when the roof is being floated off or being landed on the roof leg supports.

30.3.5 ~~5~~–Rim vents are set to open when the roof is being floated off the leg supports or at the manufacturer's recommended setting.

30.3.6 ~~6~~–Emergency roof drains are provided with slotted membrane fabric covers or equivalent covers that cover at least 90% ~~percent~~ of the area of the opening.

30.4 ~~d~~–Inspections

The owner or operator of a petroleum liquid storage tank with an external floating roof subject to ~~this Section~~ 30.0 of this regulation shall:

30.4.1 ~~1~~—Perform routine inspections semiannually in order to ensure compliance with ~~paragraph (e)~~ 30.3 of this ~~Section~~ regulation (the inspections shall include a visual inspection of the secondary seal gap).

30.4.2 ~~2~~—Measure the secondary seal gap annually in accordance with ~~paragraph (f)~~ 30.6 of this ~~Section~~ regulation when the floating roof is equipped with a vapor-mounted primary seal.

30.5 ~~e~~—Recordkeeping

30.5.1 ~~1~~—The owner or operator of any petroleum liquid storage tank with an external floating roof subject to ~~this Section~~ 30.0 of this regulation shall maintain the following records in a readily accessible location for at least 5 years and shall make copies of the records available to the Department upon verbal or written request:

30.5.1.1 ~~i~~—Records of the types of volatile petroleum liquids stored.

30.5.1.2 ~~ii~~—Records of the maximum true vapor pressure of the liquid as stored.

30.5.1.3 ~~iii~~—Records of the results of the inspections performed in accordance with ~~paragraph (d)~~ 30.4 of this ~~Section~~ regulation.

30.5.2 ~~2~~—The owner or operator of a petroleum liquid storage vessel with an external floating roof exempted from ~~this Section~~ 30.0 of this regulation by ~~paragraph (a)(2)(iii)~~ 30.1.2.3 of this ~~regulation~~, but containing a petroleum liquid with a true vapor pressure greater than 7.0 kPa (1.0 psia), shall maintain the following records in a readily accessible location for at least ~~5~~ five years and shall make copies of the records available to the Department upon verbal or written request:

30.5.2.1 ~~i~~—Records of the average monthly storage temperature.

30.5.2.2 ~~ii~~—Records of the type of liquid stored.

30.5.2.3 ~~iii~~—Records of the maximum true vapor pressure for all petroleum liquids with a true vapor pressure greater than 7.0 kPa (1.0 psia).

30.5.3 ~~3~~—The Department may, upon written notice, require more frequent inspections or modify the monitoring and recordkeeping requirements, when necessary to accomplish the purposes of ~~this Section~~ 30.0 of this regulation.

30.6 ~~f.~~ Compliance provisions. Compliance with ~~paragraph (c)(2)(iii)~~ 30.3.2.3 of this ~~Section~~ regulation shall be determined by:

30.6.1 ~~4.~~ Physically measuring the length and width of all gaps around the entire circumference of the secondary seal in each place where a 0.32 cm (0.125 in.) uniform diameter probe passes freely (without forcing or binding against the seal) between the seal and tank wall.

30.6.2 ~~2.~~ Summing the area of the individual gaps.

30.7 ~~g.~~ Reporting. The owner or operator of any facility containing sources subject to ~~this Section~~ 30.0 of this regulation shall comply with the requirements in ~~Section 5~~ 5.0 of this regulation.

~~Section 31—~~

31.0 Petroleum Liquid Storage in Fixed Roof Tanks

11/29/1994

31.1 ~~a~~—Applicability

31.1.1 ~~1. This Section applies~~ The provisions of 31.0 of this regulation apply to any fixed roof petroleum liquid storage tank with a capacity greater than 150,000 liters (L) (40,000 gallons [gal]).

31.1.2 ~~2. This Section does~~ The provisions of 31.0 of this regulation do not apply to any petroleum liquid storage tank that:

31.1.2.1 ~~i.~~—Has a capacity of less than 1,600,000 L (420,000 gal) and is used to store produced crude oil and condensate prior to lease custody transfer.

31.1.2.2 ~~ii.~~—Is a horizontal underground storage tank used to store JP-4 jet fuel.

31.1.2.3 ~~iii.~~—Contains a petroleum liquid with a maximum true vapor pressure less than 10.5 kiloPascals (kPa) (1.5 pounds per square inch atmospheric [psia]), provided that records are maintained consistent with ~~paragraph (e)(2)~~ 31.5.2 of this Section regulation.

31.2 ~~b.~~—Definitions. As used in ~~this Section~~ 31.0 of this regulation, all terms not defined herein shall have the meaning given them in the November 15, 1990 Clean Air Act Amendments (CAAA), or in ~~Section 2~~ 2.0 of this regulation.

31.3 ~~e.~~—Standards. No owner or operator of a petroleum liquid storage tank subject to ~~this Section~~ 31.0 of this regulation shall store petroleum liquid in that tank unless:

31.3.1 ~~1.~~—The tank is equipped with one of the following:

31.3.1.1 ~~i.~~—An internal floating roof equipped with a closure seal or seals to close the space between the roof edge and tank wall.

31.3.1.2 ~~ii.~~—Equally effective alternative control, approved by the Administrator of the U.S. EPA as part of a State Implementation Plan (SIP) or Federal Implementation Plan (FIP) revision.

31.3.2 ~~2.~~—The tank is maintained such that there are no visible holes, tears, or other openings in the seal or any seal fabric or materials.

31.3.3 ~~3.~~—All openings, except stub drains, are equipped with covers, lids, or seals such that:

31.3.3.1 ~~i~~–The cover, lid, or seal is in the closed position at all times except when in actual use.

31.3.3.2 ~~ii~~–Automatic bleeder vents are closed at all times except when the roof is being floated off or being landed on the roof leg supports.

31.3.3.3 ~~iii~~–Rim vents, if provided, are set to open when the roof is being floated off the roof leg supports or at the manufacturer's recommended setting.

31.4 ~~d~~–Inspections. The owner or operator of a petroleum liquid storage tank with a fixed roof subject to ~~this Section~~ 31.0 of this regulation shall:

31.4.1 ~~1~~–For tanks equipped with a single seal system:

31.4.1.1 ~~i~~–Visually inspect the internal floating roof and its closure seal or seals through roof hatches at least once every 12 months.

31.4.1.2 ~~ii~~–Perform a complete inspection of any cover and single seal whenever the tank is emptied for nonoperational reasons or at least every 10 years, whichever is more frequent.

31.4.2 ~~2~~–For tanks equipped with a double seal system:

31.4.2.1 ~~i~~–Visually inspect the internal floating roof and its closure seal or seals through the roof hatches at least once every ~~5~~ five years.

31.4.2.2 ~~ii~~–Perform a complete inspection of any cover and double seal whenever the tank is emptied for nonoperational reasons or at least every ~~5~~ five years, whichever is more frequent.

31.5 ~~e~~–Recordkeeping

31.5.1 ~~1~~–The owner or operator of a petroleum liquid storage tank with a fixed roof subject to ~~this Section~~ 31.0 of this regulation shall maintain the following records in a readily accessible location for at least ~~5~~ five years and shall make copies of the records available to the Department upon verbal or written request:

31.5.1.1 ~~i~~–Records of the types of volatile petroleum liquids stored in that tank.

31.5.1.2 ~~ii~~–Records of the maximum true vapor pressure of the liquid as stored.

31.5.1.3 ~~iii~~–Records of the results of the inspections required in ~~paragraph (d)~~ 31.4 of this Section regulation.

31.5.2 2. The owner or operator of a petroleum liquid storage tank with a fixed roof exempted from ~~this Section by paragraph (a)(2)~~ 31.1.2 of this regulation, but containing a petroleum liquid with a true vapor pressure greater than 7.0 kPa (1.0 psia), shall maintain the following records in a readily accessible location for at least ~~5~~ five years and shall make copies of the records available to the Department upon verbal or written request:

31.5.2.1 i. Records of the average monthly storage temperature.

31.5.2.2 ii. Records of the type of liquid stored.

31.5.2.3 iii. Records of the maximum true vapor pressure for any petroleum liquid with a true vapor pressure greater than 7.0 kPa (1.0 psia).

31.6 f. Reporting. The owner or operator of any facility containing sources subject to ~~this Section~~ 31.0 of this regulation shall comply with the requirements in ~~Section 5~~ 5.0 of this regulation.

Section 32—

32.0 Leaks from Natural Gas/Gasoline Processing Equipment

11/29/1994

32.1 a. Applicability

32.1.1 1. ~~This Section applies~~ The provisions of 32.0 of this regulation apply to all equipment in volatile organic compound (VOC) service in any process unit at any onshore natural gas/gasoline processing facility.

32.1.2 2. ~~This Section does~~ The provisions of 32.0 of this regulation do not apply to:

32.1.2.1 i. ~~Any equipment in vacuum service.~~

32.1.2.2 ii. ~~Any equipment in heavy liquid service.~~

32.1.2.3 iii. ~~Wet gas reciprocating compressors in plants that do not have a VOC control device, such as a flare or a continuously burning process heater or boiler.~~

32.1.3 3. ~~The equipment inspection requirements in paragraph (d) 32.4 of this Section~~ regulation do not apply to:

32.1.3.1 i. ~~Any natural gas/gasoline processing facility with a design field gas capacity of less than 2.8×10^5 standard cubic meters (10×10^6 standard cubic feet) per day that does not fractionate natural gas liquids.~~

32.1.3.2 ii. ~~Any pump with dual pump seals.~~

32.1.3.3 iii. ~~Any pressure relief valve that is connected to an operating flare header or vapor recovery device.~~

32.1.3.4 iv. ~~Any compressor with a degassing vent that is routed to an operating VOC control device.~~

32.1.4 4. ~~Any facility that becomes or is currently subject to the provisions of this Section~~ 32.0 of this regulation by exceeding the applicability threshold in ~~paragraph (a)(3)(i)~~ 32.1.3.1 of this ~~Section~~ regulation will remain subject to these provisions, even if its throughput or emissions later fall below the applicability threshold. Any facility that is currently subject to a state or federal rule promulgated pursuant to the Clean Air Act Amendments of 1977 by exceeding an applicability threshold is and will remain subject to those provisions, even if its throughput or emissions have fallen or later fall below the applicability threshold.

32.2 ~~b.~~ Definitions. As used in ~~this Section 32.0 of this regulation~~, all terms not defined herein shall have the meaning given them in the November 15, 1990 Clean Air Act Amendments (CAAA), or in ~~Section 2.0~~ 2.0 of this regulation.

“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 or in wet gas service and any devices or systems required by ~~this Section 32.0 of this regulation~~.

“Field gas” means feedstock gas entering the natural gas processing plant.

“[In] gas/vapor service” means that the piece of equipment in VOC service contains process fluid that is in the gaseous state at operating conditions.

“[In] heavy liquid service” means that the piece of equipment in VOC service is not in gas/vapor service or not in light liquid service.

“[In] light liquid service” means that the piece of equipment in VOC service either (1) contains a liquid that meets all of the conditions in definition A or (2) meets the condition specified in definition B:

Definition A--(1) the vapor pressure of one or more of the components is greater than 0.3 kiloPascal (kPa) (0.044 inch of mercury [in. Hg]) at 20°C (68°F). Standard reference tests or ASTM D-2879 shall be used to determine the vapor pressures; (2) the total concentration of the pure components having a vapor pressure greater than 0.3 kPa (0.044 in. Hg) at 20°C (68°F) is equal to or greater than 20% ~~percent~~ by weight; and (3) the fluid is a liquid at operating conditions.

Definition B--Equipment is "in light liquid service" if the weight percent evaporated is greater than 10% ~~percent~~ at 150°C as determined by ASTM D86.

“Liquids dripping” means any visible leakage from a seal including spraying, misting, clouding, and ice formation.

“Natural gas liquids” means the hydrocarbons, such as ethane, propane, butane, and pentane, that are extracted from field gas.

“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.

“Nonfractionating plant” means any gas plant that does not fractionate mixed natural gas liquids into natural gas products.

“Onshore” means all facilities except those that are located in the territorial seas or on the outer continental shelf.

“**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 processing natural gas products. A process unit can operate independently if supplied with sufficient feed or raw materials and sufficient storage facilities for the products.

“**Reciprocating compressor**” means a piece of equipment that increases the pressure of a process gas by positive displacement, employing linear movement of the driveshaft.

“**[In] vacuum service**” means that the equipment in VOC service is operating at an internal pressure that is at least ~~5~~ five kPa (0.73 in. Hg) below ambient pressure.

“**[In] VOC service**” means that the piece of equipment contains or contacts a process fluid that is at least 1% ~~percent~~ VOC by weight. The provisions of ~~paragraph (i)(2)~~ 32.9.2 of this ~~Section~~ regulation specify how to determine that a piece of equipment is not in VOC service.

“**[In] wet gas service**” means that a piece of equipment contains or contacts the field gas before the extraction step in the process.

32.3 ~~e~~—Standards: General. The owner or operator of a natural gas/gasoline processing facility subject to ~~this Section~~ 32.0 of this regulation shall ensure that:

32.3.1 ~~4~~—Any open-ended line or valve is sealed with a second valve, blind flange, cap, or plug except during operations requiring process fluid flow through the open-ended line or valve.

32.3.2 ~~2~~—When a second valve is used, each open-ended line or valve equipped with a second valve is operated in such a manner that the valve on the process fluid end is closed before the second valve is closed.

32.3.3 ~~3~~—When a double block-and-bleed system is used, the bleed valve or line is open only during operations that require venting of the line between the block valves and is closed at all other times.

32.4 ~~d~~—Standards: Equipment inspection program. The owner or operator of a natural gas/gasoline processing facility subject to ~~this Section~~ 32.0 of this regulation shall conduct the equipment inspection program described in ~~paragraphs (d)(1) through (d)(3)~~ 32.4.1 through 32.4.3 of this ~~Section~~ regulation using the test methods specified in **Appendix F** of this regulation.

32.4.1 ~~4~~—The owner or operator of a natural gas/gasoline processing facility subject to ~~this Section~~ 32.0 of this regulation shall conduct quarterly monitoring of each:

32.4.1.1 ~~i~~—Compressor.

32.4.1.2 ~~ii~~—Pump in light liquid service.

32.4.1.3 ~~iii.~~—Valve in light liquid service, except as provided in paragraphs (e) and (f) 32.5 and 32.6 of this Section regulation.

32.4.1.4 ~~iv.~~—Valve in gas/vapor service, except as provided in paragraphs (e) and (f) 32.5 and 32.6 of this Section regulation.

32.4.1.5 ~~v.~~—Pressure relief valve in gas/vapor service, except as provided in paragraphs (e) and (f) 32.5 and 32.6 of this Section regulation.

32.4.2 ~~2.~~—The owner or operator of a natural gas/gasoline processing facility subject to ~~this Section~~ 32.0 of this regulation shall conduct a weekly visual inspection of each pump in light liquid service.

32.4.3 ~~3.~~—The owner or operator of a natural gas/gasoline processing facility subject to ~~this Section~~ 32.0 of this regulation shall monitor each pressure relief valve within ~~5~~ five days after each overpressure relief to ensure that the valve has properly resealed and is not leaking.

32.4.4 ~~4.~~

32.4.4.1 ~~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~~ five days.

32.4.4.2 ~~ii.~~—No pressure relief device described in ~~paragraph (d)(4)(i)~~ 32.4.4.1 of this Section regulation shall be allowed to operate for more than 30 days after a pressure release without monitoring.

32.4.5 ~~5.~~

32.4.5.1 ~~i.~~—When an instrument reading of 10,000 parts per million (ppm) or greater is measured, it shall be determined that a leak has been detected.

32.4.5.2 ~~ii.~~—If there are indications of liquid dripping from the equipment, it shall be determined that a leak has been detected.

32.4.6 ~~6.~~—When a leak is detected, the owner or operator shall affix a weatherproof, readily visible tag in a bright color such as red or yellow bearing the equipment identification number and the date on which the leak was detected. This tag shall remain in place until the leaking equipment is repaired. The requirements of ~~this paragraph~~ 32.0 of this regulation apply to any leak detected by the equipment inspection program and to any leak from any equipment that is detected on the basis of sight, sound, or smell.

32.5 e.—Standards: Alternative standards for valves Skip period leak detection and repair.

32.5.1 4.—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 ~~paragraph (d)~~ 32.4 of this ~~Section~~ regulation.

32.5.2 2.—After two consecutive quarterly leak detection periods with the percent of valves leaking equal or less than 2.0, an owner or operator may skip one of the quarterly leak detection periods for the valves in gas/vapor and light liquid service.

32.5.3 3.—After five 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 three of the quarterly leak detection periods for the valves in gas/vapor and light liquid service.

32.5.4 4.—If the percent of valves leaking is greater than 2.0, the owner or operator shall comply with the requirements as described in ~~paragraph (d)~~ 32.4 of this ~~Section~~ regulation but can again elect to use the requirements in ~~paragraph (e)~~ 32.5 of this ~~Section~~ regulation.

32.5.5 5.—The percent of valves leaking shall be determined by dividing the sum of valves found leaking during current monitoring and valves for which repair has been delayed by the total number of valves subject to the requirements of ~~this Section~~ 32.0 of this regulation.

32.5.6 6.—An owner or operator shall keep a record of the percent of valves found leaking during each leak detection period.

32.6 f.—Standards: Alternative standards for valves that are unsafe or difficult to monitor.

32.6.1 4.—Any valve that is designated, as described in ~~paragraph (j)(5)(i)~~ 32.10.5.1 of this ~~Section~~ regulation, as an unsafe-to-monitor valve is exempt from the requirements of ~~paragraph (d)~~ 32.4 of regulation if:

32.6.1.1 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 ~~paragraph (d)~~ 32.4 of regulation.

32.6.1.2 ii.—The owner or operator of the valve adheres to a written plan that requires monitoring the valve as frequently as practicable during safe-to-monitor times.

32.6.2 2.—Any valve that is designated, as described in ~~paragraph (j)(5)(i)~~ 32.10.5.1 of this regulation, as a difficult-to-monitor valve is exempt from the requirements of ~~paragraph (d)~~ 32.4 of regulation if:

32.6.2.1 ~~i~~—The owner or operator of the valve demonstrates that the valve cannot be monitored without elevating the monitoring personnel more than 2 two meters (m) (6.6 feet [ft]) above a support surface.

32.6.2.2 ~~ii~~—The owner or operator of the valve follows a written plan that requires monitoring of the valve at least once per calendar year.

32.7 ~~g~~—Standards: Equipment repair program. The owner or operator of a natural gas/gasoline processing facility shall:

32.7.1 ~~4~~—Make a first attempt at repair for any leak not later than 5 five calendar days after the leak is detected.

32.7.2 ~~2~~—Repair any leak as soon as practicable, but not later than 15 calendar days after it is detected except as provided in ~~paragraph (h)~~ 32.8 of this ~~Section~~ regulation.

32.8 ~~h~~—Standards: Delay of repair

32.8.1 ~~4~~—Delay of repair of equipment for which a leak has been detected is allowed if the repair is technically infeasible without a process unit shutdown. Such equipment shall be repaired before the end of the next process unit shutdown.

32.8.2 ~~2~~—Delay of repair of equipment is allowed for equipment that is isolated from the process and that does not remain in VOC service.

32.8.3 ~~3~~—Delay of repair beyond a process unit shutdown is 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 is not allowed unless the next process unit shutdown occurs sooner than 6 months after the first process unit shutdown.

32.9 ~~i~~—Test methods and procedures

32.9.1 ~~4~~—In conducting the tests required to comply with ~~paragraph (d)~~ 32.4 of this ~~Section~~ regulation, the owner or operator shall use the test methods specified in **Appendix F** of this regulation.

32.9.2 ~~2~~—The owner or operator shall test each piece of equipment unless it is demonstrated that a process unit is not in VOC service, i.e., that the VOC content would never be reasonably expected to exceed 1% percent by weight. For purposes of this demonstration, the following methods and procedures shall be used:

32.9.2.1 ~~i.~~ Procedures that conform to the general methods in ASTM E260, E168, and E169 shall be used to determine the percent VOC content in the process fluid that is contained in or contacts a piece of equipment.

32.9.2.2 ~~ii.~~ Where the test methods in ~~paragraph (i)(2)(i)~~ 32.9.2.1 of regulation also measure exempt compounds, these compounds may be excluded from the total quantity of organic compounds in determining the VOC content of the process fluid.

32.9.2.3 ~~iii.~~ Engineering judgment may be used to estimate the VOC content, if a piece of equipment had not been shown previously to be in VOC service. If the Department disagrees with the judgment, ~~paragraphs (i)(2)(i) and (i)(2)(ii)~~ 32.9.2.1 and 32.9.2.2 of this Section regulation shall be used to resolve the disagreement.

32.9.3 ~~3.~~ The owner or operator shall demonstrate that a piece of equipment is in light liquid service by showing that all of the following conditions apply:

32.9.3.1 ~~i.~~ The vapor pressure of one or more of the components is greater than 0.3 kPa at 20°C (0.09 in. Hg at 68°F). Standard reference texts or ASTM D2879 shall be used to determine the vapor pressures.

32.9.3.2 ~~ii.~~ The total concentration of the pure components having a vapor pressure greater than 0.3 kPa at 20°C (0.09 in. Hg at 68°F) is equal to or greater than 20% ~~percent~~ by weight.

32.9.3.3 ~~iii.~~ The fluid is a liquid at operating conditions.

32.9.4 ~~4.~~ Samples used in conjunction with ~~paragraphs (i)(2) and (i)(3)~~ 32.9.2 and 32.9.3 of this Section regulation shall be representative of the process fluid that is contained in or contacts the equipment.

32.10 ~~j.~~ Recordkeeping

32.10.1 ~~4.~~ Each owner or operator subject to the provisions of ~~this Section~~ 32.0 of this regulation shall comply with the recordkeeping requirements of ~~this Section~~ 32.0 of this regulation.

32.10.2 ~~2.~~ An owner or operator of more than one facility subject to the provisions of ~~this Section~~ 32.0 of this regulation may comply with the recordkeeping requirements for these facilities in one recordkeeping system if the system identifies each record by each facility.

32.10.3 ~~3.~~ When each leak is detected as specified in ~~paragraph (d)~~ 32.4 of this Section regulation, the following information shall be recorded in a log and shall be kept for 5 ~~five~~ years in a readily accessible location:

32.10.3.1 ~~i.~~—The instrument and operator identification numbers and the equipment identification number.

32.10.3.2 ~~ii.~~—The date the leak was detected and the dates of each attempt to repair the leak.

32.10.3.3 ~~iii.~~—The repair methods employed in each attempt to repair the leak.

32.10.3.4 ~~iv.~~—The notation "Above 10,000" if the maximum instrument reading measured by the methods specified in **Appendix F** of this regulation after each repair attempt is equal to or greater than 10,000 ppm.

32.10.3.5 ~~v.~~—The notation "Repair delayed" and the reason for the delay if a leak is not repaired within 15 calendar days after discovery of the leak.

32.10.3.6 ~~vi.~~—The signature of the owner or operator (or designate) whose decision it was that repair could not be effected without a process shutdown.

32.10.3.7 ~~vii.~~—The expected date of successful repair of the leak if a leak is not repaired within 15 calendar days.

32.10.3.8 ~~viii.~~—The dates of process unit shutdowns that occur while the equipment is unrepaired.

32.10.3.9 ~~ix.~~—The date of successful repair of the leak.

32.10.4 4.—A list of identification numbers of equipment in vacuum service shall be recorded in a log that is kept in a readily accessible location.

32.10.5 5.—The following information pertaining to all valves subject to the requirements of ~~paragraph (f)~~ 32.6 of this ~~Section~~ regulation shall be recorded in a log that is kept for ~~5~~ five years in a readily accessible location:

32.10.5.1 ~~i.~~—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.

32.10.5.2 ~~ii.~~—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.

32.10.6 ~~6~~—The following information pertaining to all valves complying with ~~paragraph (e)~~ 32.5 of this ~~Section~~ regulation shall be recorded in a log that is kept for ~~5~~ five years in a readily accessible location:

32.10.6.1 ~~i~~—A schedule of monitoring.

32.10.6.2 ~~ii~~—The percent of valves found leaking during each monitoring period.

32.10.7 ~~7~~—The following information shall be recorded in a log that is kept for ~~5~~ five years in a readily accessible location for use in determining exemptions as provided in ~~paragraph (a)~~ 32.1 of this ~~Section~~ regulation:

32.10.7.1 ~~i~~—An analysis demonstrating the design capacity of the affected facility.

32.10.7.2 ~~ii~~—Information and data used to demonstrate that a piece of equipment is not in VOC service.

32.10.7.3 ~~iii~~—Information and data used to demonstrate that a reciprocating compressor is in wet gas service.

32.11 ~~k~~—Reporting. The owner or operator of any facility containing sources subject to ~~this Section~~ 32.0 of this regulation shall comply with the requirements in ~~Section 5~~ 5.0 of this regulation.

Section 33—

33.0 Solvent Cleaning and Drying.

11/11/2001

33.1 a. ~~Applicability~~

33.1.1 ~~4. This Section applies~~ The provisions of 33.0 of this regulation apply to any person who owns or operates a solvent cleaning machine that meets the criteria of ~~paragraphs a.1.i. and a.1.ii~~ 33.1.1.1 and 33.1.1.2 of this regulation.

33.1.1.1 ~~i.~~ Contains more than 1 liter of solvent.

33.1.1.2 ~~ii.~~ Uses any solvent containing volatile organic compounds in a total concentration greater than 5% percent by weight, as a cleaning and/or drying agent.

33.1.2 ~~2. Except as provided in paragraphs c.4. through c.6.~~ 33.3.4 through 33.3.6 of this Section regulation, existing sources affected by this Section 33.0 of this regulation shall comply with the provisions of this Section 33.0 of this regulation no later than November 11, 2001. New, modified, or reconstructed sources affected by this Section 33.0 of this regulation shall comply with the provisions of this Section 33.0 of this regulation upon start-up.

33.1.3 ~~3. Any person subject to both this Section 33.0 of this regulation and Regulation 30 7 DE Admin Code 1130 of the State of Delaware “Regulations Governing the Control of Air Pollution” shall submit to the Department a request to amend the existing Title V permit, consistent with the permitting requirements of Regulation 30 7 DE Admin Code 1130. Any person subject to paragraph c. 33.3 of this Section regulation, but not subject to Regulation 30 7 DE Admin Code 1130, shall request to be covered under a source category permit, consistent with Regulation 2 7 DE Admin Code 1102 of the State of Delaware “Regulations Governing the Control of Air Pollution” within 90 days of the Department’s establishment of a source category permit covering solvent cleaning and drying. Any person subject to paragraphs d. through g. 33.4 through 33.7 of this Section regulation, but not subject to Regulation 30 7 DE Admin Code 1130, shall submit to the Department a request to amend the existing Regulation 2 7 DE Admin Code 1102 permit, consistent with the permitting requirements of Regulation 2 7 DE Admin Code 1102.~~

33.2 b. ~~Definitions.~~ As used in this Section 33.0 of this regulation, all terms not defined herein shall have the meaning given them in the November 15, 1990 Clean Air Act Amendments, in Regulation 1 7 DE Admin Code 1101, or in Section 2 2.0 of this regulation.

“Airless cleaning system” means a solvent cleaning machine that is automatically operated and seals at a differential pressure of 0.50 pounds per square inch gauge (psig) or less, prior to the introduction of solvent or solvent

vapor into the cleaning chamber and maintains differential pressure under vacuum during all cleaning and drying cycles.

“Airtight cleaning system” means a solvent cleaning machine that is automatically operated and seals at a differential pressure of 0.50 pounds per square inch gauge (psig) or less, prior to the introduction of solvent or solvent vapor into the cleaning chamber and during all cleaning and drying cycles.

“Automated parts handling system” means a mechanical device that carries all parts and parts baskets at a controlled speed from the initial loading of soiled or wet parts through the removal of the cleaned or dried parts. Automated parts handling systems include, but are not limited to, hoists and conveyors.

“Batch vapor cleaning machine” means a vapor solvent cleaning machine in which individual parts or a set of parts move through the entire cleaning or drying cycle before new parts are introduced into the cleaning machine. The term does not include machines that do not have a solvent/air interface, such as airless and airtight cleaning systems.

“Carbon adsorber” means a bed of activated carbon into which an air/solvent gas-vapor stream is routed and which adsorbs the solvent on the carbon.

“Cold cleaning machine” means a solvent cleaning machine that contains and/or uses unheated liquid solvent into which parts are placed to remove soils from the surfaces of the parts or to dry the parts. The term does not include machines that do not have a solvent/air interface, such as airless and airtight cleaning systems.

“Downtime mode” means the time period when a solvent cleaning machine is not cleaning or drying parts and the sump heating coils, if present, are turned off.

“Dwell” means the technique of holding parts within the freeboard area but above the vapor zone of a solvent cleaning machine. Dwell occurs after cleaning or drying to allow solvent to drain from the parts or parts baskets back into the solvent cleaning machine.

“Dwell time” means the period of time between when parts or a parts basket is placed in the vapor zone of a batch vapor or in-line vapor cleaning machine and when solvent dripping ceases.

“Freeboard height” means, for a batch cold cleaning machine, the distance from the liquid solvent level to the top of the solvent cleaning machine. For a batch vapor cleaning machine, it is the distance from the solvent/air interface to the top of the solvent cleaning machine, as measured during idling mode. For an in-line cleaning machine, it is the distance from the solvent/air interface to the bottom of the entrance or exit opening, whichever is lower, as measured during idling mode.

“Freeboard ratio” means the ratio of the solvent cleaning machine freeboard height to the smaller interior dimension (length, width, or diameter) of the solvent cleaning machine.

“In-line vapor cleaning machine” means a vapor solvent cleaning machine that uses an automated parts handling system, typically a conveyor, to automatically provide a continuous supply of parts to be cleaned or dried. These units are fully enclosed except for the conveyor inlet and exit portals.

“Primary condenser” means a series of circumferential cooling coils on a vapor cleaning machine through which a chilled substance is circulated or recirculated to provide continuous condensation of rising solvent vapors and, thereby, creating a concentrated solvent vapor zone.

“Reduced room draft” means decreasing the flow or movement of air across the top of the freeboard area of a solvent cleaning machine to less than 15.2 meters per minute (50 feet per minute) by methods including, but not limited to, redirecting fans and/or air vents to not blow across the cleaning machine, moving the cleaning machine to a corner where there is less room draft, and constructing a partial or complete enclosure around the cleaning machine.

“Remote reservoir cold cleaning machine” means a solvent cleaning machine in which liquid solvent is pumped to a sink-like work area that immediately drains solvent back into an enclosed container while parts are being cleaned or dried, allowing no solvent to pool in the work area.

“Soils” means contaminants that are removed from the parts being cleaned. Soils include, but are not limited to, grease, oils, waxes, metal chips, carbon deposits, fluxes, and tars.

“Solvent/air interface” means, for a vapor cleaning machine, the location of contact between the concentrated solvent vapor layer and the air. This location of contact is defined as the mid-line height of the primary condenser coils. For a cold cleaning machine, it is the location of contact between the liquid solvent and the air.

“Solvent cleaning machine” means any device or piece of equipment that uses volatile organic compounds, liquid or vapor, to remove soils from parts or to dry parts. Types of solvent cleaning machines include, but are not limited to, batch vapor, in-line vapor, in-line cold, immersion cold, and remote reservoir cold cleaning machines, as well as, airless cleaning and airtight cleaning systems.

“Superheated vapor system” means a system that heats the solvent vapor, either passively or actively, to a temperature 10°F above the solvent’s boiling point. Parts are held in the superheated vapor before exiting the machine to evaporate the liquid solvent on the parts. Hot vapor recycle is an example of a superheated vapor system.

“Vapor cleaning machine” means a batch or in-line solvent cleaning machine that heats liquid solvent that is used as part of the cleaning or drying cycle. The heated solvent may or may not be boiling. The term does not include machines that do not have a solvent/air interface, such as airless and airtight cleaning systems.

“Vapor up control switch” means a thermostatically controlled switch that shuts off or prevents solvent from being sprayed when there is no vapor. On in-line vapor cleaning machines the switch also prevents the conveyor from operating when there is no vapor.

“Working mode” means the time period when the solvent cleaning machine is actively cleaning or drying parts.

“Working mode cover” means any cover or solvent cleaning machine design that allows the cover to shield the cleaning machine openings from outside air disturbances while parts are being cleaned or dried in the cleaning machine. A cover that is used during the working mode is opened only during parts entry and removal.

33.3 ~~e.~~ Standards for batch cold cleaning machines. ~~This paragraph applies~~ The provisions of 33.3 of this regulation apply to all batch cold cleaning machines. ~~The provisions of this paragraph~~ 33.3 of this regulation shall not apply if the owner or operator of the cold cleaning machine demonstrates and the Department approves in writing that compliance with ~~the paragraph~~ 33.3 of this regulation will result in unsafe operating conditions.

33.3.1 ~~4.~~ Immersion cold cleaning machines shall have a freeboard ratio of 0.75 or greater unless the machines are equipped with working mode covers that shall be closed except when parts are being placed into or being removed from the machine. Covers shall be free of cracks, holes, and other defects, and easily opened or closed.

33.3.2 ~~2.~~ Immersion cold cleaning machines and remote reservoir cold cleaning machines shall:

33.3.2.1 ~~i.~~ Have a permanent, conspicuous label summarizing the operating requirements in ~~paragraph e.3.~~ 33.3.3 of this ~~Section~~ regulation.

33.3.2.2 ~~ii.~~ Be equipped with a downtime mode cover that shall be closed at all times except during cleaning or drying of parts or the addition or removal of solvent. Cover shall be free of cracks, holes, and other defects, and readily opened or closed.

33.3.3 ~~3.~~ Cold cleaning machines shall be operated in accordance with the following procedures:

33.3.3.1 ~~i.~~ Waste solvent, still bottoms, and sump bottoms shall be collected and stored in closed containers. The closed containers may contain a device that allows pressure relief, but does not allow liquid solvent to drain from the container.

33.3.3.2 ~~ii.~~ Cleaned parts shall be drained at least 15 seconds or until dripping ceases, whichever is longer. Parts having cavities or

blind holes shall be tipped or rotated while the part is draining. During the draining, tipping or rotating, the parts shall be positioned so that solvent drains directly back to the cleaning machine.

33.3.3.3 ~~iii~~—Flushing of parts using a flexible hose or other flushing device shall be performed only within the freeboard area of the cold cleaning machine. The solvent flushing shall be a solid fluid stream, not an atomized or shower spray, at a pressure that does not exceed 10 pounds per square inch gauge (psig).

33.3.3.4 ~~iv~~—Work area fans shall be located and positioned so that they do not blow across the opening of the cold cleaning machine.

33.3.3.5 ~~v~~—Sponges, fabric, wood, leather, paper products, and other absorbent materials shall not be cleaned or dried in the cold cleaning machine.

33.3.3.6 ~~vi~~—Any solvent bath agitator shall be operated to produce a rolling motion of the solvent with no observable splashing of the solvent against the tank walls or the parts being cleaned. Air agitated solvent baths may not be used.

33.3.3.7 ~~vii~~—Spills during solvent transfer and use of the cold cleaning machine shall be cleaned up immediately, and the wipe rags or other absorbent material shall be immediately stored in covered containers for disposal or recycling.

33.3.3.8 ~~viii~~—The owner or operator shall ensure that the solvent level does not exceed the fill line.

33.3.4 ~~4~~—On and after November 11, 2002, no person shall use, sell, or offer for sale for use in a cold cleaning machine any solvent with a vapor pressure of 1.0 millimeters of mercury (mm Hg) or greater, measured at 20°C (68°F) that contains volatile organic compounds.

33.3.5 ~~5~~—On and after November 11, 2002, a person who sells or offers for sale any solvent containing volatile organic compounds for use in a cold cleaning machine shall provide, to the purchaser, the following written information:

33.3.5.1 ~~i~~—The name and address of the solvent supplier.

33.3.5.2 ~~ii~~—The type of solvent including the product or vendor identification number.

33.3.5.3 ~~iii~~—The vapor pressure of the solvent measured in mm Hg at 20°C (68°F).

33.3.6 ~~6~~—The owner or operator of a cold cleaning machine shall maintain for not less than five years, and shall provide to the Department,

on request, the information specified in ~~paragraph c.5.~~ 33.3.5 of this regulation. An invoice, bill of sale, certificate that corresponds to a number of sales, Material Safety Data Sheet (MSDS), or other appropriate documentation acceptable to the Department may be used to comply with ~~this Section~~ 33.0 of this regulation.

33.4 ~~d.~~ Standards for batch vapor cleaning machines. ~~This paragraph applies~~
The provisions of 33.4 of this regulation apply to batch vapor cleaning machines.

33.4.1 ~~1.~~ Batch vapor cleaning machines shall be equipped with:

33.4.1.1 ~~i.~~ Either a fully enclosed design or idling and downtime mode covers that completely covers the cleaning machine openings when in place. Covers shall be free of cracks, holes, and other defects, and readily opened or closed without disturbing the vapor zone. If the solvent cleaning machine opening is greater than 10 square feet, the covers must be powered. If a lip exhaust is used, the closed covers shall be below the level of the lip exhaust.

33.4.1.2 ~~ii.~~ A freeboard ratio of 0.75 or greater.

33.4.1.3 ~~iii.~~ A primary condenser.

33.4.1.4 ~~iv.~~ A vapor up control switch.

33.4.1.5 ~~v.~~ A device that shuts off the sump heat if the sump liquid solvent level drops to the sump heater coils.

33.4.1.6 ~~vi.~~ A vapor level control device that shuts off the sump heat if the vapor level in the vapor cleaning machine rises above the height of the primary condenser.

33.4.1.7 ~~vii.~~ An automated parts handling system that moves parts or parts baskets at a speed of 3.4 meters per minute (11 feet per minute) or less when the parts are entering or exiting the vapor zone. If the parts or parts basket being cleaned or dried occupy more than 50% of the solvent/air interface area, the automated parts handling system shall move parts or parts baskets at a speed of 0.93 meters per minute (~~3~~ three feet per minute) or less.

33.4.1.8 ~~viii.~~ Each vapor cleaning machine that uses a lip exhaust shall be designed and operated to route all collected solvent vapors through a properly operated and maintained carbon adsorber. The concentration of organic solvent in the exhaust shall not exceed 25 parts per million, averaged over one complete adsorption cycle or 24 hours, whichever is less.

33.4.1.9 ~~ix.~~ A permanent, conspicuous label summarizing the operating requirements in ~~paragraph d.4.~~ 33.4.4 of this Section regulation.

33.4.2 ~~2~~—In addition to the requirements of ~~paragraph d.1.~~ 33.4.1 of this ~~Section~~ regulation, the owner or operator of a batch vapor cleaning machine with a solvent/air interface area of 13 square feet or less shall implement one of the following control options:

33.4.2.1 ~~i~~—A working mode cover, a freeboard ratio of 1.0, and superheated vapor.

33.4.2.2 ~~ii~~—Superheated vapor and a freeboard refrigeration device operated to ensure that the chilled air blanket temperature is no greater than 30% ~~percent~~ of the solvent's boiling point.

33.4.2.3 ~~iii~~—A working mode cover and a freeboard refrigeration device operated to ensure that the chilled air blanket temperature, in °F, is no greater than 30% ~~percent~~ of the solvent's boiling point.

33.4.2.4 ~~iv~~—Reduced room draft, a freeboard ratio of 1.0, and superheated vapor.

33.4.2.5 ~~v~~—Reduced room draft and a freeboard refrigeration device operated to ensure that the chilled air blanket temperature, in °F, is no greater than 30% ~~percent~~ of the solvent's boiling point.

33.4.2.6 ~~vi~~—A freeboard ratio of 1.0 and a freeboard refrigeration device operated to ensure that the chilled air blanket temperature, in °F, is no greater than 30% ~~percent~~ of the solvent's boiling point.

33.4.2.7 ~~vii~~—Dwell and a freeboard refrigeration device operated to ensure that the chilled air blanket temperature, in °F, is no greater than 30% ~~percent~~ of the solvent's boiling point. Dwell shall be not less than 35% ~~percent~~ of the dwell time determined for the part or parts basket.

33.4.2.8 ~~viii~~—Reduced room draft, a freeboard ratio of 1.0, and dwell. Dwell shall be not less than 35% ~~percent~~ of the dwell time determined for the part or parts basket.

33.4.2.9 ~~ix~~—A freeboard refrigeration device operated to ensure that the chilled air blanket temperature, in °F, is no greater than 30% ~~percent~~ of the solvent's boiling point and a carbon adsorber that reduces solvent emissions in the exhaust to a level not to exceed 25 parts per million, averaged over one complete adsorption cycle or 24 hours, whichever is less.

33.4.2.10 ~~x~~—A freeboard ratio of 1.0, superheated vapor, and a carbon adsorber that reduces solvent emissions in the exhaust to a level not to exceed 25 parts per million, averaged over one complete adsorption cycle or 24 hours, whichever is less.

33.4.3 3.—In addition to the requirements of ~~paragraph d.1.~~ 33.4.1 of this ~~Section~~ regulation, the owner or operator of a batch vapor cleaning machine with a solvent/air interface area of greater than 13 square feet shall implement one of the following control options:

33.4.3.1 i.—A freeboard refrigeration device operated to ensure that the chilled air blanket temperature, in °F, is no greater than 30% ~~percent~~ of the solvent's boiling point, a freeboard ratio of 1.0, and superheated vapor.

33.4.3.2 ii.—Dwell, a freeboard refrigeration device operated to ensure that the chilled air blanket temperature, in °F, is no greater than 30% ~~percent~~ of the solvent's boiling point, and reduced room draft. Dwell shall be not less than 35% ~~percent~~ of the dwell time determined for the part or parts basket.

33.4.3.3 iii.—A working mode cover, a freeboard refrigeration device operated to ensure that the chilled air blanket temperature, in °F, is no greater than 30% ~~percent~~ of the solvent's boiling point, and superheated vapor.

33.4.3.4 iv.—Reduced room draft, freeboard ratio of 1.0, and superheated vapor.

33.4.3.5 v.—A freeboard refrigeration device operated to ensure that the chilled air blanket temperature, in °F, is no greater than 30% ~~percent~~ of the solvent's boiling point, reduced room draft, and superheated vapor.

33.4.3.6 vi.—A freeboard refrigeration device operated to ensure that the chilled air blanket temperature, in °F, is no greater than 30% ~~percent~~ of the solvent's boiling point, a freeboard ratio of 1.0, and reduced room draft.

33.4.3.7 vii.—A freeboard refrigeration device operated to ensure that the chilled air blanket temperature is no greater than 30% ~~percent~~ of the solvent's boiling point, superheated vapor, and a carbon adsorber that reduces solvent emissions in the exhaust to a level not to exceed 25 parts per million, averaged over one complete adsorption cycle or 24 hours, whichever is less.

33.4.4 4.—Batch vapor cleaning machines shall be operated in accordance with the following procedures:

33.4.4.1 i.—Waste solvent, still bottoms, and sump bottoms shall be collected and stored in closed containers. The closed containers may contain a device that allows pressure relief, but does not allow liquid solvent to drain from the container.

33.4.4.2 ii.—Cleaned parts shall be drained at least 15 seconds or until dripping ceases, whichever is longer. Parts having cavities or blind holes shall be tipped or rotated while the part is draining. During the draining, tipping or rotating, the parts shall be positioned so that solvent drains directly back to the batch vapor cleaning machine. A superheated vapor system shall be an acceptable alternate technology.

33.4.4.3 iii.—Parts or parts baskets shall not be removed from the batch vapor cleaning machine until dripping has ceased.

33.4.4.4 iv.—Flushing of parts using a flexible hose or other flushing device shall be performed within the vapor zone of the batch vapor cleaning machine or within a section of the machine that is not exposed to the ambient air. The solvent flushing shall be a solid fluid stream, not an atomized or shower spray.

33.4.4.5 v.—When the cover is open, the batch vapor cleaning machine shall not be exposed to drafts greater than 40 meters per minute (132 feet per minute), as measured between 4 one and 2 two meters (3.3 and 6.6 feet) upwind and at the same elevation as the tank lip.

33.4.4.6 vi.—Sponges, fabric, wood, leather, paper products, and other absorbent materials shall not be cleaned or dried in the batch vapor cleaning machine.

33.4.4.7 vii.—Spills during solvent transfer and use of the batch vapor cleaning machine shall be cleaned up immediately, and the wipe rags or other absorbent material shall be immediately stored in covered containers for disposal or recycling.

33.4.4.8 viii.—Work area fans shall be located and positioned so that they do not blow across the opening of the batch vapor cleaning machine.

33.4.4.9 ix.—During startup of each batch vapor cleaning machine, the primary condenser shall be turned on before the sump heater.

33.4.4.10 x.—During shutdown of each batch vapor cleaning machine, the sump heater shall be turned off and the solvent vapor layer allowed to collapse before the primary condenser is turned off.

33.4.4.11 xi.—When solvent is added to or drained from the batch vapor cleaning machine, the solvent shall be transferred using threaded or other leak-proof couplings, and the discharge end of the pipe shall be located beneath the liquid solvent surface.

33.4.4.12 xii.—The idling and downtime mode covers shall be closed at all times during idling and downtimes except during

maintenance of the machine when the solvent has been removed and during addition of solvent to the machine.

33.4.4.13 ~~xiii~~—If a lip exhaust is used on the open top batch vapor cleaning machine, the ventilation rate shall not exceed 20 m³/min/m² (65 ft³/min/ft²) of batch vapor cleaning machine open area, unless a higher rate is necessary to meet OSHA requirements.

33.5 ~~e~~—Standards for in-line cleaning machines. ~~This paragraph applies~~ The provisions of 33.5 of this regulation apply to in-line cold and vapor cleaning machines.

33.5.1 ~~4~~—In-line cleaning machines shall be equipped with:

33.5.1.1 ~~i~~—Either a fully enclosed design or idling and downtime mode covers that completely covers the in-line cleaning machine openings when in place. Covers shall be free of cracks, holes, and other defects, and readily opened or closed without disturbing the vapor zone.

33.5.1.2 ~~ii~~—A freeboard ratio of 0.75 or greater.

33.5.1.3 ~~iii~~—A primary condenser.

44.5.1.4 ~~iv~~—A vapor up control switch.

33.5.1.5 ~~v~~—A device that shuts off the sump heat if the sump liquid solvent level drops to the sump heater coils.

33.5.1.6 ~~vi~~—A vapor level control device that shuts off the sump heat if the vapor level in the inline cleaning machine rises above the height of the primary condenser.

33.5.1.7 ~~vii~~—An automated parts handling system that moves parts or parts baskets at a speed of 3.4 meters per minute (11 feet per minute) or less when the parts are entering or exiting the vapor zone. If the parts or parts basket being cleaned or dried occupy more than 50% of the solvent/air interface area, the automated parts handling system shall move parts or parts baskets at a speed of 0.93 meters per minute (3 feet per minute) or less.

33.5.1.8 ~~viii~~—Each in-line machine that uses a lip exhaust shall be designed and operated to route all collected solvent vapors through a properly operated and maintained carbon adsorber. The concentration of organic solvent in the exhaust shall not exceed 25 parts per million, averaged over one complete adsorption cycle or 24 hours, whichever is less.

~~33.5.1.9 ix.~~—A permanent, conspicuous label summarizing the operating requirements in ~~paragraph e.3~~ 33.5.3 of this regulation.

33.5.2 ~~2.~~—In addition to the requirements of ~~paragraph e.1.~~ 33.5.1 of this Section regulation, the owner or operator of an in-line cleaning machine shall implement one of the following control options:

33.5.2.1 ~~i.~~—A freeboard ratio of 1.0 and superheated vapor.

33.5.2.2 ~~ii.~~—A freeboard ratio of 1.0 and a freeboard refrigeration device operated to ensure that the chilled air blanket temperature, in °F, is no greater than 30% ~~percent~~ of the solvent's boiling point.

33.5.2.3 ~~iii.~~—Dwell and a freeboard refrigeration device operated to ensure that the chilled air blanket temperature, in °F, is no greater than 30% ~~percent~~ of the solvent's boiling point. Dwell shall be not less than 35% ~~percent~~ of the dwell time determined for the part or parts basket.

33.5.2.4 ~~iv.~~—Dwell and a carbon adsorber that reduces solvent emissions in the exhaust to a level not to exceed 25 parts per million, averaged over one complete adsorption cycle or 24 hours, whichever is less. Dwell shall be not less than 35% ~~percent~~ of the dwell time determined for the part or parts basket.

33.5.3 ~~3.~~—In-line cleaning machines shall be operated in accordance with the following procedures:

33.5.3.1 ~~i.~~—Waste solvent, still bottoms, and sump bottoms shall be collected and stored in closed containers. The closed containers may contain a device that allows pressure relief, but does not allow liquid solvent to drain from the container.

33.5.3.2 ~~ii.~~—Parts shall be oriented so that the solvent drains freely from the parts. Cleaned parts shall be drained at least 15 seconds or until dripping ceases, whichever is longer. Parts having cavities or blind holes shall be tipped or rotated while the part is draining. During the draining, tipping or rotating, the parts shall be positioned so that solvent drains directly within the in-line cleaning machine.

33.5.3.3 ~~iii.~~—Parts or parts baskets shall not be removed from the in-line cleaning machine until dripping has ceased.

33.5.3.4 ~~iv.~~—Flushing of parts using a flexible hose or other flushing device shall be performed within the vapor zone of the in-line cleaning machine or within a section of the machine that is not exposed to the ambient air. The solvent flushing shall be a solid fluid stream, not an atomized or shower spray.

33.5.3.5 ~~v.~~—When the in-line cleaning machine is operating, the entrance and exit portals shall not be exposed to drafts greater than 40 meters per minute (132 feet per minute), as measured between 4 one and 2 two meters (3.3 and 6.6 feet) upwind and at the same elevation as the portals.

33.5.3.6 ~~vi.~~—Sponges, fabric, wood, leather, paper products, and other absorbent materials shall not be cleaned or dried in the in-line cleaning machine.

33.5.3.7 ~~vii.~~—Spills during solvent transfer and use of the in-line cleaning machine shall be cleaned up immediately, and the wipe rags or other absorbent material shall be immediately stored in covered containers for disposal or recycling.

33.5.3.8 ~~viii.~~—Work area fans shall be located and positioned so that they do not blow across the openings of the in-line cleaning machine.

33.5.3.9 ~~ix.~~—During startup of each in-line cleaning machine, the primary condenser shall be turned on before the sump heater.

33.5.3.10 ~~x.~~—During shutdown of each in-line cleaning machine, the sump heater shall be turned off and the solvent vapor layer allowed to collapse before the primary condenser is turned off.

33.5.3.11 ~~xi.~~—When solvent is added to or drained from the in-line cleaning machine, the solvent shall be transferred using threaded or other leak-proof couplings and the discharge end of the pipe shall be located beneath the liquid solvent surface.

33.5.3.12 ~~xii.~~—The idling and downtime mode covers shall be closed at all times during idling and downtimes except during maintenance of the machine when the solvent has been removed and during addition of solvent to the machine.

33.5.3.13 ~~xiii.~~—If a lip exhaust is used on the on-line cleaning machine, the ventilation rate shall not exceed 20 m³/min/m² (65 ft³/min/ft²) of on-line cleaning machine open area, unless a higher rate is necessary to meet OSHA requirements.

33.5.3.14 ~~xiv.~~—Minimize openings during operation so that entrances and exits silhouette workloads with an average clearance between the parts and the edge of the portal opening of less than 10 centimeters (4 four inches) or less than 10% ~~percent~~ of the width of the opening.

33.6 ~~f.~~—Standards for cleaning machines not having a solvent/air interface. ~~This paragraph applies~~ The provisions of 33.6 of this regulation apply to cleaning

machines that do not have a solvent/air interface. These cleaning machines include, but are not limited to, airless and airtight cleaning systems.

33.6.1 4.—The owner or operator of each machine shall maintain a log of solvent additions and deletions for each machine including the weight of solvent contained in activated carbon or other adsorbent material used to control emissions from the cleaning machine.

33.6.2 2.—The owner or operator of each machine shall demonstrate that the emissions from each machine, on a three-month rolling average, are equal to or less than the allowable emission limit determined using Equation 4 33-1 below of this regulation.

$$EL = 330(\text{Vol})^{0.6}$$

$$\text{Eq. 4 (33-1)}$$

where:

EL = the three-month rolling average monthly emission limit (kilograms/month).

Vol = the cleaning capacity of machine (cubic meters).

33.6.3 3.—The owner or operator of each machine shall operate the machine in conformance with the manufacturer's instructions and good air pollution control practices.

33.6.4 4.—The owner or operator of each machine equipped with a carbon adsorber shall maintain and operate the carbon adsorber system to reduce solvent emissions in the exhaust to a level not exceed 25 parts per million, averaged over one complete adsorption cycle or 24 hours, whichever is less.

33.6.5 5.—A permanent, conspicuous label summarizing the operating requirements in ~~paragraph f.7. below~~ 33.6.7 of this regulation.

33.6.6 6.—The owner or operator of a solvent cleaning machine complying with ~~paragraph f.~~ 33.6 of this regulation shall demonstrate compliance with the applicable ~~3~~ three-month rolling average monthly emission limit on a monthly basis. If the applicable ~~3~~ three-month rolling average monthly emission limit is not met, an exceedance has occurred. All exceedances shall be reported to the Department within 30 days of the determination of the exceedance.

33.6.7 7.—Cleaning machines not having a solvent/air interface shall be operated in accordance with the following procedures:

33.6.7.1 i.—Waste solvent, still bottoms, and sump bottoms shall be collected and stored in closed containers. The closed containers may contain a device that allows pressure relief, but does not allow liquid solvent to drain from the container.

33.6.7.2 ii.—Cleansed parts shall be drained at least 15 seconds or until dripping ceases, whichever is longer. Parts having cavities or blind holes shall be tipped or rotated while the part is draining. During the draining, tipping or rotating, the parts shall be positioned so that solvent drains directly into the cleaning machine.

33.6.7.3 iii.—Parts or parts baskets shall not be removed from the cleaning machine until dripping has ceased.

33.6.7.4 iv.—Sponges, fabric, wood, leather, paper products, and other absorbent materials shall not be cleaned or dried in the cleaning machines.

33.6.7.5 v.—Spills during solvent transfer and use of the cleaning machines shall be cleaned up immediately, and the wipe rags or other absorbent material shall be immediately stored in covered containers for disposal or recycling.

33.6.7.6 vi.—Work area fans shall be located and positioned so that they do not blow across the opening of the cleaning machine.

33.6.7.7 vii.—When solvent is added to or drained from the cleaning machine, the solvent shall be transferred using threaded or other leak-proof couplings and the discharge end of the pipe shall be located beneath the liquid solvent surface.

33.6.8 8.—The owner or operator of a solvent cleaning machine complying with ~~paragraph f.~~ 33.6 of this regulation shall maintain records and determine compliance with the applicable provisions in accordance with the following:

33.6.8.1 i.—On the first operating day of every month ensure that the solvent cleaning machine system contains only clean liquid solvent. This includes, but is not limited to, fresh unused solvent, recycled solvent, and used solvent that have been cleaned of soils. A fill line must be indicated during the first month the measurements are made. The solvent level within the machine must be returned to the same fill-line each month, immediately prior to calculating monthly emissions. The solvent cleaning machine does not have to be emptied and filled with fresh unused solvent prior to the calculations.

33.6.8.2 ii.—Using the records of all solvent additions and deletions for the previous monthly reporting period, determine total solvent emissions, E, using Equation 2 ~~33-2 below~~ of this regulation:

$$E = SA - LSR - SSR \qquad \text{Eq. 2 (33-2)}$$

where:

- E = the total VOC solvent emissions from the solvent cleaning machine during the most recent monthly reporting period (kilograms of solvent per month).
- SA = the total amount of VOC liquid solvent added to the solvent cleaning machine during the most recent monthly reporting period (kilograms of solvent per month).
- LSR = the total amount of VOC liquid solvent removed from the solvent cleaning machine during the most recent monthly reporting period (kilograms of solvent per month).
- SSR = the total amount of VOC solvent removed from the solvent cleaning machine in solid waste during the most recent monthly reporting period (kilograms of solvent per month), as determined from tests conducted using Method 25D in appendix A of 40 CFR part 60 or by engineering calculations included in the compliance report.

33.6.8.3 ~~iii.~~—Determine the monthly rolling average solvent emission, EA, using Equation ~~3~~ 33-3, ~~below~~ of this regulation:

$$EA = \frac{(E_{j=1} + E_{j=2} + E_{j=3})}{3} \qquad \text{Eq. } \del{3} \text{ } \underline{33-3}$$

where:

- EA = the average VOC solvent emissions over the preceding ~~3~~ three monthly reporting periods (kilograms of solvent per month).
- E = the total VOC solvent emissions for each month (j) for the most recent ~~3~~ three monthly reporting periods (kilograms of solvent per month).
- j = 1 = the most recent monthly reporting period.
- j = 2 = the monthly reporting period immediately prior to j = 1.
- j = 3 = the monthly reporting period immediately prior to j = 2.

33.7 ~~g.~~—Alternative standard. As an alternative to meeting the requirements of ~~paragraphs d. or e. 33.4 or 33.5~~ of this Section regulation, the owner or operator of a batch vapor or in-line cleaning machine can elect to comply with the requirements of ~~paragraphs g.1. through g.4. 33.7.1 through 33.7.4~~ of this regulation. The owner or operator shall maintain records sufficient to demonstrate compliance. The records shall include, at a minimum, the quantity of solvent added to and removed from the solvent cleaning machine, the dates of the addition and removal, and the calculations of the monthly rolling ~~3~~ three-month average emission limit.

33.7.1 ~~4.~~—The owner or operator shall:

33.7.1.1 ~~i.~~—Maintain a log of solvent additions and deletions for each solvent cleaning machine.

33.7.1.2 ii.—Ensure that emissions from each solvent cleaning machine are equal to or less than the allowable emission limit presented in Table 4 33-1 of this regulation.

Table 4 33-1 - Emission Limits for Batch Vapor and In-line Cleaning Machines

Solvent cleaning machine	3-Month rolling average monthly emission limit (kilograms/square meters/month)
Batch vapor cleaning machines	150
Existing in-line cleaning machines	153
New in-line cleaning machines	99

33.7.2 2.—In addition to the requirements of ~~paragraph g.1.~~ 33.7.1 of this ~~Section~~ regulation, the owner or operator of a cleaning machine shall comply with the following:

33.7.2.1 i. ~~Paragraphs d.1.ix. and d.4.~~ The 33.4.1.9 and 33.4.4 of this regulation for batch vapor cleaning machines.

33.7.2.2 ii. ~~Paragraphs e.1.ix. and e.3.~~ The 33.5.1.9 and 33.5.3 of this regulation for in-line cleaning machines.

33.7.3 3.—The owner or operator of a solvent cleaning machine complying with ~~paragraph g.~~ 33.7 of this regulation shall demonstrate compliance with the applicable ~~3~~ three-month rolling average monthly emission limit on a monthly basis. If the applicable ~~3~~ three-month rolling average monthly emission limit is not met, an exceedance has occurred. All exceedances shall be reported to the Department within 30 days of the determination of the exceedance.

33.7.4 4.—The owner or operator of a solvent cleaning machine complying with ~~paragraph g.~~ 33.7 of this regulation shall maintain records and determine compliance with the applicable provisions in accordance with the following:

33.7.4.1 i.—On the first operating day of every month ensure that the solvent cleaning machine system contains only clean liquid solvent. This includes, but is not limited to, fresh unused solvent, recycled solvent, and used solvent that have been cleaned of soils. A fill line must be indicated during the first month the measurements are made. The solvent level within the machine must be returned to the same fill-line each month, immediately prior to calculating monthly emissions. The solvent cleaning machine does not have to be emptied and filled with fresh unused solvent prior to the calculations.

33.7.4.2 ii.—Using the records of all solvent additions and deletions for the previous monthly reporting period, determine total solvent emissions, E, using Equation 4 33-4 below of this regulation:

$$E = \frac{(SA - LSR - SSR)}{AREA} \quad \text{Eq. 4 (33-4)}$$

where:

E = the total VOC solvent emissions from the solvent cleaning machine during the most recent monthly reporting period (kilograms of solvent per square meter of solvent/air interface area per month).

SA = the total amount of VOC liquid solvent added to the solvent cleaning machine during the most recent monthly reporting period (kilograms of solvent per month).

LSR = the total amount of VOC liquid solvent removed from the solvent cleaning machine during the most recent monthly reporting period (kilograms of solvent per month).

SSR = the total amount of VOC solvent removed from the solvent cleaning machine in solid waste during the most recent monthly reporting period (kilograms of solvent per month), as determined from tests conducted using Method 25D in Appendix A of 40 CFR part 60 or by engineering calculations included in the compliance report.

Area-AREA = the solvent/air interface area of the solvent cleaning machine (square meters).

33.7.4.3 ~~iii.~~—Determine the monthly rolling average solvent emission, EA, using Equation ~~5~~ 33-5, ~~below~~ of this regulation:

$$EA = \frac{(E_{j=1} + E_{j=2} + E_{j=3})}{3} \quad \text{Eq. 5 (33-5)}$$

where:

EA = the average VOC solvent emissions over the preceding ~~3~~ three monthly reporting periods (kilograms of solvent per square meter of solvent/air interface area per month).

E = the total VOC solvent emissions for each month (j) for the most recent ~~3~~ three monthly reporting periods (kilograms of solvent per square meter of solvent/air interface area per month).

j = 1 = the most recent monthly reporting period.

j = 2 = the monthly reporting period immediately prior to j = 1.

j = 3 = the monthly reporting period immediately prior to j = 2.

33.8 ~~h.~~—Monitoring. The owner or operator of a solvent cleaning machine subject to the provisions of ~~paragraphs d. through g.~~ 33.4 through 33.7 of this ~~Section~~ regulation shall conduct monitoring as follows.

33.8.1 ~~4.~~—If a freeboard refrigeration device is used to comply with ~~this Section~~ 33.0 of this regulation, the owner or operator shall use a thermometer or thermocouple to measure the temperature at the center of

the air blanket during the idling mode. Measurements and recordings shall be made weekly.

33.8.2 ~~2~~—If a superheated vapor system is used to comply with ~~this Section 33.0 of this regulation~~, the owner or operator shall use a thermometer or thermocouple to measure the temperature at the center of the superheated solvent vapor zone while the solvent cleaning machine is in the idling mode. Measurements and recordings shall be made weekly.

33.8.3 ~~3~~—If a cover (working mode, downtime mode, and/or idling mode cover) is used to comply with ~~this Section 33.0 of this regulation~~, the owner or operator shall conduct a visual inspection to determine if the cover is opening and closing properly, completely covers the cleaning machine openings when closed, and is free of cracks, holes, and other defects. Observations and recordings shall be made monthly.

33.8.4 ~~4~~—If dwell is used to comply with ~~this Section 33.0 of this regulation~~, the owner or operator shall determine the actual dwell time by measuring the period of time that parts are held within the freeboard area of the solvent cleaning machine after cleaning or drying. Measurements and recordings shall be made monthly.

33.8.5 ~~5~~—The owner or operator shall determine the automated parts handling system speed by measuring the time it takes to travel a measured distance. The speed is equal to the distance in meters or feet divided by the time in minutes (meters or feet per minute). Measurements and recordings shall be made monthly.

33.8.6 ~~6~~—If reduced room draft is used to comply with ~~this Section 33.0 of this regulation~~, the owner or operator shall determine the average wind speed and controlling room parameters (i.e., redirecting fans, closing doors and windows, etc.) as follows.

33.8.6.1 ~~i~~—Initially measure the wind speed within 6 inches above the top of the freeboard area of the solvent cleaning machine in accordance with the following:

33.8.6.1.1 ~~A~~—Determine the direction of the wind current by slowly rotating a velometer or similar device until the maximum speed is located.

33.8.6.1.2 ~~B~~—Orient a velometer in the direction of the wind current at the four corners of the machine.

33.8.6.1.3 ~~C~~—Record the reading for each corner.

33.8.6.1.4 ~~D~~—Average the values obtained at each corner and record the average wind speed.

33.8.6.2 ii.—Record the room parameters established during the initial compliance test to achieve the reduced room draft.

33.8.6.3 iii.—Quarterly monitor of the wind speed in accordance with ~~paragraph h.6.i~~ 33.8.6.1 of this regulation.

33.8.6.4 iv.—Weekly monitoring of the room parameters as specified in ~~paragraph h.6~~ 33.8.6 of this regulation.

33.8.7 7.—If an enclosure (full or partial) is used to achieve reduced room draft, the owner or operator shall conduct an initial monitoring test of the wind speed within the enclosure by slowly rotating a velometer inside the entrance to the enclosure until the maximum speed is located and recorded. Measurements and recordings shall be made monthly. The owner or operator shall also conduct a monthly visual inspection of the enclosure to determine if it is free of cracks, holes, and other defects.

33.8.8 8.—The owner or operator of a using a carbon adsorber to comply with ~~this Section 33.0 of this regulation~~ shall measure and record the concentration of VOC solvent in the exhaust of the carbon adsorber whenever the solvent cleaning machine is in the working mode and/or is venting to the carbon adsorber. The concentration shall be determined through a sampling port within the exhaust outlet that is easily accessible, located downstream from no other inlet, and located at least ~~8~~ eight stack or duct diameters downstream and ~~2~~ two stack or duct diameters upstream from any flow disturbance such as a bend, expansion, contraction, or outlet.

33.9 i.—Recordkeeping. The owner or operator of a solvent cleaning machine subject to ~~this Section 33.0 of this regulation~~ shall maintain the following records in a readily accessible location for a least ~~5~~ five years and shall make these records available to the Department, upon verbal or written request:

33.9.1 4.—The log of operating times for the carbon adsorber, if applicable.

33.9.2 2.—The maintenance record for the carbon adsorber, such as replacement of the activated carbon bed, if applicable.

33.9.3 3.—The maintenance record for each control option used, such as replacement of a heater in the superheated vapor recycle system, if applicable.

33.9.4 4.—The logs and calculations demonstrating compliance with the allowable emission limits in ~~paragraphs f. and g.~~ 33.6 and 33.7 of this Section regulation.

33.9.5 5.—The results of all monitoring conducted in accordance with the requirements in ~~paragraph h.~~ 33.8 of this Section regulation.

33.10 ~~j.~~ Reporting. The owner of operator of a solvent cleaning machine subject to ~~this Section~~ 33.0 of this regulation shall:

33.10.1 ~~4.~~ Comply with the initial compliance certification requirements of ~~Section 5.a.~~ 5.1 of this regulation.

33.10.2 ~~2.~~ Comply with the requirements of ~~Section 5.b.~~ 5.2 of this regulation regarding reports of excess emissions, as well as complying with other State of Delaware exceedance reporting requirements.

Section 34—

34.0 Cutback and Emulsified Asphalt

01/11/1993

34.1 a.—Applicability. ~~This Section applies~~ The provisions of 34.0 of this regulation apply to the manufacture, mixing, storage, use, and application of cutback and emulsified asphalts. No exemptions are allowable based on the size or throughput of an operation.

34.2 b.—Definitions. As used in ~~this Section 34.0 of this regulation~~, all terms not defined herein shall have the meaning given them in the November 15, 1990 Clean Air Act Amendments (CAAA), or in ~~Section 2 2.0~~ of this regulation.

“Asphalt” means a dark-brown to black cementitious material (solid, semisolid, or liquid in consistency) of which the main constituents are bitumens that occur naturally or are a residue of petroleum refining.

“Cutback asphalt” means asphalt cement that has been liquefied by blending with petroleum solvents (diluent). Upon exposure to atmospheric conditions, the diluents evaporate, leaving the asphalt cement to perform its function.

“Emulsified asphalt” means an emulsion of asphalt cement and water that contains a small amount of an emulsifying agent; it is a heterogeneous system containing two normally immiscible phases (asphalt and water) in which the water forms the continuous phase of the emulsion, and minute globules of asphalt form the discontinuous phase.

“Penetrating prime coat” means an application of low-viscosity liquid asphalt to an absorbent surface. It is used to prepare an untreated base for an asphalt surface. The prime coat penetrates the base, plugs the voids, and hardens and helps bind the top to the overlying asphalt course. The penetrating prime coat also reduces the necessity of maintaining an untreated base course prior to placing the asphalt pavement.

34.3 e.—Standards

34.3.1 1.—No person shall cause, allow, or permit the manufacture, mixing, storage, use, or application of cutback asphalts during the ozone season without approval of the Department as provided in ~~paragraph (c)(2)~~ 34.3.2 of this ~~Section~~ regulation.

34.3.2 2.—The Department may approve, as part of a State Implementation Plan (SIP) revision, the manufacture, mixing, storage, use, or application of cutback asphalts where either:

34.3.2.1 i.—Long-life stockpile storage is necessary.

34.3.2.2 ii.—The cutback asphalt is to be used solely as a penetrating prime coat.

34.3.3 ~~3~~—During the ozone season, no person shall cause, allow, or permit the manufacturing, mixing, storage, or use of emulsified asphalt that contains any volatile organic compound (VOC).

34.4 ~~d~~—Recordkeeping. The owner or operator of any facility subject to ~~this Section 34.0 of this regulation~~ shall maintain records of the manufacture, mixing, storage, use, or application of any asphalt containing VOC during the ozone season. These records shall be maintained in a readily accessible location for a minimum of ~~5~~ five years and shall be made available to the Department upon verbal or written request.

Section 35—

35.0 Manufacture of Synthesized Pharmaceutical Products

11/29/1994

35.1 a. ~~Applicability. This Section applies~~ The provisions of 35.0 of this regulation apply to the following sources of volatile organic compounds (VOCs) at all synthesized pharmaceutical manufacturing facilities:

35.1.1 ~~1-~~Reactors.

35.1.2 ~~2-~~Distillation operations.

35.1.3 ~~3-~~Crystallizers.

35.1.4 ~~4-~~Centrifuges.

35.1.5 ~~5-~~Vacuum dryers.

35.1.6 ~~6-~~Air dryers.

35.1.7 ~~7-~~Production equipment exhaust systems.

35.1.8 ~~8-~~Rotary vacuum filters and other filters.

35.1.9 ~~9-~~In-process tanks.

35.1.10 ~~10-~~Leaks.

35.2 b. ~~Definitions. As used in this Section 35.0 of this regulation,~~ all terms not defined herein shall have the meaning given them in the November 15, 1990 Clean Air Act Amendments (CAAA), or in ~~Section 2~~ 2.0 of this regulation.

“Production equipment exhaust system” means a device for collecting and directing out of the work area VOC fugitive emissions from reactor openings, centrifuge openings, and other vessel openings to protect workers from excessive VOC exposure.

“Reactor” means a vat or vessel, which may be jacketed to permit temperature control, designed to contain chemical reactions.

“Separation operation” means a process that separates a mixture of compounds and solvents into two or more components. Specific mechanisms include extraction, centrifugation, filtration, and crystallization.

“Synthesized pharmaceutical manufacturing” means manufacture of pharmaceutical products and intermediates by chemical synthesis. The production and recovery of materials produced via fermentation, extraction of organic chemicals from vegetative materials or animal tissues, and formulation and packaging of the product are not considered synthesized pharmaceutical manufacturing.

35.3 ~~e~~-Standards

35.3.1 ~~4~~-Reactors, distillation operations, crystallizers, centrifuges, and vacuum dryers. The owner or operator of a synthesized pharmaceutical manufacturing facility subject to ~~this Section 35.0 of this regulation~~ shall control the VOC emissions from all vents from reactors, distillation operations, crystallizers, centrifuges, and vacuum dryers at the facility that emit 6.8 kilograms per day (kg/day) (15 pounds per day [lb/day]) or more of VOC as determined by the procedure in "Control of Volatile Organic Emissions from Manufacture of Synthesized Pharmaceutical Products," Appendix B, EPA-450/2-78-029, December 1978. Surface condensers or equivalent controls shall be used, provided that:

35.3.1.1 ~~i~~-If surface condensers are used, the condenser outlet gas temperature shall not exceed the allowable temperature limit described for each associated vapor pressure in the following table:

Allowable condenser outlet gas temperature, °C (°F)	VOC vapor pressure at 20°C	
	kPa	(psi)
-25 (-13)	>40.01	(5.8)
-15 (5)	>20.0	(2.9)
0 (32)	>10.0	(1.5)
10 (50)	>7.0	(1.0)
25 (77)	>3.5	(0.5)

35.3.1.2 ~~ii~~-If equivalent controls such as carbon absorption or incineration are used, the VOC emissions shall be reduced by at least as much as they would be by using a surface condenser. The owner or operator shall calculate the efficiency equivalent to a condenser in accordance with the procedures specified on pages 4-2 through 4-6 in "Control of Volatile Organic Emissions from Manufacture of Synthesized Pharmaceutical Products," Appendix B, EPA-450/2-78-029, December 1978.

35.3.2 ~~2~~-Air dryers and production equipment exhaust systems. The owner or operator of a synthesized pharmaceutical manufacturing facility subject to ~~this Section 35.0 of this regulation~~ shall reduce the VOC emissions from all air dryers and production equipment exhaust systems either:

35.3.2.1 ~~i~~-By at least 90 weight ~~% percent~~ if emissions are 150 kg/day (330 lb/day) or more of VOC before controls.

35.3.2.2 ~~ii~~-To 15.0 kg/day (33 lb/day) or less if emissions are less than 150 kg/day (330 lb/day) of VOC.

35.3.3 ~~3~~-Storage tanks. The owner or operator of a synthesized pharmaceutical manufacturing facility subject to ~~this Section 35.0 of this regulation~~ shall reduce the VOC emissions from storage tanks by:

35.3.3.1 i.—Providing a vapor balance system or equivalent control that is at least 90% percent effective by weight in reducing emissions from truck or railcar deliveries to storage tanks with capacities greater than 7,500 liters (L) (2,000 gallons [gal]) that store VOC with vapor pressures greater than 28.0 kiloPascals (kPa) (4.1 pounds per square inch [psi]) at 20°C (68°F).

35.3.3.2 ii.—Installing pressure/vacuum conservation vents set at ± 0.2 kPa (0.03 psi) on all storage tanks that store VOC with vapor pressures greater than 10.0 kPa (1.5 psi) at 20°C (68°F).

35.3.4 4.—Centrifuges, rotary vacuum filters, and other filters. The owner or operator of a synthesized pharmaceutical facility subject to ~~this Section 35.0 of this regulation~~ shall enclose all centrifuges, rotary vacuum filters, and other filters having an exposed liquid surface where the liquid contains VOC and exerts a total VOC vapor pressure of 3.50 kPa (0.5 psi) or more at 20°C (68°F).

35.3.5 5.—In-process tanks. The owner or operator of a synthesized pharmaceutical facility subject to ~~this Section 35.0 of this regulation~~ shall install covers on all in-process tanks that contain VOC at any time. These covers shall remain closed, unless production, sampling, maintenance, or inspection procedures require operator access.

35.3.6 6.—Leaks. The owner or operator of a synthesized pharmaceutical manufacturing facility subject to ~~this Section 35.0 of this regulation~~ shall repair all leaks from which a liquid containing VOC can be observed running or dripping. The repair shall be completed as soon as practicable but no later than 15 calendar days after the leak is found. If the leaking component cannot be repaired until the process is shut down, the leaking component shall then be repaired before the process is restarted.

35.4 d.—Testing. The owner or operator of any facility containing sources subject to ~~this Section 35.0 of this regulation~~ shall comply with the testing requirements in **Appendix E** of this regulation.

35.5 e.—Monitoring for air pollution control equipment.

35.5.1 4.—At a minimum, continuous monitors for the following parameters shall be installed on air pollution control equipment used to control sources subject to ~~this Section 35.0 of this regulation~~:

35.5.1.1 i.—Destruction device combustion temperature.

35.5.1.2 ii.—Temperature rise across a catalytic incinerator bed.

35.5.1.3 iii.—VOC concentration on a carbon adsorption unit to determine breakthrough.

35.5.1.4 iv.—Outlet gas temperature of a refrigerated condenser.

35.5.1.5 ~~v.~~—Temperature of a nonrefrigerated condenser coolant supply system.

35.5.2 ~~2.~~—Each monitor shall be equipped with a recording device.

35.5.3 ~~3.~~—Each monitor shall be calibrated quarterly.

35.5.4 ~~4.~~—Each monitor shall operate at all times while the associated control equipment is operating.

35.6 ~~f.~~—Recordkeeping.

35.6.1 ~~4.~~—The owner or operator of a pharmaceutical manufacturing facility subject to ~~this Section~~ 35.0 of this regulation shall maintain the following records:

35.6.1.1 ~~i.~~—Parameters listed in ~~paragraph (e)~~ 35.5 of this Section regulation shall be recorded.

35.6.1.2 ~~ii.~~—For sources subject to ~~this Section~~ 35.0 of this regulation, the solvent true vapor pressure as determined by ASTM D323-89 shall be recorded for every process.

35.6.2 ~~2.~~—For any leak subject to ~~paragraph (c)(6)~~ 35.3.6 of this Section regulation, which cannot be readily repaired within 1 hour after detection, the following records shall be kept:

35.6.2.1 ~~i.~~—The name of the leaking equipment.

35.6.2.2 ~~ii.~~—The date and time the leak is detected.

35.6.2.3 ~~iii.~~—The action taken to repair the leak.

35.6.2.4 ~~iv.~~—The date and time the leak is repaired.

35.7 ~~g.~~—Reporting. The owner or operator of any facility containing sources subject to ~~this Section~~ 35.0 of this regulation shall comply with the requirements in ~~Section 5~~ 5.0 of this regulation.

~~Section 36—~~
36.0 Stage II Vapor Recovery
01/11/2002

36.1 a. ~~Applicability~~

36.1.1 4. ~~This Section~~ The provisions of 36.0 of this regulation applies to any gasoline dispensing facility located in the State of Delaware, except:

36.1.1.1 i. ~~Any gasoline dispensing facility, which never has a throughput of greater than 10,000 gallons of gasoline, shall be subject only to the requirements of paragraph (e)(2) 36.5.2 of this Section regulation.~~ Any gasoline dispensing facility that ever exceeds this throughput shall be subject to all of the requirements of ~~this Section~~ 36.0 of this regulation, and shall remain subject to these requirements even if its throughput later falls below the exemption throughput.

36.1.1.2 ii. ~~Any gasoline dispensing facility that is used exclusively for refueling marine vehicles, aircraft, farm equipment, and/or emergency vehicles.~~

36.1.2 2. ~~On and after May 1, 2003, the requirements of paragraph (f) 36.6 of this Section regulation~~ apply to any owner and/or operator of any company that performs compliance testing of Stage II Systems within the State of Delaware.

36.1.3 3. ~~The requirements of this Section 36.0 of this regulation~~ are in addition to all other State and Federal requirements, to include the permitting requirements of ~~Regulation No. 2 of 7 DE Admin Code 1102,~~ the State of Delaware "Regulations Governing the Control of Air Pollution." Any gasoline dispensing facility that is currently subject to any state or federal rule promulgated pursuant to the Clean Air Act Amendments of 1977 by exceeding an applicability threshold is and shall remain subject to those provisions.

36.1.4 4. ~~Compliance Schedule~~

Any gasoline dispensing facility subject to the requirements of ~~this Section~~ 36.0 of this regulation shall be in compliance as follows: Any facility that first commences operations:

36.1.4.1 i. ~~Before November 15, 1990 and that has any throughput of greater than 10,000 gallons but less than 100,000 gallons: by November 15, 1994 for facilities located in New Castle and Kent Counties, and by November 15, 1996 for facilities located in Sussex.~~

36.1.4.2 ii. ~~Before November 15, 1990 and that has any throughput of at least 100,000 gallons: by November 15, 1993 for~~

facilities located in New Castle and Kent Counties, and by November 15, 1995 for facilities located in Sussex County.

36.1.4.3 ~~iii~~—On or after November 15, 1990 and before January 11, 1993: by May 15, 1993 for facilities located in New Castle and Kent Counties, and by May 15, 1995 for facilities located in Sussex County.

36.1.4.4 ~~iv~~—On or after January 11, 1993: upon commencement of operations.

36.1.5 ~~5~~—Any Stage II vapor recovery system installed prior to November 15, 1992, and using dual vapor recovery hoses (not coaxial) shall be retrofitted with coaxial hoses no later than January 1, 1994, or upon any vapor system modification, whichever is first. Any system installed after November 15, 1992 shall be equipped with coaxial hoses.

36.1.6 ~~6~~—Remote vapor check valves in balance type systems installed prior to November 15, 1992, shall be retrofitted with check valves located in the nozzle no later than January 1, 1994, or upon any vapor system modification, whichever is first. Any system installed after November 15, 1992 shall be equipped with remote check valves located in the nozzle.

36.2 ~~b~~—Definitions

“Assist System” means a system that creates a vacuum to assist the movement of vapors back into the storage tank.

“Balance System” means a system where pressure develops in the vehicle tank during fueling operations, and vacuum in the storage tank created when the fuel is removed, forces displaced vapors out the vehicle tank and back into the storage tank.

36.3 ~~c~~—Standards

36.3.1 ~~4~~—The owner and/or operator of any gasoline dispensing facility subject to the requirements of ~~this Section~~ 36.0 of this regulation shall:

36.3.1.1 ~~i~~—Design, install, operate, and maintain one of the Stage II Vapor Recovery Systems identified in ~~paragraph (g)~~ 36.7 of this section regulation.

36.3.1.2 ~~ii~~—For systems with manifolded vapor lines, the liquid shall return into the lowest octane tank. For non-manifolded systems with separate vapor lines, the liquid shall return to the tank that has the same product as is dispensed at the nozzle where the liquid was introduced into the vapor lines.

36.3.1.3 ~~iii~~—On and after May 1, 2003, install and maintain a vapor shear valve that functions similarly to the product shear valve.

36.3.1.4 ~~iv.~~—Conspicuously post "Operating Instructions" on both sides of each gasoline dispenser. Such instructions shall include:

36.3.1.4.1 ~~A.~~—A clear description of how to correctly dispense gasoline.

36.3.1.4.2 ~~B.~~—A warning that repeated attempts to continue dispensing gasoline, after the system has indicated that the vehicle fuel tank is full (by automatically shutting off), may result in spillage or recirculation of gasoline.

36.3.1.4.3 ~~C.~~—A toll-free telephone number to report problems experienced with the vapor recovery system to the Department.

36.3.2 ~~2.~~—At least one representative (an owner, facility manager, or designated employee) from each facility, or facilities under common ownership, shall attend a training program on the operation and maintenance requirements of the Stage II equipment that is selected for installation and/or installed on their facility premises. Acceptable forms of training include equipment manufacturer's seminars, classes or workshops, or any other training approved by the Department.

36.3.2.1 ~~i.~~—Verification, such as a certificate of attendance from the training program, shall be obtained by the attendee within three (~~3~~) months of the installation of the Stage II system. The certificate shall display the name of the person who completed the training program.

36.3.2.2 ~~ii.~~—The representative that completed the training program is then responsible for informing all facility employees about conducting routine maintenance pursuant to ~~paragraph (c)(3)~~ 36.3.3 of this ~~section~~ regulation and about the operation and maintenance of the Stage II system. The representative shall maintain proof of training for all employees who will be conducting daily inspections. If such representative leaves that facility, or the company owning several facilities, another representative shall take and successfully complete the training within three (~~3~~) months.

36.3.2.3 ~~iii.~~—Training shall include, but not be limited to, the following subjects:

36.3.2.3.1 ~~A.~~—Purposes and effects of the Stage II Vapor Control Program.

36.3.2.3.2 ~~B.~~—Equipment operation and function specific to their facility's equipment.

36.3.2.3.3 ~~C.~~ Maintenance schedules and requirements for the facility's equipment.

36.3.2.3.4 ~~D.~~ Equipment warranties.

36.3.2.3.5 ~~E.~~ Equipment manufacturer contracts (names, addresses, and phone numbers) for parts and service.

36.3.3 ~~3.~~ Each day personnel trained pursuant to ~~paragraph (c)(2)~~ 36.3.2 of this Section regulation shall perform routine maintenance inspections and record the inspection results.

36.3.3.1 ~~i.~~ Such inspections shall consist of, but not limited to, inspection of the Stage II system for the following defects:

36.3.3.1.1 ~~A.~~ A faceplate or face cone of a balance or assist system nozzle that does not make a good seal with a vehicle fill tube, or the accumulated damage to the faceplate or face cone is over 25% of its' surface.

36.3.3.1.2 ~~B.~~ A vapor assist system nozzle fitted with an efficiency compliance device that is damaged over 25% of its' surface.

36.3.3.1.3 ~~C.~~ A nozzle bellows with a triangular tear measuring ½ inch or more to a side, a hole measuring ½ inch or more in diameter, or a slit or tear measuring one inch or more in length.

36.3.3.1.3 ~~D.~~ A nozzle bellows or efficiency compliance device that is loosely attached to the nozzle body, not attached by a manufacturer approved method, or a vapor check valve frozen in the open position.

36.3.3.1.4 ~~E.~~ A nozzle liquid shutoff mechanism that malfunctions in any manner, where the spring or latching knurl is damaged or missing.

36.3.3.1.5 ~~F.~~ A nozzle with a vapor check valve that is defective, or a hose with a disconnected or damaged breakaway.

36.3.3.1.6 ~~G.~~ A vapor assist system nozzle spout that is damaged and the vapor collection holes are obstructed.

36.3.3.1.7 ~~H.~~ A dispenser mounted vacuum pump that is not functioning.

36.3.3.1.8 ~~I.~~ A vacuum assist system with a central vacuum unit or vapor processing unit that is inoperative.

36.3.3.1.9 ~~J~~—A hose retractor that does not fully retract.

36.3.3.1.10 ~~K~~—Any other component required by the Department for use in the system that is missing, disconnected, or malfunctioning.

36.3.3.2 ~~ii~~—The owner and/or operator shall post "Out of Order" signs and "Bag-out" the nozzle associated with any part of the defective vapor recovery system until said system has been repaired or replaced.

36.4 ~~d~~—Testing Requirements

36.4.1 ~~4~~—Any gasoline dispensing facility subject to the requirements of ~~paragraph (c)(1)(i)~~ 36.3.1.1 of this ~~Section~~ regulation shall perform and pass the following tests in accordance with the test methods and procedures stated, or as otherwise approved by the Department and the Administrator of the EPA. Where any of the following test methods and procedures, in the opinion of the Department, conflict and/or are redundant with those specified in any CARB Executive Order adopted by reference in ~~paragraph (g)~~ 36.7 of this ~~Section~~ regulation, the following test methods and procedures shall apply.

36.4.1.1 ~~i~~—The following tests shall be performed and passed within ten (10) days of installation of the Stage II vapor recovery system:

36.4.1.1.1 ~~A~~—A Pressure Decay/Leak Test, conducted in accordance with Test Procedure TP-96-1 of the San Diego Protocol, Revision III dated 3-1-96. This test procedure is hereby incorporated by reference.

36.4.1.1.2 ~~B~~—A Dynamic Backpressure and Liquid Blockage Test, conducted in accordance with the procedures in "Recommended Practices for Installation and Testing of Vapor Recovery Systems at Vehicle Fueling Sites, PEI/RP300-97", Chapter 8. This test procedure is hereby incorporated by reference.

36.4.1.1.3 ~~C~~—For assist systems, an Air to Liquid Volume Ratio Test conducted in accordance with the procedures in "Recommended Practices for Installation and Testing of Vapor Recovery Systems at Vehicle Fueling Sites, PEI/RP300-97", Chapter 9. This test procedure is hereby incorporated by reference.

36.4.1.1.4 ~~D~~—A Vapor Tie Test, conducted in accordance with Test Procedure TP-96-1 of the San Diego Protocol,

Revision III dated 3-1-96. This test procedure is hereby incorporated by reference.

36.4.1.2 ~~ii.~~—The following tests shall be performed and passed annually for each Stage II vapor recovery system according to the test procedures stated in ~~paragraph (d)(1)(i)~~ 36.4.1.1 of this Section ~~regulation~~:

36.4.1.2.1 ~~A.~~—A Pressure Decay/Leak Test.

36.4.1.2.2 ~~B.~~—For Balance Systems, A Dynamic Backpressure and Liquid Blockage Test.

36.4.1.2.3 ~~C.~~—For Assist Systems, An Air to Liquid Volume Ratio Test.

36.4.1.3 ~~iii.~~—Any additional testing~~(s)~~ or testings required by the Department or the manufacturer shall be carried out according to the schedule stated in any permit issued pursuant to ~~Regulation No. 27 DE Admin Code 1102.~~

36.4.2 ~~2.~~—The Department may require the performance of any of the tests identified in ~~paragraph (d)(1)~~ 36.4.1 of this Section ~~regulation~~ at anytime at the owner's expense.

36.4.3 ~~3.~~—Written notification shall be submitted to the Department not less than ~~ten (10)~~ 10 working days prior to the performance of any compliance test, unless approval by the Department is granted to the contrary.

36.4.4 ~~4.~~—The owner ~~and/or operator~~ or both and test contractor shall report all test failures to the Department within ~~twenty-four (24)~~ 24 hours of the failure.

36.4.5 ~~5.~~—The owner ~~and/or operator~~ shall submit the following to the Department within ~~thirty (30)~~ 30 days of the test date:

36.4.5.1 ~~i.~~—the actual test date; and

36.4.5.2 ~~ii.~~—the installing ~~and/or testing~~ companies' name~~(s)~~ or names, address~~(es)~~ or addresses, and phone number~~(s)~~ or numbers; and

36.4.5.3 ~~iii.~~—if any corrective action was performed pursuant to ~~paragraph (f)(4)(ii)~~ 36.6.4.2 of this regulation then submit all information specified in ~~(f)(4)~~ 36.6.4 of this regulation.

36.5 ~~e.~~—Recordkeeping and Reporting

36.5.1 4.—The owner and/or operator of a gasoline dispensing facility subject to the requirements of ~~this Section 36.0~~ 36.0 of this regulation shall keep on the facility premises and in a form acceptable to the Department, all of the following information. This information shall be retained for at least three ~~(3)~~ years from the date of record and shall be made immediately available to the Department upon request.

36.5.1.1 i.—Permits and Applications. Copies of the Stage I and Stage II System permit applications and the current Construction/Operation Permits shall be permanently maintained.

36.5.1.2 ii.—Installation and Testing Results. The test results shall be dated, and shall note the installing and test companies' names, addresses, and phone numbers. These records shall be kept on file until they are replaced with new test results verifying proper functioning of the Stage II system.

36.5.1.3 iii.—Maintenance Records. Any maintenance conducted on any part of the Stage II vapor recovery system shall be logged on a maintenance record. This maintenance record shall include a general part description, the date repaired or replaced, the replacement part manufacturer's information, and a description of the problem and solution.

36.5.1.4 iv.—Inspection Records. A file shall be maintained of all daily inspection reports including records of daily self-inspections, and any third party inspection records.

36.5.1.5 v.—Compliance Records. A file shall be maintained of all compliance records. This record shall include:

36.5.1.5.1 A.—Any warning letters and notices of violations issued by the Department to the facility.

36.5.1.5.2 B.—Proof of attendance and completion of a training program for each person trained in accordance with ~~paragraph (c)(2)(ii) 36.3.2.2~~ 36.3.2.2 of this regulation. This does not apply to the records of an employee who is no longer in service for at least one ~~(1)~~ year.

36.5.2 2.—Any gasoline dispensing facility exempted from the requirements of ~~this Section 36.0~~ 36.0 of this regulation pursuant to ~~paragraph (a)(1)(i) 36.1.1.1~~ 36.1.1.1 of this Section regulation shall maintain records of monthly throughput, and shall furnish these records to the Department upon request. These records shall be maintained on file for a minimum of three years from the date of record.

36.5.3 3.—The owner and/or operator, or both, of any facility containing sources subject to ~~this Section 36.0~~ 36.0 of this regulation shall comply with the requirements of ~~Section 5~~ 5.0 of this regulation.

36.6 ~~f.~~ Compliance Testing Company Requirements

36.6.1 ~~1.~~ Any owner ~~and/or~~ operator, or both, of any company that performs Stage II compliance testing within the State of Delaware shall submit all of the following information to the Department, prior to performing any Stage II compliance testing within the State of Delaware:

36.6.1.1 ~~i.~~ The name and business mailing address of the Stage II compliance testing company owner ~~and/or~~ operator;

36.6.1.2 ~~ii.~~ The address and telephone number of the facility~~(ies)~~ or facilities from which the daily compliance testing activities of the compliance testing company originate;

36.6.1.3 ~~iii.~~ A written description of the employee training systems in place at the compliance testing company to ensure required compliance tests are performed in accordance with applicable protocols and procedures.

36.6.1.4 ~~iv.~~ Certification by an individual who is a responsible and trained representative of the compliance testing company containing the following language verbatim:

36.6.1.4.1 ~~A.~~ I certify that I personally examined and am familiar with the information contained in this document and all the attachments and that, based on my inquiry of those persons immediately responsible for obtaining the information, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including possible fines and imprisonment; and

36.6.1.4.2 ~~B.~~ Employee training systems are in place at the company to ensure Stage II compliance tests are performed in accordance with all applicable protocols and procedures; and

36.6.1.4.3 ~~C.~~ I am fully authorized to make this attestation on behalf of this Stage II Compliance Testing Company.

36.6.2 ~~2.~~ Any company subject to the requirements of ~~paragraph (f) 36.6~~ of this ~~section~~ regulation shall notify the Department in writing of any change to any information submitted to the Department within 14 days of the effective date of such change.

36.6.3 ~~3.~~ No person subject to the requirements of ~~paragraph (f) 36.6~~ of this ~~Section~~ regulation shall perform any Stage II compliance test unless said person has first been trained in accordance to applicable compliance test protocols and procedures.

36.6.4 4.—Any person subject to ~~paragraph (f)~~ 36.6 of this ~~Section~~ regulation shall certify to the owner and/or operator of the gasoline dispensing facility that each compliance test performed to meet the requirements of ~~this section~~ 36.0 of this regulation was performed in accordance with ~~paragraph (d)~~ 36.4 of this ~~Section~~ regulation. Certification shall include:

36.6.4.1 i.—The date each compliance test was first performed and the test results; and

36.6.4.2 ii.—An itemized list of all corrective action performed on the Stage II system. This list shall include, but not be limited to, component re-installation, tightening, repair or replacement, as necessary, for the system to pass the applicable test(s) or tests; and

36.6.4.3 iii.—The date each compliance test was performed and passed; and

36.6.4.4 iv.—Certification by a responsible and trained representative(s) or representatives of the compliance testing company containing the following language verbatim:

36.6.4.4.1 A.—I certify that I personally examined and am familiar with the information contained in this document and all the attachments and that, based on my inquiry of those persons immediately responsible for obtaining the information, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including possible fines and imprisonment; and

36.6.4.4.2 B.—I am fully authorized to make this attestation on behalf of this Stage II Compliance Testing Company.

36.7 g.—Approved Stage II Vapor Recovery Systems

The following California Air Resources Board (CARB) executive orders are hereby adopted by reference.

Number & Date	Description
G-70-7-AD (03/22/93)	Certification of the Hasstech Model VCP-2 and VCP 2A Phase II Vapor Recovery System.
G-70-14-AA (02/08/83)	Recertification of Red Jacket Aspirator Assist Phase II Vapor Recovery System.
G-70-17-AD (05/06/93)	Modification of Certification of the Emco Wheaton Balance Phase II Vapor Recovery System.
G-70-18-C (08/28/79)	Modification of Certification of the Shell Model 75B1 and 75B1-R3 Service Station Phase II Vapor Recovery System.

G-70-23-AC (04/29/96)	Recertification of the Exxon Balance Phase II Vapor Recovery System.
G-70-25-AA (02/08/83)	Recertification of the Atlantic Richfield Balance Phase II Vapor Recovery System.
G-70-33-AB (03/09/84)	Certification of the Modified Hirt VCS-200 Vacuum Assist Phase II Vapor Recovery System.
G-70-36-AD (09/18/92)	Modification of Certification of the OPW Balance Phase II Vapor Recovery System.
G-70-37-B (01/22/80)	Modification of the Certification of the Chevron Balance Phase II Vapor Recovery System with OPW nozzles for Service.
G-70-38-AB (12/19/90)	Recertification of the Texaco Balance Phase II Vapor Recovery System.
G-70-48-AA (02/08/83)	Recertification of the Mobil Oil Balance Phase II Vapor Recovery System.
G-70-49-AA (02/08/83)	Recertification of the Union Balance Phase II Vapor Recovery System.
G-70-52-AM (10/04/91)	Certification of Components for Red Jacket, Hirt and Balance Phase II Vapor Recovery System.
G-70-53-AA (02/08/83)	Recertification of the Chevron Balance Phase II Vapor Recovery System.
G-70-70-AC (06/23/92)	Certification of the Healy Phase II Vapor Recovery System of Service Stations.
G-70-77 (09/15/82)	Certification of the OPW Repair/Replacement Parts and Modification of the Certification of the OPW Balance Phase II Vapor Recovery System.
G-70-78 (05/20/83)	Certification of the E-Z Flo Nozzle Company Rebuilt Vapor Recovery Nozzles and Vapor Recovery Components.
G-70-101-B (11/15/85)	Certification of the E-Z Flo Model 3006 and 3007 Vapor Recovery Nozzles and Use of E-Z Flo Components with OPW Models 11 VC and 11 VE Vapor Recovery Nozzles.
G-70-107 (05/15/86)	Certification of Rainbow Petroleum Products Model RA3003, RA3005, RA3006 and RA3007 Vapor Recovery Nozzles and Vapor Recovery Components.
G-70-110 (01/20/87)	Certification of Stage I and II Vapor Recovery Systems for Methanol Fueling Facilities.
G-70-118-AB (03/31/95)	Certification of Amoco V-1 Vapor Recovery System.
G-70-125-AA (03/16/93)	Modification of the Certification of the Husky Model V Phase II Balance Vapor Recovery Nozzle.
G-70-127 (08/16/90)	Certification of the OPW Model 111-V Phase Vapor Recovery Nozzle.
G-70-134 (12/21/90)	Certification of the EZ Flo Rebuilt A-4000 Series and 11V-Series Vapor Recovery System.
G-70-139 (03/17/92)	Addition to the Certification of the Hirt Model VCS-200 Phase II Vapor Recovery System.
G-70-150-AE (07/12/00)	Modification of the Certification of the Gilbarco Vapor Vac Phase II Vapor Recovery System.
G-70-153-AD (04/03/00)	Modification to the Certification of the Dresser/Wayne WayneVac Phase II Vapor Recovery System.
G-70-154-AA (06/10/97)	Modification to the Certification of the Tokheim MaxVac Phase II Vapor Recovery System.
G-70-159-AB (07/17/95)	Modification of the Certification of the Saber Nozzle for Use with the Gilbarco VaporVac Phase II Vapor Recovery System.
G-70-163-AA	Certification of the OPW VaporEZ Phase II Vapor Recovery System.

(09/04/96)	
G-70-164-AA (12/10/96)	Modification to the Certification of the Hasstech VCP-3A Vacuum Assist Phase II Vapor Recovery System.
G-70-165 (04/20/95)	Healy Vacuum Assist Phase II Vapor Recovery System.
G-70-169-AA (08/11/97)	Modification to the Certification of the Franklin Electric INTELLIVAC Phase II Vapor Recovery System.
G-70-170 (02/22/96)	Certification of the EZ-flo Rebuilt 5005 and 5015 for use with the Balance Phase II Vapor Recovery System.
G-70-177-AA (06/22/00)	Certification of the VCS400-7 Vacuum Assist Phase II Vapor Recovery System.
G-70-179 (07/02/97)	Certification of the Catlow ICVN-V1 Vacuum Assist Phase II Vapor Recovery System.
G-70-180 (04/17/97)	Order Revoking Certification of the Healy Phase II Vapor Recovery Systems for Gasoline Dispensing Systems.
G-70-183 (03/04/98)	Certification of the Healy/Franklin Vacuum Assist Phase II Vapor Recovery System.
G-70-186 (10/26/98)	Certification of the Healy Model 400 ORVR Vapor Recovery System.
G-70-188 (05/18/99)	Certification of the Catlow ICVN Vapor Recovery Nozzle System for use with the Gilbarco VaporVac Vapor Recovery System.
G-70-191 (08/08/99)	Healy/Franklin VP-1000 Vapor Pump Phase II Vapor Recovery System (Healy ORVR Phase II Vapor Recovery System).
G-70-196 (12/30/00)	Certification of the Saber Technologies, LLC SaberVac VR Phase II Vapor Recovery System.

Section 37—

37.0 Graphic Arts Systems

11/29/1994

37.1 a. Applicability

37.1.1 1. ~~This Section applies~~ The provisions of 37.0 of this regulation apply to any packaging rotogravure, publication rotogravure, or flexographic printing press at any facility whose maximum theoretical emissions of volatile organic compounds (VOCs) (including solvents used to clean each of these printing presses) without control devices from all printing presses are greater than or equal to 7.7 tons per year.

37.1.2 2. ~~An owner or operator of a facility whose emissions are below the applicability threshold in paragraph (a)(1) 37.1.1 of this Section regulation shall comply with the certification, recordkeeping, and reporting requirements of paragraph (g)(1) 37.7.1 of this Section regulation.~~

37.1.3 3. ~~Any facility that becomes or is currently subject to the provisions of this Section 37.0 of this regulation by exceeding the applicability threshold in paragraph (a)(1) 37.1.1 of this Section regulation will remain subject to these provisions even if its emissions later fall below the applicability threshold.~~

37.1.4 4. ~~Any facility that is currently subject to a state or federal rule promulgated pursuant to the Clean Air Act Amendments of 1977 by exceeding an applicability threshold is and will remain subject to these provisions, even if its throughput or emissions have fallen or later fall below the applicability threshold.~~

37.2 b. ~~Definitions. As used in this Section 37.0 of this regulation,~~ all terms not defined herein shall have the meaning given them in the November 15, 1990 Clean Air Act Amendments, or in ~~Section 2 2.0~~ of this regulation.

“Flexographic printing press” means a printing press that uses a roll printing technique in which the pattern to be applied is raised above the printing roll and the image carrier is made of rubber or other elastomeric materials.

“Packaging rotogravure printing press” means a rotogravure printing press used to print on paper, paper board, metal foil, plastic film, and other substrates that are, in subsequent operations, formed into packaging products and labels, and other nonpublication products.

“Press-Ready Ink” means ink, as applied to a substrate, after all solvents and diluents have been added.

“Printing press” means equipment used to apply words, pictures, or graphic designs to either a continuous substrate or a sheet. A continuous substrate consists of paper, plastic, or other material that is unwound from a roll, passed through coating or ink applicators and any associated drying areas. The press

includes all coating and ink applicators and drying areas between unwind and rewind of the continuous substrate. A sheet consists of paper, plastic, or other material that is carried through the process on a moving belt. The press includes all coating and ink applicators and drying operations between the time that the sheet is put on the moving belt until it is taken off.

“Publication rotogravure printing press” means a rotogravure printing press on which the following paper products are printed:

1. Catalogues, including mail order and premium.
2. Direct mail advertisements, including circulars, letters, pamphlets, cards, and printed envelopes.
3. Display advertisements, including general posters, outdoor advertisements, car cards, window posters; counter and floor displays; points-of-purchase, and other printed display material.
4. Magazines, books.
5. Miscellaneous advertisements, including brochures, pamphlets, catalogue sheets, circular folders, announcements, package inserts, book jackets, market circulars magazine inserts, and shopping news.
6. Newspapers, magazine and comic supplements for newspapers, and preprinted newspaper inserts, including hi-fi and spectacolor rolls and Sections.
7. Periodicals.
8. Telephone and other directories, including business reference services.

“Roll printing” means the application of words, designs, and pictures to a substrate, usually by means of a series of rolls each with only partial coverage.

“Rotogravure printing press” means any printing press designed to print on a substrate using a gravure cylinder.

37.3 ~~e~~-Standards

37.3.1 ~~4~~—No owner or operator of a packaging rotogravure or flexographic printing press subject to ~~this Section 37.0 of this regulation~~ shall apply any coating or ink unless the VOC content is equal to or less than one of the following:

37.3.1.1 ~~i~~. 40% ~~percent~~ VOC by volume of the coating or ink, excluding water and exempt compounds, as applied.

37.3.1.2 ~~ii~~. 25% ~~percent~~ VOC by volume of the volatile content in the coating or ink, as applied.

37.3.1.3 ~~iii~~. 0.5 kilogram (kg) VOC per kg (0.5 pound [lb] VOC per lb) coating solids, as applied.

37.3.2 ~~2~~—No owner or operator of a publication rotogravure printing press subject to ~~this Section 37.0 of this regulation~~ shall apply any coating or ink unless the VOC content is equal to or less than one of the following:

37.3.2.1 i. ~~40% percent~~ VOC by volume of the coating or ink, excluding water and exempt compounds, as applied.

37.3.2.2 ii. ~~25% percent~~ VOC by volume of the volatile content in the coating or ink, as applied.

37.3.3 ~~3.~~—As an alternative to compliance with the limits in ~~paragraphs (c)(1) or (c)(2)~~ 37.3.1 or 37.3.2 of this ~~Section~~ regulation, an owner or operator of a packaging rotogravure, publication rotogravure, or flexographic printing press may comply with the requirements of ~~this Section 37.0~~ of this regulation by meeting the requirements of ~~paragraph (d) or (e)~~ 37.4 or 37.5 of this ~~Section~~ regulation.

37.4 ~~d.~~—Daily-weighted average limitations

37.4.1 ~~4.~~—No owner or operator of a packaging rotogravure, publication rotogravure, or flexographic printing press shall apply, during any day, coatings or inks on the subject printing press unless the daily-weighted average, by volume, VOC content of all coatings and inks, as applied, each day on the subject printing press is equal to or less than the limitation specified in either ~~paragraph (c)(1)(i) or (c)(2)(i)~~ 37.3.1.1 or 37.3.2.1 (as determined by ~~paragraph (d)(4)~~ 37.4.4); ~~(c)(1)(ii) or (c)(2)(ii)~~ 37.3.1.2 or 37.3.2.2 (as determined by ~~paragraph (d)(5)~~ 37.4.5); or, in the case of packaging rotogravure or flexographic printing, ~~(c)(1)(iii)~~ 37.3.1.3 (as determined by ~~paragraph (d)(6)~~ 37.4.6) of this ~~Section~~ regulation.

37.4.2 ~~2.~~—An owner or operator may comply with the daily-weighted average limitation by grouping coatings or inks used on a printing press into two categories that meet the conditions in ~~paragraphs (d)(2)(i) and (ii)~~ 37.4.2.1 and 37.4.2.2 of this ~~Section~~ regulation. Any use of averaging between the two categories of coating or inks used on a packaging rotogravure press or on a flexographic press requires compliance with the emission standard in ~~paragraph (c)(1)(iii)~~ 37.3.1.3 of this regulation, as determined by the equation in ~~paragraph (d)(6)~~ 37.4.6 of this regulation.

37.4.2.1 i.—The daily-weighted average VOC content for the first category shall comply with ~~paragraph (c)(1)(i) or (c)(2)(i)~~ 37.3.1.1 or 37.3.2.1 of this ~~Section~~ regulation, as determined by applying the equation in ~~paragraph (d)(4)~~ 37.4.4 of this ~~Section~~ regulation to the coatings or inks in this first category.

37.4.2.2 ii.—The daily weighted-average VOC content for the second category shall comply with ~~paragraph (c)(1)(ii) or (c)(2)(ii)~~ 37.3.1.2 or 37.3.2.2 of this ~~Section~~ regulation, as determined by applying the equation in ~~paragraph (d)(5)~~ 37.4.5 of this ~~Section~~ regulation to the coatings or inks in this second category.

37.4.3 ~~3.~~—Compliance with ~~this Section 37.0~~ of this regulation shall be demonstrated through the applicable coating or ink analysis test methods

and procedures specified in **Appendix B** of this regulation and the recordkeeping and reporting requirements specified in ~~paragraph (g)(3)~~ 37.7.3 of this ~~Section~~ regulation.

37.4.4 4.—The following equation shall be used to determine if the weighted average VOC content of all coatings and inks, as applied, each day on the subject printing press exceeds the limitation specified in ~~paragraph (c)(1)(i) or (c)(2)(i)~~ 37.3.1.1 or 37.3.2.1 of this ~~Section~~ regulation:

$$\text{VOC}_{(i)(A)} = \frac{\sum_{i=1}^n L_i V_{\text{VOC}i}}{\sum_{i=1}^n L_i (V_{\text{si}} + V_{\text{VOC}i})} \times 100 \quad (37-1)$$

where:

$\text{VOC}_{(i)(A)}$ = The weighted average VOC content in units of percent VOC by volume of all coatings and inks (excluding water and exempt compounds) used each day.

i = Subscript denoting a specific coating or ink, as applied.

n = The number of different coatings and/or inks, as applied, each day on a printing press.

L_i = The liquid volume of each coating or ink, as applied, used that day in units of liters (L) (gallons [gal]).

V_{si} = The volume fraction of solids in each coating or ink, as applied.

$V_{\text{VOC}i}$ = The volume fraction of VOC in each coating or ink, as applied.

37.4.5 5.—The following equation shall be used to determine if the weighted average VOC content of all coatings and inks, as applied, each day on the subject printing press exceeds the limitation specified in ~~paragraph (c)(1)(ii) or (c)(2)(ii)~~ 37.3.1.2 or 37.3.2.2 of this ~~Section~~ regulation:

$$\text{VOC}_{(i)(B)} = \frac{\sum_{i=1}^n L_i V_{\text{VOC}i}}{\sum_{i=1}^n L_i (V_{\text{VOC}i})} \times 100 \quad (37-2)$$

where:

$\text{VOC}_{(i)(B)}$ = The weighted average VOC content in units of percent VOC by volume of the volatile content of all coatings and inks used each day.

i = Subscript denoting a specific coating or ink, as applied.

n = The number of different coatings and/or inks, as applied, each day on each printing press.

L_i = The liquid volume of each coating or ink, as applied, in units of L (gal).

V_{VOCi} = The volume fraction of VOC in each coating or ink, as applied.

V_{Vci} = The volume fraction of volatile matter in each coating or ink, as applied.

37.4.6 ~~6~~—The following equation shall be used to determine if the weighted average VOC content of all coatings and inks, as applied, each day on the subject printing press exceeds the limitation specified in ~~paragraph (c)(1)(iii)~~ 37.3.1.3 of this ~~Section~~ regulation:

$$VOC_{(i)(C)} = \frac{\sum_{i=1}^n L_i D_i W_{VOCi}}{\sum_{i=1}^n L_i D_i W_{si}} \quad (37-3)$$

where:

$VOC_{(i)(C)}$ = The weighted average VOC content in units of mass of VOC per mass of coating solids.

i = Subscript denoting a specific coating or ink, as applied.

n = The number of different coatings and/or inks, as applied, each day on a printing press.

L_i = The liquid volume of each coating or ink, as applied, used on the day in units of L (gal).

D_i = The density of each coating or ink, as applied, in units of mass of coating or ink per unit volume of coating or ink.

W_{VOCi} = The weight fraction of VOC in each coating or ink, as applied.

W_{si} = The weight fraction of solids in each coating or ink, as applied.

37.5 ~~e~~—Control devices

37.5.1 ~~4~~—No owner or operator of a packaging rotogravure, publication rotogravure, or flexographic printing press equipped with a control system shall operate the printing press unless the owner or operator meets one of the requirements under ~~paragraphs (e)(1)(i) and (ii)~~ 37.5.1.1 and 37.5.1.2 of this ~~Section~~ regulation.

37.5.1.1 ~~i~~—

37.5.1.1.1 ~~A~~—A carbon adsorption control device is used that reduces the VOC emissions delivered from the capture system to the control device by at least 90% percent by weight.

37.5.1.1.2 ~~B~~—An incineration control device is used to reduce VOC emissions delivered from the capture system to the control device by at least 90% percent, by weight.

37.5.1.1.3 ~~C.~~ Any other VOC emission control device is used to reduce the VOC emissions delivered from the capture system to the control device by at least 90% percent.

37.5.1.2 ~~ii.~~ The printing press is equipped with a capture system and control device that provides an overall emission reduction efficiency of at least:

37.5.1.2.1 ~~A.~~ 75% percent for a publication rotogravure printing press.

37.5.1.2.2 ~~B.~~ 65% percent for a packaging rotogravure printing press.

37.5.1.2.3 ~~C.~~ 60% percent for a flexographic printing press.

37.5.2 ~~2.~~ An owner or operator of a packaging rotogravure, publication rotogravure, or flexographic printing press equipped with a control system shall ensure that:

37.5.2.1 ~~i.~~ A capture system and control device are operated at all times that the printing press is in operation, and the owner or operator demonstrates compliance with ~~this Section~~ 37.0 of this regulation through the applicable coating analysis and capture system and control device efficiency test methods specified in **Appendix B**, **Appendix D** and **Appendix E** of this regulation and in accordance with the capture efficiency test methods in **Appendix D**.

37.5.2.2 ~~ii.~~ The control device is equipped with the applicable monitoring equipment specified in 2.0 of Appendix D ~~(b)~~ of this regulation, and the monitoring equipment is installed, calibrated, operated, and maintained according to the vendor's specifications at all times the control device is in use.

37.6 ~~f.~~ Test methods. The VOC content of each coating and ink and the efficiency of each capture system and control device shall be determined by the applicable test methods and procedures specified in **Appendix A** through **Appendix D** of this regulation to establish the records required under ~~paragraph (g)~~ 37.7 of this Section regulation.

37.7 ~~g.~~ Recordkeeping and reporting

37.7.1 ~~4.~~ Requirements for exempt sources. By November 15, 1993, any owner or operator of a printing press that is exempt from the requirements of ~~this Section~~ 37.0 of this regulation because of the criteria in ~~paragraph (a)~~ 37.1 of this Section regulation shall comply with the following:

37.7.1.1 ~~i~~—Initial certification. The owner or operator shall certify to the Department that the facility is exempt under the provisions of ~~paragraph (a) 37.1~~ of this ~~Section~~ regulation. Such certification shall include:

37.7.1.1.1 ~~A~~—The name and location of the facility.

37.7.1.1.2 ~~B~~—The address and telephone number of the person responsible for the facility.

37.7.1.1.3 ~~C~~—A declaration that the facility is exempt from ~~this Section 37.0~~ of this regulation because of the criteria in ~~paragraph (a) 37.1~~ of this ~~Section~~ regulation.

37.7.1.1.4 ~~D~~—Calculations demonstrating that total potential emissions of VOC from all flexographic and rotogravure printing presses at the facility are and will be less than 7.7 tons per year of press-ready ink, before the application of capture systems and control devices. Total potential emissions of VOC for a flexographic or rotogravure printing facility is the sum of potential emissions of VOC from each flexographic and rotogravure printing press at the facility. The following equation shall be used to calculate total potential emissions of VOC per calendar year before the application of capture systems and control devices for each flexographic and rotogravure printing press at the facility:

$$E_p = A \times B \qquad (37-4)$$

where:

E_p = Total potential emissions of VOC from one flexographic or rotogravure printing press in units of kilograms per year (kg/yr) (pounds per year [lb/yr]).

A = Weight of VOC per volume of solids of the coating or ink with the highest VOC content, as applied, each year on the printing press in units of kilograms VOC per liter (kg VOC/L) (pounds of VOC per gallon [lb VOC/gal]) of coating or ink solids.

B = Total volume of solids for all coatings and inks that can potentially be applied each year on the printing press in units of liters per year (L/yr) (gallons per year [gal/yr]). The instrument and/or method by which the owner or operator accurately measured or calculated the volume of coating and ink solids applied and the amount that can potentially be applied each year on the printing press shall be described in the certification to the Department.

37.7.1.2 ~~ii.~~—Recordkeeping. The owner or operator shall collect and record all of the following information each year for each printing press and maintain the information at the facility for a period of 5 years:

37.7.1.2.1 ~~A.~~—The name and identification number of each coating and ink, as applied, each year on each printing press.

37.7.1.2.2 ~~B.~~—The weight of VOC per volume of coating solids and the volume of solids of each coating and ink, as applied, each year on each printing press.

37.7.1.2.3 ~~C.~~—The total potential emissions as calculated in ~~paragraph (g)(1)(i)(D)~~ 37.7.1.1.4 of this ~~Section~~ regulation using VOC content for that year.

37.7.1.3 ~~iii.~~—Reporting. Any record showing that total potential emissions of VOC from all printing presses exceed 7.7 tons per year of press-ready ink in any calendar year before the application of capture systems and control devices shall be reported by sending a copy of such record to the Department within 45 calendar days after the exceedance occurs. This requirement is in addition to any other State of Delaware exceedance reporting requirements.

37.7.2 ~~2.~~—Requirements for sources using complying coatings or inks. Any owner or operator of a printing press subject to ~~this Section 37.0 of this regulation~~ and complying by means of use of complying coatings or inks, shall comply with the following:

37.7.2.1 ~~i.~~—Initial certification. By November 15, 1993, or upon initial startup of a new printing press, or upon changing the method of compliance for an existing subject printing press from daily-weighted averaging or control devices to use of complying coatings or inks, the owner or operator of a subject printing press shall certify to the Department that the printing press will be in compliance with ~~paragraph (c)(1) or (c)(2)~~ 37.3.1 or 37.3.2 of this ~~Section~~ regulation on and after November 15, 1993, or on and after the initial startup date. Such certification shall include:

37.7.2.1.1 ~~A.~~—The name and location of the facility.

37.7.2.1.2 ~~B.~~—The address and telephone number of the person responsible for the facility.

37.7.2.1.3 ~~C.~~—Identification of subject sources.

37.7.2.1.4 ~~D.~~—The name and identification number of each coating and ink, as applied.

37.7.2.1.5 ~~E.~~ The VOC content of all coatings and inks, as applied.

37.7.2.2 ~~ii.~~ Recordkeeping. By November 15, 1993, or on and after the initial startup date, the owner or operator of a printing press subject to the limitations of ~~this Section 37.0 of this regulation~~ and complying by means of ~~paragraph (c)(1)(i) or (c)(2)(i)~~ 37.3.1.1 or 37.3.2.1 of this regulation shall collect and record all of the following information each day for each printing press and maintain the information at the facility for a period of ~~5~~ five years:

37.7.2.2.1 ~~A.~~ The name and identification number of each coating and ink, as applied.

37.7.2.2.2 ~~B.~~ The VOC content of each coating and ink, as applied, expressed in units necessary to determine compliance.

37.7.2.3 ~~iii.~~ Reporting.

37.7.2.3.1 ~~A.~~ Any record showing an exceedance of the VOC contents of ~~paragraph (c)(1) or (c)(2)~~ 37.3.1 or 37.3.2 of this Section regulation shall be reported by the owner or operator of the subject printing press to the Department within 45 calendar days following the exceedance, in addition to complying with any other applicable reporting requirements.

37.7.2.3.2 ~~B.~~ At least 30 calendar days before changing the method of compliance with ~~this Section 37.0 of this regulation~~ from the use of complying coatings to daily-weighted averaging or control devices, the owner or operator shall comply with all requirements of ~~paragraph (g)(3)(i) or (g)(4)(i)~~ 37.7.3.1 or 37.7.4.1 of this Section regulation, respectively, as well as the requirements of ~~Regulation No. 2~~ **7 DE Admin Code 1102**. Upon changing the method of compliance with ~~this Section 37.0 of this regulation~~ from the use of complying coatings to daily-weighted averaging or control devices, the owner or operator shall comply with all requirements of ~~paragraph (g)(3) or (g)(4)~~ 37.7.3 or 37.7.4 of this Section regulation, respectively.

37.7.3 ~~3.~~ Requirements for sources using daily-weighted averaging. Any owner or operator of a printing press subject to the limitations of ~~this Section 37.0 of this regulation~~ and complying by means of daily-weighted averaging shall comply with the following:

37.7.3.1 ~~i.~~ Initial certification. By November 15, 1993, or upon initial startup of a new printing press, or upon changing the method of compliance for an existing subject press from use of complying coating or control devices to daily-weighted averaging, the owner or operator of the subject printing press shall certify to the Department that the printing press will be in compliance with ~~paragraph (d)~~ 37.4 of this ~~Section~~ regulation on and after November 15, 1993, or on and after the initial startup date. Such certification shall include:

37.7.3.1.1 ~~A.~~ The name and location of the facility.

37.7.3.1.2 ~~B.~~ The address and telephone number of the person responsible for the facility.

37.7.3.1.3 ~~C.~~ The name and identification of each printing press that will comply by means of ~~paragraph (d)~~ 37.4 of this ~~Section~~ regulation.

37.7.3.1.5 ~~D.~~ The name and identification number of each coating and ink available for use on each printing press.

37.7.3.1.6 ~~E.~~ The VOC content of each coating and ink, as applied, each day on each printing press, expressed in units necessary to determine compliance.

37.7.3.1.7 ~~F.~~ The instrument or method by which the owner or operator will accurately measure or calculate the volume of each coating and ink, as applied, each day on each printing press.

37.7.3.1.8 ~~G.~~ The method by which the owner or operator will create and maintain records each day as required in ~~paragraph (g)(3)(ii)~~ 37.7.3.2 of this ~~Section~~ regulation.

37.7.3.1.9 ~~H.~~ An example of the format in which the records required in ~~paragraph (g)(3)(ii)~~ 37.7.3.2 of this ~~Section~~ regulation will be kept.

37.7.3.2 ~~ii.~~ Recordkeeping. On and after November 15, 1993, or on and after the initial startup date, the owner or operator of a printing press subject to the limitations of ~~this Section~~ 37.0 of this regulation and complying by means of daily-weighted averaging shall collect and record all of the following information each day for each printing press and maintain the information at the facility for a period of 5 years:

37.7.3.2.1 ~~A.~~ The name and identification number of each coating and ink, as applied, on each printing press.

37.7.3.2.2 ~~B.~~—The VOC content and the volume of each coating and ink, as applied, each day on each printing press, expressed in units necessary to determine compliance.

37.7.3.2.3 ~~G.~~—The daily-weighted average VOC content of all coatings and inks, as applied, on each printing press.

37.7.3.3 ~~iii.~~—Reporting. On and after November 15, 1993, the owner or operator of a subject printing press shall notify the Department in the following instances:

37.7.3.3.1 ~~A.~~—Any record showing noncompliance with ~~paragraph (d) 37.4 of this regulation~~ shall be reported by sending a copy of such record to the Department within 45 calendar days following the occurrence. This requirement is in addition to any other State of Delaware exceedance reporting requirements.

37.7.3.3.2 ~~B.~~—At least 30 calendar days before changing the method of compliance with ~~this Section 37.0 of this regulation~~ from daily-weighted averaging to use of complying coatings or control devices, the owner or operator shall comply with all requirements of ~~paragraph (g)(2)(i) or (g)(4)(i) of this Section regulation~~, respectively, as well as ~~Regulation No. 2~~ **7 DE Admin Code 1102**. Upon changing the method of compliance with ~~this Section 37.0 of this regulation~~ from daily-weighted averaging to use of complying coatings or control devices, the owner or operator shall comply with all requirements of ~~paragraph (g)(2) or (g)(4) 37.7.2 or 37.7.4 of this Section regulation~~, respectively.

37.7.4 ~~4.~~—Requirements for sources using control devices. Any owner or operator of a printing press subject to ~~this Section 37.0 of this regulation~~ and complying by means of control devices shall comply with ~~Section 4(e) 4.5~~ of this regulation and the following:

37.7.4.1 ~~i.~~—Initial certification. By November 15, 1993, or upon initial startup of a new printing press, or upon changing the method of compliance for an existing printing press from use of complying coatings or daily-weighted averaging to control devices, the owner or operator of the subject printing press shall perform all tests and submit to the Department the results of all tests and calculations necessary to demonstrate that the subject printing press will be in compliance with ~~paragraph (e) 37.5 of this Section regulation~~, on and after November 15, 1993, or on and after the initial startup date.

37.7.4.2 ~~ii.~~—Recordkeeping. On and after November 15, 1993, or on and after the initial startup date, the owner or operator of a

printing press subject to the limitations of ~~this Section 37.0 of this regulation~~ and complying by means of control devices shall collect and record all of the following information each day for each printing press and maintain the information at the facility for a period of 5 years:

37.7.4.2.1 ~~A.~~ Control device monitoring data.

37.7.4.2.2 ~~B.~~ A log of operating time for the capture system, control device, monitoring equipment and the associated printing press.

37.7.4.2.3 ~~C.~~ A maintenance log for the capture system, control device, and monitoring equipment detailing all routine and non-routine maintenance performed including dates and duration of any outages.

37.7.4.3 ~~iii.~~ Reporting. On and after November 15, 1993, the owner or operator of a subject printing press shall notify the Department in the following instances:

37.7.4.3.1 ~~A.~~ Any record showing non-compliance with ~~paragraph (e) 37.5 of this regulation~~ shall be reported by sending a copy of such record to the Department within 45 calendar days following the occurrence. This requirement is in addition to any other State of Delaware exceedance reporting requirements.

37.7.4.3.2 ~~B.~~ At least 30 calendar days before changing the method of compliance with ~~this Section 37.0 of this regulation~~ from control devices to use of complying coatings or daily-weighted averaging, the owner or operator shall comply with all requirements of ~~paragraph (g)(2)(i) or (g)(3)(i) 37.7.2.1 or 37.7.3.1 of this Section regulation,~~ respectively, as well as ~~Regulation No. 2 7 DE Admin Code 1102.~~ Upon changing the method of compliance with ~~this Section 37.0 of this regulation~~ from control devices to use of complying coatings or daily-weighted averaging, the owner or operator shall comply with all requirements of ~~paragraph (g)(2) or (g)(3) 37.7.2 or 37.7.3 of this Section regulation,~~ respectively.

~~Section 38—~~

38.0 Petroleum Solvent Dry Cleaners

01/11/1993

38.1 a. ~~Applicability~~

38.1.1 ~~4. This Section applies~~ The provisions of 38.0 of this regulation apply to petroleum solvent dry cleaning facilities.

38.1.2 ~~2. Any petroleum solvent dry cleaning facility that consumes less than 123,000 liters (L) (32,500 gallons [gal]) of petroleum solvent per year is subject only to the requirements of paragraph (e)(1) 38.5.1 of this Section regulation.~~ Any facility that becomes or is currently subject to all of the provisions of this Section 38.0 of this regulation by exceeding this applicability threshold will remain subject to these provisions even if its consumption of petroleum solvent later falls below the applicability threshold. Any facility that is currently subject to a state or federal rule promulgated pursuant to the Clean Air Act Amendments of 1977 by exceeding an applicability threshold is and will remain subject to these provisions, even if its throughput or emissions have fallen or later fall below the applicability threshold.

38.1.3 ~~3. This Section does~~ The provisions of 38.0 of this regulation do not apply to facilities that use only petroleum-based solvents that contain chlorine.

38.2 b. ~~Definitions.~~ As used in this Section 38.0 of this regulation, all terms not defined herein shall have the meaning given them in the November 15, 1990 Clean Air Act Amendments, or in ~~Section 2~~ 2.0 of this regulation.

“Filter cartridge” means a replaceable filter unit containing filtration paper and carbon or carbon only.

“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 of solvent, or solvent-laden waste standing open to the atmosphere.

“Petroleum solvent cartridge filtration system” means a process in which soil-laden solvent is pumped under pressure from a washer through a sealed vessel containing filter cartridges that remove entrained solids and impurities from the solvent.

“Petroleum solvent dry cleaning facility” means a facility engaged in the cleaning of fabrics, clothing, and other articles in a petroleum solvent by means of one or more washes in the solvent, extraction of excess solvent by spinning, and drying by tumbling in an airstream. Equipment at the facility includes, but is not limited to, any petroleum solvent washer, dryer, solvent filter system, settling tank, vacuum still, and any other container or conveyor of petroleum solvent.

“**Settling tank**” means a container, and any associated piping and ductwork, that gravimetrically separates oils, grease, and dirt from petroleum solvent.

“**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 installing this device.

“**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 installing this device.

“**Standard dryer**” means a device that dries dry-cleaned articles by tumbling in a heated airstream.

“**Still**” means a device used to volatilize, separate, and recover petroleum solvent from contaminated solvent, together with the piping and ductwork used in installing this device.

“**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 installing this device.

38.3 ~~e~~-Standards

38.3.1 ~~4~~-Fugitive emissions. The owner or operator of a petroleum solvent dry cleaning facility subject to ~~this Section~~ 38.0 of this regulation shall ensure that:

38.3.1.1 ~~i~~-There are no perceptible leaks from any portion of the equipment.

38.3.1.2 ~~ii~~-All washer lint traps, button traps, access doors, and other parts of the equipment where solvent may be exposed to the atmosphere are kept closed at all times except when opening is required for proper operation or maintenance.

38.3.2 ~~2~~-Leak repair. The owner or operator of a petroleum solvent dry cleaning facility subject to ~~this Section~~ 38.0 of this regulation shall repair any perceptible leaks in any portion of the dry cleaning equipment within 3 working days after the leak is detected. If necessary repair parts are not on hand, the owner or operator shall order these parts within 3 working days and repair the leaks no later than ~~3~~ three working days after the parts arrive.

38.3.3 ~~3~~-Dryers. The owner or operator of a petroleum solvent dry cleaning facility subject to ~~this Section~~ 38.0 of this regulation shall do one of the following:

38.3.3.1 ~~i~~—Limit the volatile organic compound (VOC) emissions from each standard dryer to 1.6 kilograms (kg) (3.5 pounds [lb]) VOC per 45 kg (100 lb) dry weight of articles dry cleaned.

38.3.3.2 ~~ii~~—Install, maintain, and operate a solvent-recovery dryer such that the dryer remains closed and the recovery phase continues until a final recovered solvent flow rate of no greater than 50 milliliters per minute (ml/min) (0.013 gallons per minute [gal/min]) is attained.

38.3.4 4.—Filtration systems. The owner or operator of a petroleum solvent filtration system subject to ~~this Section 38.0 of this regulation~~ shall do either ~~paragraph (c)(4)(i) or (c)(4)(ii)~~ 38.3.4.1 or 38.3.4.2 of this ~~Section regulation~~:

38.3.4.1 ~~i~~—Reduce the VOC content in filtration waste to 1 kg (2.2 lb) VOC per 100 kg (220 lb) dry weight of articles dry cleaned.

38.3.4.2 ~~ii~~—

38.3.4.2.1 ~~A~~—Install, maintain, and operate a cartridge filtration system according to the manufacturer's instructions.

38.3.4.2.2 ~~B~~—Drain all filter cartridges in their sealed housings for 8 hours or more before removing them.

38.4 ~~d~~—Test methods and procedures

38.4.1 1.—To be in compliance with ~~paragraph (c)(3)(i)~~ 38.3.3.1 of this ~~Section regulation~~, each owner or operator of a petroleum solvent dry cleaning facility subject to ~~this Section 38.0 of this regulation~~ shall:

38.4.1.1 ~~i~~—Calculate the weight of VOCs vented from the dryer emission control device calculated by using Methods 1, 2, and 25A (40 CFR, Part 60, Appendix A, July 1, 1992) with the following specifications:

38.4.1.1.1 ~~A~~—Field calibration of the flame ionization analyzer with propane standards.

38.4.1.1.2 ~~B~~—Laboratory determination of the ratio of the flame ionization analyzer response to a given parts per million (ppm) by volume concentration of propane to the response to the same ppm concentration of the VOCs to be measured.

38.4.1.1.3 ~~C~~—Determination of the weight of VOCs vented to the atmosphere by:

38.4.1.1.3.1 4.—Multiplying the ratio determined in ~~paragraph (d)(1)(i)(B)~~ 38.4.1.1.2 of this ~~Section regulation~~ by the measured concentration of VOC gas (as propane) as indicated by the flame ionization analyzer response output record.

38.4.1.1.3.2 2.—Converting the ppm by volume value calculated in ~~paragraph (d)(1)(i)(C)(1)~~ 38.4.1.1.3.1 of this ~~Section regulation~~ into a mass concentration value for the VOCs present.

38.4.1.1.3.3 3.—Multiplying the mass concentration value calculated in ~~paragraph (d)(1)(i)(C)(2)~~ 38.4.1.1.3.2 of this ~~Section regulation~~ by the exhaust flow rate determined by using Methods 1 and 2.

38.4.1.2 ii.—Calculate the dry weight of articles dry cleaned.

38.4.1.3 iii.—Repeat paragraphs ~~(d)(1)(i)~~ and ~~(d)(1)(ii)~~ 38.4.1.1 and 38.4.1.2 of this ~~Section regulation~~ for normal operating conditions that encompass at least 30 dryer loads, which total not less than 1,800 kg (4,000 lb) dry weight and represent a normal range of variations in fabrics, solvents, load weights, temperatures, flow rates, and process deviations.

38.4.2 2.—To determine initial compliance with ~~paragraph (e)(3)(ii)~~ 38.3.3.2 of this ~~Section regulation~~, the owner or operator of a petroleum solvent dry cleaning facility shall:

38.4.2.1 i.—Verify that the flow rate of recovered solvent from the solvent-recovery dryer at the end of the recovery phase is no greater than 50 ml/min (0.013 gal/min) by:

38.4.2.1.1 A.—Determining the appropriate location for measuring the flow rate of recovered solvent; the suggested point is at the outlet of the solvent-water separator.

38.4.2.1.2 B.—Near the end of the recovery cycle, diverting the flow of recovered solvent to a graduated cylinder.

38.4.2.1.3 C.—Continuing the cycle until a flow rate of solvent no greater than 50 ml/min (0.013 gal/min) is reached.

38.4.2.1.4 D.—Recording the type of articles dry cleaned and the length of the cycle.

38.4.2.2 ~~ii.~~—To determine initial compliance with ~~paragraph (c)(3)(ii)~~ 38.3.3.2 of this ~~Section~~ regulation, conduct the procedure in ~~paragraph (d)(2)(i)~~ 38.4.2.1 of this regulation for at least 50% percent of the dryer loads over a period of no less than ~~2~~ two consecutive weeks.

38.4.3 ~~3.~~—To be in compliance with ~~paragraph (c)(4)~~ 38.3.4 of this ~~Section~~ regulation, the owner or operator of a petroleum solvent dry cleaning facility subject to ~~this Section~~ 38.0 of this regulation shall:

38.4.3.1 ~~i.~~—Calculate the weight of volatile organic compounds (VOCs) contained in each of at least five 1-kg (2.2-lb) samples of filtration waste material taken at intervals of at least 4 one week, by employing ASTM D322-80 (Standard Test Method for Gasoline Diluent in Used Gasoline Engine Oils by Distillation).

38.4.3.2 ~~ii.~~—Calculate the total dry weight of articles dry cleaned during the intervals between removal of filtration waste samples, as well as the total mass of filtration waste produced in the same period.

38.4.3.3 ~~iii.~~—Calculate the weight of VOCs contained in filtration waste material per 100 kg (220 lb) dry weight of articles dry cleaned.

38.4.4 ~~4.~~—Compliance with ~~paragraph (e)~~ 38.3 of this ~~Section~~ regulation requires that each owner or operator of a petroleum solvent dry cleaning facility subject to ~~this Section~~ 38.0 of this regulation make weekly inspections of washers, dryers, solvent filters, settling tanks, vacuum stills, and all containers and conveyors of petroleum solvent to identify perceptible VOC vapor or liquid leaks.

38.5 ~~e.~~—Recordkeeping requirements

38.5.1 ~~1.~~—The owner or operator of a petroleum solvent dry cleaning facility claiming exemption from ~~this Section~~ 38.0 of this regulation shall maintain records of annual solvent consumption in a readily accessible location for at least ~~5~~ five years to document whether the applicability threshold in ~~paragraph (a)(2)~~ 38.1.2 of this ~~Section~~ regulation has been exceeded.

38.5.2 ~~2.~~—The owner or operator of a petroleum solvent dry cleaning facility subject to ~~this Section~~ 38.0 of this regulation shall maintain the following records in a readily accessible location for at least ~~5~~ five years:

38.5.2.1 ~~i.~~—Records of the weight of VOCs vented from the dryer emission control device calculated according to ~~paragraph (d)(1)(i)~~ 38.4.1.1 of this ~~Section~~ regulation.

38.5.2.2 ii.—Records of the dry weight of articles dry cleaned for use in the calculations required in ~~paragraphs (d)(1), (d)(2), and (d)(3)~~ 38.4.1, 38.4.2 and 38.4.3 of this Section regulation.

38.5.2.3 iii.—Records of the weight of VOCs contained in the filtration waste samples required by ~~paragraph (d)(3)(i)~~ 38.4.3.1 of this Section regulation.

38.5.2.4 iv.—Records of the weight of VOCs in filtration waste material per 100 kg (220 lb) dry weight of articles dry cleaned.

38.6 f.—Reporting requirements. The owner or operator of any facility containing sources subject to ~~this Section 38.0~~ of this regulation shall:

38.6.1 1.—Comply with the initial compliance certification requirements of ~~Section 5(a)~~ 5.1 of this regulation.

38.6.2 2.—Comply with the requirements of ~~Section 5(b)~~ 5.2 of this regulation for excess emissions related to the control devices required to comply with ~~paragraphs (c)(2), (c)(3)(ii), and (c)(4)(ii)~~ 38.3.2, 38.3.3.2 and 38.3.4.2 of this Section regulation, as well as any other State of Delaware exceedance reporting requirements.

~~Section 39—~~
39.0 [RESERVED]
06/30/1999

Section 40—

40.0 Leaks from Synthetic Organic Chemical, Polymer, and Resin Manufacturing Equipment.

01/11/1993

40.1 a—Applicability

40.1.1 4.

40.1.1.1 i.—~~This Section~~ The provisions of 40.0 of this regulation applies to all equipment in volatile organic compound (VOC) service in any process unit at a synthetic organic chemical, polymer, and resin production facility which manufactures, as an intermediate or end product, *Methyl tert-Butyl Ether, Polyethylene, Polypropylene, Polystyrene*, and those organic chemicals given in Section 60.489 of 40 CFR, Part 60 (July 1, 1992).

40.1.1.2 ii.—A piece of equipment is not in VOC service if the VOC content of the process fluid can never be reasonably expected to exceed ~~10%~~ percent by weight. For purposes of this demonstration, the following methods and procedures shall be used:

40.1.1.2.1 A.—Procedures that conform to the general methods in ASTM E260, E168, and E169 shall be used to determine the percent VOC content in the process fluid that is contained in or contacts a piece of equipment.

40.1.1.2.2 B.—Organic compounds that are considered by the Administrator of the U.S. EPA to have negligible photochemical reactivity may be excluded from the total quantity of organic compounds in determining the VOC content of the process fluid.

40.1.1.2.3 C.—Engineering judgment may be used to estimate the VOC content, if a piece of equipment had not been shown previously to be in VOC service. If the Department disagrees with the judgment, ~~paragraphs (i)(2)(i), (i)(2)(ii), and (i)(2)(iii)~~ 40.9.2.1, 40.9.2.2 and 40.9.2.3 of this Section regulation shall be used to resolve the disagreement.

40.1.2 2.—~~This Section~~ The provisions of 40.0 of this regulation does not apply to any synthetic organic chemical, polymer, or resin manufacturing facility whose annual design production capacity is less than 1,000 megagrams (Mg) (1,100 tons) of product.

40.1.3 3.—The requirements of ~~paragraph (d)~~ 40.4 of this Section regulation do not apply to:

40.1.3.1 i.—Any equipment in vacuum service.

40.1.3.2 ~~ii.~~—Any pressure-relief valve that is connected to an operating flare header or vapor recovery device.

40.1.3.3 ~~iii.~~—Any liquid pump that has a dual mechanical pump seal with a barrier fluid system.

40.1.3.4 ~~iv.~~—Any compressor with a degassing vent that is routed to an operating VOC control device.

40.2 ~~b.~~—Definitions. As used in ~~this Section~~ 40.0 of this regulation, all terms not defined herein shall have the meaning given them in the November 15, 1990 Clean Air Act Amendments, or in ~~Section 2~~ 2.0 of this regulation.

“**[In] gas/vapor service**” means that the piece of equipment in VOC service contains process fluid that is in the gaseous state at operating conditions.

“**[In] heavy liquid service**” means that the piece of equipment in VOC service is not in gas/vapor service or not in light liquid service.

“**[In] light liquid service**” means that the piece of equipment in VOC service contacts a fluid that contains greater than 10% ~~percent~~ by weight light liquid and meets the following conditions: (1) the vapor pressure of one or more of the components is greater than 0.3 kiloPascal (kPa). (0.044 inch of mercury [in. Hg]) at 20°C (68°F) (standard reference tests or ASTM D-2879 shall be used to determine the vapor pressures); and (2) the fluid is a liquid at operating conditions.

“**Process unit**” means components assembled to produce, as intermediate or final products, one or more of the chemicals listed in 40 CFR 60.489 (July 1, 1992). A process unit can operate independently if supplied with sufficient feed or raw materials and sufficient storage facilities for the product.

“**[In] vacuum service**” means that the equipment in VOC service is operating at an internal pressure that is at least 5 kPa (0.73 in. Hg) below ambient pressure.

“**[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 ~~paragraph (a)(1)(ii)~~ 40.1.1.2 of this ~~Section~~ regulation specify how to determine that a piece of equipment is not in VOC service.

40.3 ~~e.~~—Standards: General. The owner or operator of a synthetic organic chemical, polymer, or resin manufacturing facility subject to ~~this Section~~ 40.0 of this regulation shall ensure that:

40.3.1 ~~1.~~—Any open-ended line or valve is sealed with a second valve, blind flange, cap, or plug except during operations requiring process fluid flow through the open-ended line or valve.

40.3.2 2.—When a second valve is used, each open-ended line or valve equipped with a second valve is operated in such a manner that the valve on the process fluid end is closed before the second valve is closed.

40.3.3 3.—When a double block-and-bleed system is used, the bleed valve or line is open only during operations that require venting of the line between the block valves and is closed at all other times.

40.4 d.—Standards: Equipment inspection program. The owner or operator of a synthetic organic chemical, polymer, or resin manufacturing facility shall conduct the equipment inspection program described in ~~paragraphs (d)(1) through (d)(3)~~ 40.4.1 through 40.4.3 of this ~~Section~~ regulation using the test methods specified in **Appendix F** of this regulation.

40.4.1 1.—The owner or operator of a synthetic organic chemical, polymer, or resin manufacturing facility shall conduct quarterly monitoring of each:

40.4.1.1 i.—Compressor.

40.4.1.2 ii.—Pump in light liquid service.

40.4.1.3 iii.—Valve in light liquid service, except as provided in ~~paragraphs (e) and (f)~~ 40.5 and 40.6 of this ~~Section~~ regulation.

40.4.1.4 iv.—Valve in gas/vapor service, except as provided in ~~paragraphs (e) and (f)~~ 40.5 and 40.6 of this ~~Section~~ regulation.

40.4.1.5 v.—Pressure relief valve in gas/vapor service, except as provided in ~~paragraphs (e) and (f)~~ 40.5 and 40.6 of this ~~Section~~ regulation.

40.4.2 2.—The owner or operator of a synthetic organic chemical or resin manufacturing facility shall conduct a weekly visual inspection of each pump in light liquid service.

40.4.3 3.—The owner or operator of a synthetic organic chemical, polymer, or resin manufacturing facility shall monitor each pressure relief valve after each overpressure relief to ensure that the valve has properly resealed and is not leaking.

40.4.4 4.—

40.4.4.1 i.—When an instrument reading of 10,000 parts per million (ppm) or greater is measured, it shall be determined that a leak has been detected.

40.4.4.2 ii.—If there are indications of liquid dripping from the equipment, it shall be determined that a leak has been detected.

40.4.5 5.—When a leak is detected, the owner or operator shall affix a weatherproof, readily visible tag in a bright color such as red or yellow bearing the equipment identification number and the date on which the leak was detected. This tag shall remain in place until the leaking equipment is repaired. The requirements of this paragraph apply to any leak detected by the equipment inspection program and to any leak from any equipment that is detected on the basis of sight, sound, or smell.

40.5 e.—Standards: Alternative standards for valves Skip period leak detection and repair.

40.5.1 1.—An owner or operator shall comply with the requirements for valves in gas/vapor service and valves in light liquid service as described in ~~paragraph (d)~~ 40.4 of this ~~Section~~ regulation except as provided in ~~paragraph (e)(2)~~ 40.5.2 of this ~~Section~~ regulation.

40.5.2 2.—

40.5.2.1 i.—If the percent of valves leaking is equal or less than 2.0 for two consecutive quarters, an owner or operator may skip alternate quarterly leak detection periods for the valves in gas/vapor and light liquid service.

40.5.2.2 ii.—If the percent of valves leaking is equal to or less than 2.0 for five consecutive quarters, an owner or operator may skip three of the quarterly leak detection periods per year for the valves in gas/vapor and light liquid service, provided that each valve shall be monitored once each year.

40.5.2.3 iii.—If at any time the percent of valves leaking is greater than 2.0, the owner or operator shall resume compliance with the requirements in ~~paragraph (d)~~ 40.4 of this ~~Section~~ regulation but may again elect to comply with the alternative standards in ~~paragraph (e)~~ 40.5 of this ~~Section~~ regulation.

40.5.2.4 iv.—The percent of valves leaking shall be determined by dividing the sum of valves found leaking during current monitoring and previously leaking valves for which repair has been delayed by the total number of valves subject to the requirements of ~~this Section~~ 40.0 of this regulation.

40.5.2.5 v.—An owner or operator shall keep a record of the percent of valves found leaking during each leak detection period.

40.6 f.—Standards: Alternative standards for unsafe-to-monitor valves and difficult-to-monitor valves.

40.6.1 1.—Any valve is exempt from the requirements of ~~paragraph (d)~~ 40.4 of this regulation as an unsafe-to-monitor valve if:

40.6.1.1 ~~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 ~~paragraph (d)~~ 40.4 of this regulation.

40.6.1.2 ~~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.

40.6.2 ~~2~~—Any valve is exempt from the requirements of ~~paragraph (d)~~ 40.4 of this regulation as a difficult-to-monitor valve if:

40.6.2.1 ~~i~~—The owner or operator of the valve demonstrates that the valve cannot be monitored without elevating the monitoring personnel more than ~~2~~ two meters (m) (6.6 feet [ft]) above a support surface.

40.6.2.2 ~~ii~~—The owner or operator of the valve follows a written plan that requires monitoring of the valve at least once per calendar year.

40.6.3 ~~3~~—The alternative standards of ~~paragraph (e)~~ 40.5 of this regulation are not available to valves subject to the requirements of ~~paragraph (f)~~ 40.6 of this Section regulation.

40.7 ~~g~~—Standards: Equipment repair program. The owner or operator of a synthetic organic chemical, polymer, or resin manufacturing facility shall:

40.7.1 ~~1~~—Make a first attempt at repair for any leak not later than ~~5~~ five calendar days after the leak is detected.

40.7.2 ~~2~~—Repair any leak as soon as practicable, but not later than 15 calendar days after it is detected except as provided in ~~paragraph (h)~~ 40.8 of this Section regulation.

40.8 ~~h~~—Standards: Delay of repair

40.8.1 ~~1~~—Delay of repair of equipment for which a leak has been detected is allowed if repair is technically infeasible without a process unit shutdown. Repair of such equipment shall occur before the end of the first process unit shutdown after the leak is detected.

40.8.2 ~~2~~—Delay of repair of equipment is also allowed for equipment that is isolated from the process and that does not remain in VOC service after the leak is detected.

40.8.3 ~~3~~—Delay of repair beyond a process unit shutdown is allowed for a valve, if valve assembly replacement is necessary during the process unit shutdown, and if valve assembly supplies have been depleted, where valve assembly supplies had been sufficiently stocked before the supplies

were depleted. Delay of repair beyond the first process unit shutdown is not allowed unless the next process unit shutdown occurs sooner than ~~6~~ six months after the first process unit shutdown.

40.9 ~~i~~-Test methods and procedures

40.9.1 ~~1~~—In conducting the monitoring required to comply with ~~paragraph (d) 40.4~~ of this ~~Section~~ regulation, the owner or operator shall use the test methods specified in **Appendix F** of this regulation.

40.9.2 ~~2~~—The owner or operator shall demonstrate that a piece of equipment is in light liquid service by showing that all of the following conditions apply:

40.9.2.1 ~~i~~—The vapor pressure of one or more of the components is greater than 0.3 kPa (0.044 in. Hg) at 20°C (68°F) standard reference texts or ASTM D2879 shall be used to determine the vapor pressures.

40.9.2.2 ~~ii~~—The total concentration of the pure components having a vapor pressure greater than 0.3 kPa (0.044 in. Hg) at 20°C (68°F) is equal to or greater than ~~20%~~ percent by weight.

40.9.2.3 ~~iii~~—The fluid is a liquid at operating conditions.

40.9.3 ~~3~~—Samples used in conjunction with ~~paragraphs (i)(2) and (i)(3) 40.9.2 and 40.9.3~~ of this ~~Section~~ regulation shall be representative of the process fluid that is contained in or contacts the equipment.

40.10 ~~j~~-Recordkeeping requirements

40.10.1 ~~1~~—Each owner or operator subject to the provisions of ~~this Section 40.0~~ of this regulation shall comply with the recordkeeping requirements of ~~this Section 40.0~~ of this regulation.

40.10.2 ~~2~~—An owner or operator of more than one facility subject to the provisions of ~~this Section 40.0~~ of this regulation may comply with the recordkeeping requirements for these facilities in one recordkeeping system if the system identifies each record by each facility.

40.10.3 ~~3~~—When each leak is detected as specified in ~~paragraph (d) 40.4~~ of this ~~Section~~ regulation, the following information shall be recorded in a log and shall be kept for ~~5~~ five years in a readily accessible location:

40.10.3.1 ~~i~~—The instrument and operator identification numbers and the equipment identification number.

40.10.3.2 ~~ii~~—The date the leak was detected and the dates of each attempt to repair the leak.

40.10.3.3 ~~iii.~~—The repair methods employed in each attempt to repair the leak.

40.10.3.4 ~~iv.~~—The notation "Above 10,000" if the maximum instrument reading measured by the methods specified in **Appendix F** of this regulation after each repair attempt is equal to or greater than 10,000 ppm.

40.10.3.5 ~~v.~~—The notation "Repair delayed" and the reason for the delay if a leak is not repaired within 15 calendar days after the leak is discovered.

40.10.3.6 ~~vi.~~—The signature of the owner or operator (or designate) whose decision it was that repair could not be effected without a process shutdown.

40.10.3.7 ~~vii.~~—The expected date of successful repair of the leak if a leak is not repaired within 15 days.

40.10.3.8 ~~viii.~~—The dates of process unit shutdowns that occur while the equipment is unrepaired.

40.10.3.9 ~~ix.~~—The date of successful repair of the leak.

40.10.4 4.—A list of identification numbers of equipment in vacuum service shall be recorded in a log that is kept in a readily accessible location.

40.10.5 5.—The following information for valves complying with ~~paragraph (e)~~ 40.5 of this ~~Section~~ regulation shall be recorded in a log that is kept for ~~5~~ five years in a readily accessible location:

40.10.5.1 ~~i.~~—A schedule of monitoring.

40.10.5.2 ~~ii.~~—The percent of valves found leaking during each monitoring period.

40.10.6 6.—The following information pertaining to all valves subject to the requirements of ~~paragraph (f)~~ 40.6 of this ~~Section~~ regulation shall be recorded in a log that is kept for ~~5~~ five years in a readily accessible location:

40.10.6.1 ~~i.~~—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.

40.10.6.2 ~~ii.~~—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.

40.10.7 ~~7.~~The following information shall be recorded in a log that is kept for 5 years in a readily accessible location for use in determining exemptions as provided in ~~paragraph (a)~~ 40.1 of this ~~Section~~ regulation:

40.10.7.1 ~~i.~~An analysis demonstrating the design capacity of the affected facility.

40.10.7.2 ~~ii.~~Information and data used to demonstrate that a piece of equipment is not in VOC service.

40.11 ~~k.~~Reporting. The owner or operator of any facility containing sources subject to ~~this Section~~ 40.0 of this regulation shall comply with the requirements in ~~Section 5~~ 5.0 of this regulation.

Section 41—

41.0 Manufacture of High-Density Polyethylene, Polypropylene and Polystyrene Resins

01/11/1993

41.1 a—Applicability

41.1.1 1.—~~This Section~~ The provisions of 41.0 of this regulation applies to the following process Sections at facilities engaged in manufacturing high-density polyethylene, polypropylene, and polystyrene:

41.1.1.1 i.—For manufacturing high-density polyethylene using a liquid-phase slurry process: each material recovery Section and each product finishing Section.

41.1.1.2 ii.—For manufacturing polypropylene using a liquid-phase process: each polymerization reaction Section, each material recovery Section, and each product finishing Section.

41.1.1.3 iii.—For manufacturing polystyrene using a continuous process: each material recovery Section.

41.1.2 2.—Facilities having all process Sections with uncontrolled emission rates at or below those identified in ~~paragraphs (a)(2)(i) through (vi)~~ 41.1.2.1 through 41.1.2.6 of this Section regulation are exempt from the requirements of ~~this Section~~ 41.0 of this regulation except that owners or operators seeking to comply with ~~this Section~~ 41.0 of this regulation by complying with the uncontrolled emission rates in ~~paragraphs (a)(2)(i) through (vi)~~ 41.1.2.1 through 41.1.2.6 of 41.0 of this regulation are still required to comply with the initial certification requirements at ~~Section 5~~ 5.0 of this regulation.

	Production Process	Process Section	Uncontrolled emission rate, megagram of product per year (Mg/yr)
41.1.2.1 (i)	High-density polyethylene, liquid-phase slurry process	material recovery Section	7
41.1.2.2 (ii)	High-density polyethylene, liquid-phase slurry process	product finishing Section	19
41.1.2.3 (iii)	Polypropylene, liquid-phase process	polymerization reaction Section	7
41.1.2.4 (iv)	Polypropylene, liquid-phase process	material recovery Section	8
41.1.2.5 (v)	Polypropylene, liquid-phase process	product finishing Section	36
41.1.2.6 (vi)	Polystyrene, continuous process	material recovery Section	7

41.1.3 ~~3.~~—Any facility that becomes or is currently subject to the provisions of ~~this Section 41.0 of this regulation~~ by exceeding the applicability thresholds in ~~paragraph (a)(2)~~ 41.1.2 of this Section regulation will remain subject to these provisions even if its emissions later fall below the thresholds.

41.2 ~~b.~~—Definitions. As used in ~~this Section 41.0 of this regulation~~, all terms not defined herein shall have the meaning given them in the November 15, 1990 Clean Air Act Amendments, or in ~~Section 2~~ 2.0 of this regulation.

“Continuous process” means a polymerization process in which reactants are introduced continuously and products are removed either continuously or intermittently at regular intervals so that the process can be operated and polymers produced essentially continuously.

“Flame zone” means that portion of the combustion chamber in a boiler occupied by the flame envelope.

“High-density polyethylene” means a linear, thermoplastic polymer comprised of at least 50% ~~percent~~ ethylene by weight and having a density greater than 0.94 grams per cubic centimeter (g/cm^3) (59 pounds per cubic foot [lb/ft^3]).

“Liquid-phase process” means a polymerization process in which the polymerization reaction is carried out in the liquid phase; i.e., the monomer~~(s)~~ or monomers and any catalyst are dissolved or suspended in a liquid solvent.

“Liquid-phase slurry process” means a liquid-phase polymerization process in which the monomer~~(s)~~ or monomers are in solution (completely dissolved) in a liquid solvent, but the polymer is in the form of solid particles suspended in the liquid reaction mixture during the polymerization reaction, sometimes called a particle-form process.

“Polypropylene” means a polymer comprised of at least 50% ~~percent~~ propylene by weight.

“Polystyrene” means a thermoplastic polymer comprised of at least 80% ~~percent~~ styrene or para-methylstyrene by weight.

“Process line” means a group of equipment assembled that can operate independently if supplied with sufficient raw materials to produce polypropylene, high-density polyethylene, or polystyrene. A process line consists of the equipment in the following process Sections (to the extent that these process Sections are present at a plant): raw materials preparation, polymerization reaction, product finishing, product storage, and material recovery.

“Process Section” means the equipment designed to accomplish a general but well-defined task in polymer production. Process Sections include raw materials preparation, polymerization reaction, material recovery, product finishing,

and product storage and may be dedicated to a single process line or common to more than one process line.

“Product finishing Section” means the equipment that treats, shapes, or modifies the polymer or resin to produce the finished end product of the particular facility. Product finishing equipment may extrude and pelletize, cool and dry, blend, introduce additives, cure, or anneal. Product finishing does not include polymerization or shaping such as fiber spinning, molding, or fabricating or modification such as fiber stretching and crimping.

41.3 ~~e~~—Standards: High-density polyethylene and polypropylene

41.3.1 ~~4~~—The owner or operator of a high-density polyethylene or polypropylene process line containing a process Section subject to ~~this Section~~ 41.0 of this regulation shall comply with one of the following:

41.3.1.1 ~~i~~—Reduce emissions of total volatile organic compounds (VOCs) by 98 weight ~~% percent~~, determined according to the procedure specified in ~~paragraph (e)(1)~~ 41.5.1 of this Section regulation, or to a VOC concentration of 20 parts per million volumetric (ppmv), as determined by the procedure specified in ~~paragraph (e)(2)~~ 41.5.2 of this Section regulation, on a dry basis, whichever is less stringent. Total VOC is expressed as the sum of the actual compounds, not carbon equivalents. If an owner or operator elects to comply with the 20 ppmv concentration standard, the concentration shall include a correction to ~~3% percent~~ oxygen only when supplemental combustion air is used to combust the vent stream. The procedure in ~~paragraph (e)(3)~~ 41.5.3 of this regulation shall be used to correct the concentration to ~~3% percent~~ oxygen.

41.3.1.2 ~~ii~~—Combust the emissions in a boiler or process heater with a design heat input capacity of 150 million British thermal units per hour (Btu/hr) or greater by introducing the vent stream into the flame zone of the boiler or process heater.

41.3.1.3 ~~iii~~—Combust the emissions in a flare as follows:

41.3.1.3.1 ~~A~~—Flares shall be designed for and operated with no visible emissions as determined by the method specified in ~~paragraph (e)(4)(i)~~ 41.5.4.1 of this Section regulation, except for periods not to exceed a total of ~~5~~ five minutes during any ~~2~~ two consecutive hours.

41.3.1.3.2 ~~B~~—Flares shall be operated with a flame present at all times, as determined by the method specified in ~~paragraph (e)(4)(ii)~~ 41.5.4.2 of this Section regulation.

41.3.1.3.3 ~~C.~~ Flares used to comply with provisions of ~~this Section 41.0~~ of this regulation shall be steam-assisted, air-assisted, or non-assisted.

41.3.1.3.4 ~~D.~~ Flares shall be used only with the net heating value of the gas being combusted being 11.2 megajoules per standard cubic meter (MJ/scm) (300 Btu per standard cubic foot [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 method specified in ~~paragraph (e)(5)(vii)~~ 41.5.5.7 of this ~~Section~~ regulation.

41.3.1.3.5 ~~E.~~

41.3.1.3.5.1 ~~1.~~ Steam-assisted and nonassisted flares shall be designed for and operated with an exit velocity, as determined by the method specified in ~~paragraph (e)(5)(iv)~~ 41.5.5.4 of this ~~Section~~ regulation, less than 18.3 meters per second (m/s) (60 feet per second [ft/s]), except as provided in ~~paragraphs (c)(1)(iii)(E)(2) and (3)~~ 41.3.1.3.5.2 and 41.3.1.3.5.3 of this ~~Section~~ regulation.

41.3.1.3.5.2 ~~2.~~ Steam-assisted and nonassisted flares designed for and operated with an exit velocity, as determined by the methods specified in ~~paragraph (e)(5)(iv)~~ 41.5.5.4 of this ~~Section~~ regulation equal to or greater than 18.3 m/s (60 ft/s) but less than 122 m/s (400 ft/s) are allowed if the net heating value of the gas being combusted is greater than 37.3 MJ/scm (1,000 Btu/scf).

41.3.1.3.5.3 ~~3.~~ Steam-assisted and nonassisted flares designed for and operated with an exit velocity, as determined by the methods specified in ~~paragraph (e)(5)(iv)~~ 41.5.5.4 of this ~~Section~~ regulation, less than the velocity, V_{max} , as determined by the method specified in ~~paragraph (e)(5)(v)~~ 41.5.5.5 of this ~~Section~~ regulation and less than 122 m/s (400 ft/s) are allowed.

41.3.1.3.6 ~~F.~~ Air-assisted flares shall be designed and operated with an exit velocity less than the velocity, V_{max} , as determined by the method specified in ~~paragraph (e)(5)(vi)~~ 41.5.5.6 of this ~~Section~~ regulation.

41.4 ~~d.~~—Standards: Polystyrene. The owner or operator of a polystyrene process line containing process Sections subject to ~~this Section~~ 41.0 of this regulation shall comply with one of the following:

41.4.1 ~~1.~~—Not allow continuous VOC emissions from the material recovery Section to be greater than 0.12 kilogram (kg) VOC per 1,000 kg of product (0.12 lb VOC per 1,000 lb of product).

41.4.2 ~~2.~~—Not allow the outlet gas stream from each final condenser in the material recovery Section to exceed -25°C (-13°F).

41.5 ~~e.~~—Test methods and procedures.

41.5.1 ~~1.~~—The owner or operator shall determine compliance with the percent emission reduction standard in ~~paragraph (c)(1)(i)~~ 41.3.1.1 of this ~~Section~~ regulation as follows:

41.5.1.1 ~~i.~~—The emission reduction of total VOC shall be determined using the following equation:

$$P = \frac{E_{\text{inlet}} - E_{\text{outlet}}}{E_{\text{inlet}}} \times 100 \quad (41-1)$$

where:

P = Percent emission reduction, by weight.

E_{inlet} = Mass rate of total VOC entering the control device, kg VOC/hr.

E_{outlet} = Mass rate of total VOC discharged to the atmosphere, kg VOC/hr.

41.5.1.2 ~~ii.~~—The mass rates of total VOC (E_i , E_o) shall be computed using the following equations:

$$E_i = K_1 \left(\sum_{j=1}^n C_{ij} M_{ij} \right) Q_i \quad (41-2)$$

$$E_o = K_1 \left(\sum_{j=1}^n C_{oj} M_{oj} \right) Q_o \quad (41-3)$$

where:

C_{ij} , C_{oj} = Concentration of sample component J of the gas stream at the inlet and outlet of the control device, respectively, dry basis, ppmv.

M_{ij} , M_{oj} = Molecular weight of sample component J of the gas stream at the inlet and outlet of the control device respectively, g/g-mole (lb/lb-mole).

Q_i , Q_o = Flow rate of the gas stream at the inlet and outlet of the control device, respectively, dscm/hr (dscf/hr).

$$K_1 = 4.157 \times 10^{-8} \frac{[(\text{kg})/(\text{g-mole})]/[(\text{g})(\text{ppm})(\text{dscm})]\{5.711 \times 10^{-15} [(\text{lb})/(\text{lb-mole})] / [(\text{lb})(\text{ppm})(\text{dscf})]\}}{}$$

41.5.1.3 ~~iii.~~—Method 18 shall be used to determine the concentration of each individual organic component (C_{ij} , C_{oj}) in the gas stream. Method 1 or 1A, as appropriate, shall be used to determine the inlet and outlet sampling sites. The inlet site shall be before the inlet of the control device and after all product recovery units.

41.5.1.4 ~~iv.~~—Method 2, 2A, 2C, or 2D, as appropriate, shall be used to determine the volumetric flow rates (Q_i , Q_o). If necessary, Method 4 shall be used to determine the moisture content. Both determinations shall be compatible with the Method 18 determinations.

41.5.1.5 ~~v.~~—Inlet and outlet samples shall be taken simultaneously. The sampling time for each run shall be ~~4~~ one hour in which either an integrated sample or four grab samples shall be taken. If grab sampling is used, then the samples shall be taken at 15-minute intervals.

41.5.2 ~~2.~~—The owner or operator shall determine compliance with the emission concentration standard in ~~paragraph (c)(1)(i)~~ 41.3.1.1 of this ~~Section~~ regulation as follows:

41.5.2.1 ~~i.~~—The total VOC concentration is the sum of the individual components and shall be computed for each run using the following equation:

$$C_{\text{VOC}} = \sum_{j=1}^n C_j \quad (41-4)$$

where:

C_{VOC} = Concentration of total VOC, dry basis, ppmv.

C_j = Concentration of sample component j , ppm.

n = Number of components in the sample.

41.5.2.2 ~~ii.~~—Method 18 shall be used to determine the concentration of each individual inorganic component (C_j) in the gas stream. Method 1 or 1A as appropriate, shall be used to determine the sampling site at the outlet of the control device. Method 4 shall be used to determine the moisture content, if necessary.

41.5.2.3 ~~iii.~~—The sampling time for each run shall be ~~4~~ one hour in which either an integrated sample or four grab samples shall be taken. If grab sampling is used, then the samples shall be taken at 15-minute intervals.

41.5.3 3.—

41.5.3.1 i.—If supplemental combustion air is used, the total VOC concentration shall be corrected to 3% percent oxygen and shall be computed using the following equation:

$$C_{\text{CORR}} = C_{\text{MEAS}} \left(\frac{17.9}{20.9 - \%O_{2d}} \right) \quad (41-5)$$

where:

C_{CORR} = Concentration of total VOC corrected to 3% percent oxygen, dry basis, ppmv.

C_{MEAS} = Concentration of total VOC, dry basis, ppmv, as calculated in ~~paragraph (e)(2)(i)~~ 41.5.2.1 above of this relation.

$\%O_{2d}$ = Concentration of O_2 , dry basis, percent by volume.

41.5.3.2 ii.—The emission rate correction factor, integrated sampling and analysis procedure of Method 3 shall be used to determine the oxygen concentration ($\%O_{2d}$). The sampling site shall be the same as that of the total VOC sample and the samples shall be taken during the same time that the total VOC samples are taken.

41.5.4 4.—When a flare is used to comply with ~~paragraph (e)(1)(iii)~~ 41.3.1.3 of this ~~Section~~ regulation:

41.5.4.1 i.—Method 22 shall be used to determine the compliance of flares with the visible emission requirement in ~~paragraph (e)(1)(iii)(A)~~ 41.3.1.3.1 of this ~~Section~~ regulation. The observation period is 2 hours and shall be used according to Method 22.

41.5.4.2 ii.—The presence of a flare pilot flame shall be monitored using a thermocouple or other equivalent monitoring device to detect the presence of a flame.

41.5.5 5.—The test methods in 40 CFR Part 60, Appendix A (July 1, 1992), shall be used as reference methods for determining the VOC emission rate in terms of kg emission per megagram (Mg) of product, exit velocities, or net heating value of the gas combusted to determine compliance under ~~paragraphs (e) and (d)~~ 41.3 and 41.4 of this ~~Section~~ regulation as follows:

41.5.5.1 i.—Method 1 or 1A, as appropriate, for selecting the sampling site. The sampling site for the molar composition and vent stream flow rate determination prescribed in ~~paragraphs (e)(5)(ii) and (e)(5)(iii)~~ 41.5.5.2 and 41.5.5.3 of this ~~Section~~ regulation shall be prior to the inlet of any combustion device and prior to any dilution of the stream with air.

41.5.5.2 ii.—The composition of the process vent stream shall be determined as follows:

41.5.5.2.1 A.—Method 18 and ASTM D2504-67 (reapproved 1977) to measure the concentration of VOC and the concentration of all other compounds present except water vapor and carbon monoxide.

41.5.5.2.2 B.—Method 4 to measure the content of water vapor.

41.5.5.3 iii.—The volumetric flow rate shall be determined using Method 2, 2A, 2C, or 2D, as appropriate.

41.5.5.4 iv.—The actual exit velocity of a flare shall be determined by dividing the volumetric flow rate (in units of standard temperature and pressure), as determined by Method 2, 2A, 2C, or 2D as appropriate, by the unobstructed (free) cross-sectional area of the flare tip.

41.5.5.5 v.—The maximum permitted velocity, V_{max} , for flares complying with ~~paragraph (e)(1)(iii)(E)(1)~~ 41.3.1.3.5.1 of this Section regulation shall be determined using the following equation:

$$\text{Log}_{10}(V_{max}) = \frac{H_T + 28.8}{31.7} \quad (41-6)$$

where:

V_{max} = Maximum permitted velocity, m/s.

28.8 = Constant.

31.7 = Constant.

H_T = The net heating value as determined in ~~paragraph (e)(5)(vii)~~ 41.5.5.7 of this Section regulation.

41.5.5.6 vi.—The V_{max} for air-assisted flares shall be determined by the following equation:

$$V_{max} = 8.706 + 0.7084(H_T) \quad (41-7)$$

where:

V_{max} = Maximum permitted velocity, m/s.

8.706 = Constant.

0.7084 = Constant.

H_T = The net heating value as determined in ~~paragraph (e)(5)(vii)~~ 41.5.5.7 of this Section regulation.

41.5.5.7 vii.—The net heating value of the process vent stream being combusted in a flare shall be calculated using the following equation:

$$H_T = K \sum_{i=1}^n C_i H_i \quad (41-8)$$

where:

H_T = Net heating value of the sample, MJ/scm, where the net enthalpy per mole of off-gas is based on combustion at 25°C and 760 millimeters of Mercury (mm Hg) (77°F and 29.92 inches of Mercury [in. Hg]), but the standard temperature for determining the volume corresponding to one mole is 20°C (68°F).

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

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

C_i = Concentration of sample components i in ppm on a wet basis, as measured for organics by Method 18 and measured for hydrogen and carbon monoxide by ASTM D1946-82.

H_i = Net heat of combustion of sample component i , kcal/g-mole at 25°C (77°F) and 760 mm Hg (29.92 in. Hg). The heats of combustion of process vent stream components may be determined using ASTM D2382-76 (reapproved 1977) if published values are not available or cannot be calculated.

41.5.5.8 ~~viii~~—The emission rate of VOC in the process vent stream shall be calculated using the following equation:

$$E_{\text{VOC}} = K \left(\sum_{i=1}^n C_i M_i \right) Q_s \quad (41-9)$$

where:

E_{VOC} = Emission rate of total organic compounds in the sample, kilogram per hour (kg/hr).

K = Constant, $2.494 \times 10^{-6} (1/\text{ppm})(\text{g-mole}/\text{scm})(\text{kg}/\text{g})(\text{min}/\text{hr})$, where standard temperature for (g-mole/scm) is 20°C (68°F).

C_i = Concentration of sample component i , ppm.

M_i = Molecular weight of sample component i , g/g-mole.

Q_s = Vent stream flow rate (scm/min), at a standard temperature of 20°C (68°F).

41.5.5.9 ~~ix~~—The rate of polymer produced, P_p (kg/hr), shall be determined by dividing the weight of polymer pulled in kg from the process line during the performance test by the number of hours (hr) taken to perform the performance test. The polymer pulled, in kg, shall be determined by direct measurement or, subject to prior approval by the Administrator of the U.S. EPA and acceptance as part of a State Implementation Plan (SIP) or Federal

Implementation Plan (FIP) revision, computed from materials balance by good engineering practice.

41.5.5.10 ~~x~~—The emission rate of VOC in terms of kilograms of emissions per megagram of production shall be calculated using the following equation:

$$ER_{\text{VOC}} = \frac{E_{\text{VOC}}}{P_{\text{P}} \times \frac{1\text{Mg}}{1,000\text{kg}}} \quad (41-10)$$

where:

ER_{VOC} = Emission rate of VOC, kg VOC/Mg product.

E_{VOC} = Emission rate of VOC in the sample, kg/hr.

P_{P} = The rate of polymer produced, kg/hr.

41.6 ~~f~~—Recordkeeping. The owner or operator of a facility subject to 41.0 of this regulation shall maintain the following records in a readily accessible location for at least ~~5~~ five years and shall make these records available to the Department upon verbal or written request:

41.6.1 ~~1~~—For facilities complying with the standards listed in paragraph ~~(e)(1)(i)~~ 41.3.1.1 of this regulation, parameters listed in paragraphs ~~(e)(1)~~, ~~(e)(2)~~ 41.5.1, 41.5.2, and, where applicable, ~~(e)(5)~~ 41.5.5 of this regulation.

41.6.2 ~~2~~—For facilities complying with the standards listed in paragraph ~~(e)(1)(ii)~~ 41.3.1.2 of this regulation, parameters listed in paragraphs ~~(e)(3)~~ 41.5.3, and, where applicable, ~~(e)(5)~~ 41.5.5 of this regulation.

41.6.3 ~~3~~—For facilities complying with the standards listed in paragraph ~~(e)(1)(iii)~~ 41.3.1.3 of this regulation, parameters listed in paragraphs ~~(e)(4)~~ 41.5.4, and, where applicable, ~~(e)(5)~~ 41.5.5 of this regulation.

41.6.4 ~~4~~—For facilities complying with the standards listed in paragraph ~~(e)~~ 41.4 of this regulation, parameters listed in paragraph ~~(e)(5)~~ 41.5.5 of this regulation where applicable.

41.6.5 ~~5~~—For all facilities containing sources subject to 41.0 of this regulation, the following records shall be kept:

41.6.5.1 ~~i~~—The time, date, and duration of any excess emissions.

41.6.5.2 ~~ii~~—The subject source of any excess emissions.

41.6.5.3 ~~iii~~—The cause of any excess emissions.

41.6.5.4 ~~iv~~—The estimated rate of emissions (expressed in the units of the applicable emission limitation) and the operating data

and calculations used in determining the magnitude of any excess emissions.

41.6.5.5 ~~v.~~ Any corrective actions and schedules utilized to correct the conditions causing any excess emissions.

41.7 ~~g.~~ Reporting requirements. The owner or operator of any facility containing sources subject to ~~this Section~~ 41.0 of this regulation shall:

41.7.1 ~~1.~~ Comply with the initial compliance certification requirements of ~~Section 5(a)~~ 5.1 of this regulation.

41.7.2 ~~2.~~ Comply with the requirements of ~~Section 5(b)~~ 5.2 of this regulation for excess emissions related to the control devices required to comply with paragraphs ~~(c)(1)(ii), (c)(1)(iii), or (d)(2)~~ 41.3.1.2, 41.3.1.3, or 41.4.2 of this ~~Section~~ regulation, as well as any other State of Delaware exceedance reporting requirements.

Section 42—

42.0 Air Oxidation Processes in the Synthetic Organic Chemical Manufacturing Industry

01/11/1993

42.1 a—Applicability

42.1.1 1. ~~This Section applies~~ The provisions of 42.0 of this regulation apply to the following air oxidation facilities in the synthetic organic chemical manufacturing industry:

42.1.1.1 i. ~~Each air oxidation reactor not discharging its vent stream into a recovery system.~~

42.1.1.2 ii. ~~Each combination of an air oxidation reactor and the recovery system into which its vent stream is discharged.~~

42.1.1.3 iii. ~~Each combination of two or more air oxidation reactors and the common recovery system into which their vent streams are discharged.~~

42.1.2 2. ~~Any air oxidation reactor vent stream that has a total resource effectiveness (TRE) index value greater than 1.0 is exempt from all provisions of this Section 42.0 of this regulation except the requirements in paragraphs (c), (e)(2), and (f)(10) 42.3, 42.5.2, and 42.6.10 of this Section regulation.~~

42.2 b. ~~Definitions. As used in this Section 42.0 of this regulation,~~ all terms not defined herein shall have the meaning given them in the November 15, 1990 Clean Air Act Amendments (CAAA), or in ~~Section 2~~ 2.0 of this regulation.

“Air oxidation facility” means a product recovery system and all associated air oxidation process reactors discharging directly into that system or any such reactors discharging directly into the atmosphere.

“Air oxidation process” means a reactor in which air is used as an oxidizing agent to produce an organic chemical.

“Air oxidation reactor” means any device or process vessel in which one or more organic reactants are combined with air or a combination of air and oxygen to produce one or more organic compounds. Ammoxidation and oxychlorination are included in this definition.

“Air oxidation reactor recovery train” means an individual recovery system receiving the vent stream from at least one air oxidation reactor, along with all air oxidation reactors feeding vent streams into this system.

“Product recovery system” means any equipment used to collect volatile organic compounds (VOCs) for use, reuse, or sale. Such equipment includes, but

is not limited to, absorbers, adsorbers, condensers, and devices that recover non-VOCs such as ammonia and HCl.

“Synthetic organic chemical manufacturing industry” means the industry that produces, as intermediates or final products, one or more of the chemicals listed at 40 CFR 60.489 (July 1, 1992).

“Total resource effectiveness index value,” or TRE index value, means a measure of the supplemental total resource requirement per unit of VOC emission reduction associated with an individual air oxidation vent stream, based on vent stream flow rate, emission rate of VOC, net heating value, and corrosive properties, as quantified by the equation given under ~~paragraph (e)(1)~~ 42.5.1 of this Section regulation.

“Vent stream” means any gas stream containing nitrogen that was introduced as air to the air oxidation reactor and released to the atmosphere directly from any air oxidation reactor recovery train or indirectly, after diversion through other process equipment.

42.3 ~~e~~—Standards. For each vent stream from an air oxidation reactor or combination air oxidation reactor and recovery train subject to ~~this Section 42.0 of this regulation~~, the owner or operator shall comply with ~~paragraph (e)(1), (2), or (3)~~ 42.3.1, 42.3.2, or 42.3.3 of this Section regulation.

42.3.1 ~~1~~—Reduce total VOC emissions by 98 weight % ~~percent~~ or to 20 parts per million volumetric (ppmv) on a dry basis corrected to 3% ~~percent~~ oxygen, whichever is less stringent. If a boiler or process heater is used to comply with ~~this paragraph 42.3 of this regulation~~, the vent stream shall be introduced into the flame zone of the boiler or process heater.

42.3.2 ~~2~~—Combust the emissions in a flare that meets the requirements of 40 CFR 60.18 (July 1, 1992).

42.3.3 ~~3~~—Maintain a TRE index value greater than 1.0 without the use of VOC emission control devices.

42.4 ~~d~~—Monitoring requirements.

42.4.1 ~~1~~—The owner or operator of an air oxidation facility that uses an incinerator to seek to comply with the VOC emission limit specified under ~~paragraph (e)(1)~~ 42.3.1 of this Section regulation shall install, calibrate, maintain, and operate according to manufacturer's specifications the following equipment:

42.4.1.1 ~~i~~—A temperature monitoring device equipped with a continuous recorder and having an accuracy of $\pm 1\%$ ~~percent~~ of the temperature being monitored expressed in degrees Celsius or $\pm 0.5^{\circ}\text{C}$, whichever is greater.

42.4.1.1.1 A.—Where an incinerator other than a catalytic incinerator is used, a temperature monitoring device shall be installed in the firebox.

42.4.1.1.2 B.—Where a catalytic incinerator is used, temperature monitoring devices shall be installed in the gas stream immediately before and after the catalyst bed.

42.4.1.2 ii.—A flow indicator that provides a record of vent stream flow to the incinerator at least once every hour for each air oxidation facility. The flow indicator shall be installed in the vent stream from each air oxidation facility at a point closest to the inlet of each incinerator and before being joined with any other vent stream.

42.4.2 2.—The owner or operator of an air oxidation facility that uses a flare to seek to comply with ~~paragraph (c)(2)~~ 42.3.2 of this ~~Section~~ regulation shall install, calibrate, maintain, and operate according to manufacturer's specifications the following equipment:

42.4.2.1 i.—A heat-sensing device, such as an ultra-violet sensor or thermocouple, at the pilot light to indicate the continuous presence of a flame.

42.4.2.2 ii.—A flow indicator that provides a record of vent stream flow to the flare at least once every hour for each air oxidation facility. The flow indicator shall be installed in the vent stream from each air oxidation facility at a point closest to the flare and before being joined with any other vent stream.

42.4.3 3.—The owner or operator of an air oxidation facility that uses a boiler or process heater to seek to comply with ~~paragraph (c)(1)~~ 42.3.1 of this ~~Section~~ regulation shall install, calibrate, maintain, and operate according to the manufacturer's specifications the following equipment:

42.4.3.1 i.—A flow indicator that provides a record of vent stream flow to the boiler or process heater at least once every hour for each air oxidation facility. The flow indicator shall be installed in the vent stream from each air oxidation reactor within a facility at a point closest to the inlet of each boiler or process heater and before being joined with any other vent stream.

42.4.3.2 ii.—A temperature monitoring device in the firebox equipped with a continuous recorder and having an accuracy of ~~±1% percent~~ of the temperature being measured expressed in degrees Celsius or ± 0.5 °C, whichever is greater, for boilers or process heaters of less than 44 megawatts (MW) (150 million British thermal units per hour [Btu/hr]) heat input design capacity.

42.4.3.3 ~~iii~~—Monitor and record the periods of operation of the boiler or process heater if the design input capacity of the boiler or process heater is 44 MW (150 million Btu/hr) or greater. The records shall be readily available for inspection.

42.4.4 4—The owner or operator of an air oxidation facility that seeks to demonstrate compliance with the TRE index value limit specified under ~~paragraph (c)(3)~~ 42.3.3 of this ~~Section~~ regulation shall install, calibrate, maintain, and operate according to manufacturer's specifications the following equipment:

42.4.4.1 ~~i~~—Where an absorber is the final recovery device in a recovery system:

42.4.4.1.1 ~~A~~—A scrubbing liquid temperature monitoring device having an accuracy of $\pm 1\%$ ~~percent~~ of the temperature being monitored, expressed in degrees Celsius or $\pm 0.5^{\circ}\text{C}$, whichever is greater, and a specific gravity monitoring device having an accuracy of ± 0.02 specific gravity unit, each equipped with a continuous recorder.

42.4.4.1.2 ~~B~~—An organic monitoring device used to indicate the concentration level of organic compounds exiting the recovery device based on a detection principle such as infrared, photoionization, or thermal conductivity, each equipped with a continuous recorder.

42.4.4.2 ~~ii~~—Where a condenser is the final recovery device in a recovery system:

42.4.4.2.1 ~~A~~—A condenser exit (product side) temperature monitoring device equipped with a continuous recorder and having an accuracy of $\pm 1\%$ ~~percent~~ of the temperature being monitored expressed in degrees Celsius or $\pm 0.5^{\circ}\text{C}$, whichever is greater.

42.4.4.2.2 ~~B~~—An organic monitoring device used to indicate the concentration level of organic compounds exiting the recovery device based on a detection principle such as infrared, photoionization, or thermal conductivity, each equipped with a continuous recorder.

42.4.4.3 ~~iii~~—Where a carbon adsorber is the final recovery device in a recovery system:

42.4.4.3.1 ~~A~~—An integrating steam flow monitoring device having an accuracy of $\pm 10\%$ ~~percent~~, and a carbon bed temperature monitoring device having an accuracy of $\pm 1\%$ ~~percent~~ of the temperature being monitored expressed in

degrees Celsius or $\pm 0.5^{\circ}\text{C}$, whichever is greater, both equipped with a continuous recorder.

42.4.4.3.2 ~~B.~~—An organic monitoring device used to indicate the concentration level of organic compounds exiting the recovery device based on a detection principle such as infrared, photoionization, or thermal conductivity, each equipped with a continuous recorder.

42.5 ~~e.~~—Test methods and procedures. The following methods shall be used as reference methods to demonstrate compliance with ~~paragraph (e)~~ 42.3 of this Section regulation:

42.5.1 ~~4.~~—The following equation shall be used to calculate the TRE index for a given vent stream:

$$\text{TRE} = \frac{1}{E} \left[a + b(\text{FL})^{0.66} + c(\text{FL}) + d(\text{FL})(H_T) + e(\text{FL})^{0.66}(H_T)^{0.66} + f(\text{FL})^{0.5} \right]$$

(42-1)

where:

TRE = The total resource effectiveness index value.

E = The measured hourly emissions in units of kilograms per hour (kg/hr).

FL = The vent stream flow rate in standard cubic meter per minute (scm/min), at a standard temperature of 20°C . For a Category E stream, the factor $f(\text{FL})^{0.5}$ should be replaced with:

$$f \left[(\text{FL}) \frac{(H_T)^{0.5}}{3.6} \right]$$

where:

HT = Vent stream net heating value in units of megajoules per standard cubic meter (MJ/scm), where the net enthalpy per mole of off-gas is based on combustion at 25°C (68°F) and 760 millimeters of Mercury (mm Hg), but the standard temperature for determining the volume corresponding to one mole is 20°C , as in the definition of FL.

a, b, c, d, e, and f = Specific coefficients for six different general categories of process vent streams. The set of coefficients that apply to a given air oxidation process vent stream may be obtained from the Department.

42.5.2 ~~2.~~—Each owner or operator of an air oxidation facility seeking to comply with ~~paragraph (a)(2) or (c)(3)~~ 42.1.2 or 42.3.3 of this Section regulation shall recalculate the TRE index value for that air oxidation facility whenever process changes are made. Some examples of process changes are changes in production capacity, feedstock type, or catalyst type, or whenever recovery equipment is replaced, removed, or added.

The TRE index value shall be recalculated based on test data or on best engineering estimates of the effects of the change to the recovery system.

42.5.3 3.—Method 1 or 1A, as appropriate, for selection of the sampling sites. The control device inlet sampling site for determining vent stream molar composition or VOC reduction efficiency shall be prior to the inlet of the control device and after the recovery system.

42.5.4 4.—Method 2, 2A, 2C, or 2D, as appropriate, for determining the volumetric flow rates.

42.5.5 5.—The emission rate correction factor, integrated sampling, and analysis procedure of Method 3 shall be used to determine the oxygen concentration (%O_{2d}) for determining compliance with the 20 ppmv limit. The sampling site shall be the same as that of the VOC samples, and the samples shall be taken during the same time that the VOC samples are taken. The VOC concentration corrected to ~~3%~~ percent O₂ (C_c) shall be computed using the following equation:

$$C_c = C_{\text{VOC}} \frac{17.9}{20.9 - \%O_{2d}} \quad (42-2)$$

where:

C_c = Concentration of VOC corrected to ~~3%~~ percent O₂, dry basis, ppmv.

C_{VOC} = Concentration of VOC, dry basis, ppmv.

%O_{2d} = Concentration of O₂, dry basis, percent by volume.

42.5.6 6.—Method 18 to determine the VOC concentration in the control device outlet and the VOC concentration in the inlet when the reduction efficiency of the control device is to be determined.

42.5.6.1 i.—The sampling time for each run shall be ~~4~~ one hour, in which either an integrated sample or four grab samples shall be taken. If grab sampling is used, then the samples shall be taken at 15- minute intervals.

42.5.6.2 ii.—The emission reduction (R) of VOC shall be determined using the following equation:

$$R = \frac{E_i - E_o}{E_i} \times 100 \quad (42-3)$$

where:

R = Emission reduction, percent by weight.

E_i = Mass rate of VOC entering the control device, kg VOC/hr.

E_o = Mass rate of VOC discharged to the atmosphere, kg VOC/hr.

42.5.6.3 iii.—The mass rates of VOC (E_i, E_o) shall be computed using the following equations:

$$E_i = K_2 \left(\sum_{j=1}^n C_{ij} M_{ij} \right) Q_i \quad (42-4)$$

$$E_o = K_2 \left(\sum_{j=1}^n C_{oj} M_{oj} \right) Q_o \quad (42-5)$$

where:

C_{ij} , C_{oj} = Concentration of sample component J of the gas stream at the inlet and outlet of the control device, respectively.

M_{ij} , M_{oj} = Molecular weight of sample component J of the gas stream at the inlet and outlet of the control device, respectively, g/g-mole (lb/lb-mole).

Q_i , Q_o = Flow rate of gas stream at the inlet and outlet of the control device, respectively, dscm/min (dscf/hr).

K_2 = Constant, $2.494 \times 10^{-6} (1/\text{ppm})(\text{g-mole}/\text{scm})(\text{kg}/\text{g})(\text{min}/\text{hr})$, where standard temperature for (g-mole/scm) is 20°C .

42.5.6.4 ~~iv.~~—The VOC concentration (C_{VOC}) is the sum of the individual components and shall be computed for each run using the following equation:

$$C_{\text{VOC}} = \sum_{j=1}^n C_j \quad (42-6)$$

where:

C_{VOC} = Concentration of VOC, dry basis, ppmv.

C_j = Concentration of sample components in the sample.

n = Number of components in the sample.

42.5.7 ~~7.~~—When a flare is used to seek to comply with ~~paragraph (c)(2) 42.3.2~~ of this ~~Section~~ regulation, the flare shall comply with the requirements of 40 CFR 60.18 (July 1, 1992).

42.5.8 ~~8.~~—The test methods in Appendix A to 40 CFR Part 60 (July 1, 1992), except as provided under 40 CFR 60.8 (July 1, 1992), shall be used for determining the net heating value of the gas combusted to determine compliance under ~~paragraph (c)(2) 42.3.2~~ of this ~~Section~~ and for determining the process vent stream TRE index value to determine compliance under ~~paragraph (c)(3) 42.3.3~~ of this ~~Section~~ regulation.

42.5.9 ~~9.~~

42.5.9.1 ~~i.~~—Method 1 or 1A, as appropriate, for selecting the sampling site. The sampling site for the vent stream flow rate and molar composition determination prescribed in ~~paragraph (e)(10) and (11) 42.5.10 and 42.5.11~~ of this ~~Section~~ regulation shall be,

except for the situations outlined in ~~paragraph (e)(9)(ii)~~ 42.5.9.2 of this ~~Section~~ regulation, prior to the inlet of any control device, prior to any post-reactor dilution of the stream with air, and prior to any post-reactor introduction of halogenated compounds into the vent stream. No transverse site selection method is needed for vents smaller than 4 four inches in diameter.

42.5.9.2 ~~ii.~~—If any gas stream other than the air oxidation vent stream is normally conducted through the final recovery device:

42.5.9.2.1 ~~A.~~—The sampling site for vent stream flow rate and molar composition shall be prior to the final recovery device and prior to the point at which the nonair oxidation stream is introduced.

42.5.9.2.2 ~~B.~~—The efficiency of the final recovery device is determined by measuring the VOC concentration using Method 18 at the inlet to the final recovery device after the introduction of any nonair oxidation vent stream and at the outlet of the final recovery device.

42.5.9.2.3 ~~C.~~—This efficiency is applied to the VOC concentration measured prior to the final recovery device and prior to the introduction of the nonair oxidation stream to determine the concentration of VOC in the air oxidation stream from the final recovery device. This concentration of VOC is then used to perform the calculations outlined in ~~paragraphs (e)(12) and (13)~~ 42.5.12 and 42.5.13 of this ~~Section~~ regulation.

42.5.10 ~~10.~~—The molar composition of the process vent stream shall be determined as follows:

42.5.10.1 ~~i.~~—Method 18 to measure the concentration of VOC including those containing halogens.

42.5.10.2 ~~ii.~~—ASTM D1946-77 to measure the concentration of carbon monoxide and hydrogen.

42.5.10.3 ~~iii.~~—Method 4 to measure the content of water vapor.

42.5.11 ~~11.~~—The volumetric flow rate shall be determined using Method 2, 2A, 2C, or 2D, as appropriate.

42.5.12 ~~12.~~—The net heating value of the vent stream shall be calculated using the following equation:

$$H_T = K_1 \left(\sum_{j=1}^n C_j H_j \right) \quad (42-7)$$

where:

H_T = Net heating value of the sample, MJ/scm, where the net enthalpy per mole of off-gas is based on combustion at 25°C and 760 mm Hg, but the standard temperature for determining the volume corresponding to one mole is 20°C, as in the definition of Q_s (off-gas flow rate).

$$K_1 = \text{Constant, } 1.740 \times 10^{-7} \frac{1 \text{ (g-mole) MJ}}{\text{ppm scm kcal}}$$

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

C_j = Concentration of compound j in ppm, as measured for organics by Method 18 and measured for hydrogen and carbon monoxide by ASTM D1946-77 as indicated in ~~paragraph (e)(10)~~ 42.5.10 of this Section regulation.

H_j = Net heat of combustion of compound j, kilocalories per gram-mole (kcal/g-mole), based on combustion at 25°C and 760 mm Hg. The heats of combustion of vent stream components would be required to be determined using ASTM D2382-76 if published values are not available or cannot be calculated.

42.5.13 ~~13.~~–The emission rate of VOCs in the process vent stream shall be calculated using the following equation:

$$E_{\text{VOC}} = K_2 \left(\sum_{j=1}^n C_j M_j \right) Q_s \quad (42-8)$$

where:

E_{VOC} = Emission rate of VOC in the sample, kg/hr.

K_2 = Constant, $2.494 \times 10^{-6} (1/\text{ppm})(\text{g-mole}/\text{scm})(\text{kg}/\text{g})(\text{min}/\text{hr})$, where standard temperature for (g-mole/scm) is 20°C.

C_j = Concentration on a dry basis of compound j in ppm as measured by Method 18 as indicated in ~~paragraph (e)(10)~~ 42.5.10 of this Section regulation.

M_j = Molecular weight of sample j, g/g-mole.

Q_s = Vent stream flow rate (scm/min) at a standard temperature of 20°C.

42.6 ~~f.~~–Recordkeeping. The owner or operator of a facility subject to this Section 42.0 of this regulation shall keep the records specified in this ~~paragraph 42.6~~ 42.6 of this regulation in a readily accessible location for at least 5 years. These records shall be made available to the Department immediately upon verbal or written request.

42.6.1 ~~4.~~–Where an owner or operator subject to this Section 42.0 of this regulation seeks to demonstrate compliance with ~~paragraph (e)(1)~~ 42.3.1 of this Section regulation through using either a thermal or catalytic incinerator:

42.6.1.1 i.—The average firebox temperature of the incinerator (or the average temperature upstream and downstream of the catalyst bed for a catalytic incinerator), measured at least every 15 minutes and averaged over the same time period as the compliance test.

42.6.1.2 ii.—The percent reduction of VOC determined as specified in ~~paragraph (c)(1)~~ 42.3.1 of this ~~Section~~ regulation that is achieved by the incinerator, or the concentration of VOC determined as specified in ~~paragraph (c)(1)~~ 42.3.1 of this ~~Section~~ regulation at the outlet of the control device on a dry basis corrected to 3% percent oxygen.

42.6.2 2.—Where an owner or operator subject to the provisions of ~~this Section~~ 42.0 of this regulation seeks to demonstrate compliance with ~~paragraph (c)(1)~~ 42.3.1 of this ~~Section~~ regulation through using a boiler or process heater:

42.6.2.1 i.—A description of the location at which the vent stream is introduced into the boiler or process heater.

42.6.2.2 ii.—The average combustion temperature of the boiler or process heater with a design heat input capacity of less than 44 MW (150 million Btu/hr) measured at least every 15 minutes and averaged over the same time period as the compliance testing.

42.6.3 3.—Where an owner or operator subject to the provisions of ~~this Section~~ 42.0 of this regulation seeks to comply with ~~paragraph (c)(2)~~ 42.3.2 of this ~~Section~~ regulation through the use of a smokeless flare:

42.6.3.1 i.—The flare design (i.e., steam-assisted, air-assisted, or nonassisted), all visible emission readings, heat content determinations, flow rate measurements, and exit velocity determinations made during the compliance test.

42.6.3.2 ii.—Continuous records of the flare pilot flame monitoring.

42.6.3.3 iii.—Records of all periods of operation during which the pilot flame is absent.

42.6.4 4.—Where an owner or operator seeks to demonstrate compliance with ~~paragraph (c)(3)~~ 42.3.3 of this ~~Section~~ regulation:

42.6.4.1 i.—Where an absorber is the final recovery device in a recovery system, the exit specific gravity and average exit temperature of the absorbing liquid, measured at least every 15 minutes and averaged over the same time period of the compliance testing (both measured while the vent stream is normally routed and constituted).

42.6.4.2 ii.—Where a condenser is the final recovery device in a recovery system, the average exit (product side) temperature, measured at least every 15 minutes and averaged over the same time period of the compliance testing while the vent stream is normally routed and constituted.

42.6.4.3 iii.—Where a carbon adsorber is the final recovery device in a recovery system, the total steam mass flow measured at least every 15 minutes and averaged over the same time period of the compliance test (full carbon bed cycle), temperature of the carbon bed after regeneration (and within 15 minutes of completion of any cooling cycle(s) or cycles), and duration of the carbon bed steaming cycle (all measured while the vent stream is normally routed and constituted).

42.6.4.4 iv.—As an alternative to ~~paragraphs (f)(4)(i), (ii), or (iii)~~ 42.6.4.1, 42.6.4.2, or 42.6.4.3 of this ~~Section~~ regulation, the concentration level or reading indicated by the organic monitoring device at the outlet of the absorber, condenser, or carbon adsorber measured at least every 15 minutes and averaged over the same time period of the compliance testing while the vent stream is normally routed and constituted.

42.6.4.5 v.—As an alternative to ~~paragraphs (f)(4)(i), (ii), (iii), or (iv)~~ 42.6.4.1, 42.6.4.2, 42.6.4.3, or 42.6.4.4 of this ~~Section~~ regulation, all measurements and calculations performed to determine the TRE index value of the vent stream.

42.6.5 5.—Each owner or operator subject to the provisions of this ~~Section~~ 42.0 of this regulation shall keep up-to-date, readily accessible, continuous records of the equipment operating parameters specified to be monitored under ~~paragraphs (d)(1) and (d)(3)~~ 42.4.1 and 42.4.3 of this ~~Section~~ regulation, as well as up-to-date, readily accessible records of periods of operation during which the parameter boundaries established during the most recent compliance test are exceeded. The Department may at any time require a report of these data. Where a combustion device is used by an owner or operator seeking to demonstrate compliance with ~~paragraph (e)(1) or (e)(3)~~ 42.3.1 or 42.3.3 of this ~~Section~~ regulation, periods of operation during which the parameter boundaries established during the most recent performance tests are exceeded are defined as follows:

42.6.5.1 i.—For thermal incinerators, all ~~3~~ three-hour periods of operation during which the average combustion temperature was more than 28°C (50°F) below the average combustion temperature during the most recent test at which compliance with ~~paragraph (e)(1)~~ 42.3.1 of this ~~Section~~ regulation was determined.

42.6.5.2 ii.—For catalytic incinerators, all ~~3~~ three-hour periods of operation during which the average temperature of the vent stream

immediately before the catalyst bed is more than 28°C (50°F) below the average temperature of the vent stream during the most recent test at which compliance with ~~paragraph (c)(1)~~ 42.3.1 of this ~~Section~~ regulation was determined. The owner or operator also shall record all ~~3~~ three-hour periods of operation 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 test at which compliance with ~~paragraph (c)(1)~~ 42.3.1 of this ~~Section~~ regulation was determined.

42.6.5.3 ~~iii.~~ All ~~3~~ three-hour periods of operation during which the average combustion temperature was more than 28°C (50°F) below the average combustion temperature during the most recent test at which compliance with ~~paragraph (c)(1)~~ 42.3.1 of this ~~Section~~ regulation was determined for boilers or process heaters with a design heat input capacity of less than 44 MW (150 million Btu/hr).

42.6.5.4 ~~iv.~~ 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 (c)(1)~~ 42.3.1 of this ~~Section~~ regulation.

42.6.6 ~~6.~~ Each owner or operator subject to the provisions of this ~~Section~~ 42.0 of this regulation shall keep up-to-date, readily accessible continuous records of the flow indication specified under ~~paragraphs (d)(1)(ii), (d)(2)(ii), and (d)(3)(i)~~ 42.4.1.2, 42.4.2.2, and 42.4.3.1 of this ~~Section~~ regulation, as well as up-to-date, readily accessible records of all periods when the vent stream is diverted from the control device or has no flow rate.

42.6.7 ~~7.~~ Each owner or operator subject to the provisions of this ~~Section~~ 42.0 of this regulation who uses a boiler or process heater with a design heat input capacity of 44 MW or greater to comply with ~~paragraph (c)(1)~~ 42.3.1 of this ~~Section~~ regulation 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 or federal regulatory requirements.)

42.6.8 ~~8.~~ Each owner or operator subject to the provisions of this ~~Section~~ 42.0 of this regulation shall keep up-to-date, readily accessible, continuous records of the flare pilot flame monitoring specified in ~~paragraph (d)(2)~~ 42.4.2 of this ~~Section~~ regulation as well as up-to-date, readily accessible records of all periods of operations in which the pilot flame is absent.

42.6.9 ~~9.~~ Each owner or operator subject to the provisions of this ~~Section~~ 42.0 of this regulation shall keep up-to-date, readily accessible, continuous records of the equipment operating parameters specified to be

monitored under ~~paragraph (d)(3)~~ 42.4.3 of this ~~Section~~ regulation as well as up-to-date, readily accessible records of periods of operation during which the parameter boundaries established during the most recent compliance test are exceeded. The Department may at any time require a report of these data. Where the owner or operator seeks to demonstrate compliance with ~~paragraph (e)(3)~~ 42.3.3 of this ~~Section~~ regulation, periods of operation during which the parameter boundaries established during the most recent compliance tests are exceeded are defined as follows:

42.6.9.1 ~~i.~~ Where an absorber is the final recovery device in a recovery system, and where an organic monitoring device is not used, either ~~paragraph (f)(9)(i)(A) or (B)~~ 42.6.9.1.1 or 42.6.9.1.2 of this ~~Section~~ regulation:

42.6.9.1.1 ~~A.~~ All 3-hour periods of operation during which the average absorbing liquid temperature was more than 11°C (20°F) above the average absorbing liquid temperature during the most recent compliance test that demonstrated that the facility was in compliance.

42.6.9.1.2 ~~B.~~ All 3-hour periods of operation during which the average absorbing liquid specific gravity was more than 0.1 unit above or below the average absorbing liquid specific gravity during the most recent compliance test that demonstrated that the facility was in compliance.

42.6.9.2 ~~ii.~~ Where a condenser is the final recovery device in a recovery system, and where an organic monitoring device is not used, all 3-hour periods of operation during which the average exit (product side) condenser operating temperature was more than 6°C (11°F) above the average exit (product side) operating temperature during the most recent compliance test that demonstrated that the facility was in compliance.

42.6.9.3 ~~iii.~~ Where a carbon adsorber is the final recovery device in a recovery system and where an organic monitoring device is not used, either ~~paragraph (f)(9)(iii)(A) or (B)~~ 42.6.9.3.1 or 42.6.9.3.2 of this ~~Section~~ regulation:

42.6.9.3.1 ~~A.~~ All carbon bed regeneration cycles during which the total mass steam flow was more than 10% ~~percent~~ below the total mass steam flow during the most recent compliance test that demonstrated that the facility was in compliance.

42.6.9.3.2 ~~B.~~ All carbon bed regeneration cycles during which the temperature of the carbon bed after regeneration (and after completion of any cooling cycle~~s~~ or cycles) was more than 10% ~~percent~~ greater than the carbon bed temperature (in degrees Celsius) during the most recent

compliance test that demonstrated that the facility was in compliance.

42.6.9.4 ~~iv.~~ Where an absorber, condenser, or carbon adsorber is the final recovery device in the recovery system and an organic monitoring device approved by the Department is used, all ~~3~~ three-hour periods of operation during which the average concentration level or reading of organic compounds in the exhaust gases is more than ~~20% percent~~ greater than the exhaust gas organic compound concentration level or reading measured by the monitoring device during the most recent compliance test that demonstrated that the facility was in compliance.

42.6.10 ~~10.~~ Each owner or operator subject to the provisions of ~~this Section~~ 42.0 of this regulation and seeking to demonstrate compliance with ~~paragraph (e)(3)~~ 42.3.3 of this ~~Section~~ regulation shall keep up-to-date, readily accessible records of:

42.6.10.1 ~~i.~~ Any changes in production capacity, feedstock type, or catalyst type, or of any replacement, removal, or addition of recovery equipment or air oxidation reactors.

42.6.10.2 ~~ii.~~ Any recalculation of the TRE index value performed pursuant to ~~paragraph (e)(2)~~ 42.5.2 of this ~~Section~~ regulation.

42.6.10.3 ~~iii.~~ The results of any test performed pursuant to the methods and procedures required by ~~paragraph (d)(4)~~ 42.4.4 of this ~~Section~~ regulation.

42.7 ~~g.~~ Reporting requirements. The owner or operator of any facility containing sources subject to ~~this Section~~ 42.0 of this regulation shall:

42.7.1 ~~1.~~ Comply with the initial compliance certification requirements of ~~Section 5(a)~~ 5.1 of this regulation.

42.7.2 ~~2.~~ Comply with the requirements of ~~Section 5(b)~~ 5.2 of this regulation for excess emissions related to the control devices required to comply with ~~this Section~~ 42.0 of this regulation, as well as any other State of Delaware exceedance reporting requirements.

Section 43—

43.0 Bulk Gasoline Marine Tank Vessel Loading Facilities.

08/08/1994

43.1 a. ~~Applicability~~

43.1.1 1. ~~This section applies~~ The provisions of this regulation apply to all loading berths at any bulk marine tank loading facility that delivers gasoline into marine tank vessels. Operations conducted in association with crude oil handling are not subject to this section 43.0 of this regulation.

43.1.2 2. ~~Any facility subject to this section 43.0 of this regulation~~ which has an annual throughput of less than or equal to 15,000 gallons of gasoline is exempt from this regulation except for the recordkeeping and reporting requirements of ~~paragraphs (g.) and (h.)~~ 43.7 and 43.8 of this regulation, respectively.

43.1.3 3. ~~Any facility that becomes or is currently subject to the provisions of this section 43.0 of this regulation~~ will remain subject to these provisions even if its throughput later falls below the applicability threshold.

43.1.4 4. ~~Nothing in this section 43.0 of this regulation~~ shall be construed as to require any act or omission that would be in violation of any regulation or other requirements of the United States Coast Guard or prevent any act that is necessary to secure the safety of a vessel or the safety of the passengers or crew.

43.2 b. ~~Definitions. As used in this section 43.0 of this regulation,~~ all terms not defined herein shall have the meaning given them in the November 15, 1990 Clean Air Act Amendments (CAAA), or in ~~Section 2 2.0~~ of this regulation.

“Ballasting” means the loading of water or other liquid into a marine tank vessel's cargo tank to obtain proper propeller, rudder and hull immersion.

“Boiler” means any enclosed combustion device that uses fuel to produce energy in the form of steam.

“Car-sealed” means having a seal that is placed on the device used to change the position of a valve (e.g., from open to closed) such that the position of the valve cannot be changed without breaking the seal and requiring the replacement of the old seal, once broken, with a new seal.

“Combustion device” means all equipment, including, but not limited to, incinerators, flares, boilers, and process heaters used for combustion or destruction of organic vapors displaced from the loading berths.

“Flare” means an engineered control device designed for direct combustion of waste gases.

“Facility” means any plant, terminal, refinery or other location where there exists a dock, berth, or anchorage capable of bulk loading on marine tank vessels.

“Gasoline” means any petroleum product having a Reid Vapor Pressure of 4 psia or greater and used as automotive fuel and aviation fuel.

“Housekeeping” means altering the composition of gases contained within marine vessel tanks by tank washing, gas freeing, or purging.

“Inlet to the control device” means any point on the vapor line between the vessel and the control device prior to the addition of any inert, dilution or enrichment gas.

“Loading berth” means the loading arms, pumps, meters, shutoff valves, relief valves, and other piping and valves necessary to fill marine vessels. This includes those items necessary for off shore loading.

“Loading cycle” means the time period from the beginning of filling a marine vessel until flow of product into the vessel ceases, as measured by the flow indicator.

“Marine tank vessel” means any tank ship or barge which transports liquid product such as gasoline in bulk.

“Non-vapor tight” means any marine vessel that does not pass the required vapor-tightness test.

“Process heater” means a device that transfers heat liberated by burning fuel to fluids contained in tubes, except water that is heated to produce steam.

“Recovery device” means an individual unit of equipment, including but not limited to an absorber, carbon adsorber, or condensers, capable of and used for the purpose of removing vapors and recovering liquids.

“Vapor collection system” means any equipment located at the affected facility used for containing vapors displaced during the loading of marine tank vessels. This does not include the vapor collection system that is part of any marine vessel vapor collection manifold system.

“Vapor-tight” means any marine tank vessel that has demonstrated within the preceding 12 months to have no leaks. This demonstration shall be made using 40 CFR Part 60, App. A., Method 21 (7/1/92), during the last 20% percent of loading in a product tank. A reading of greater than 10,000 ppmv as methane shall constitute a leak. As an alternative, a marine vessel owner or operator may use the vapor-tightness test described in ~~paragraph (f.)~~ 43.6 of this ~~section~~ regulation to demonstrate vapor-tightness. A marine vessel loaded at negative pressure is assumed to be vapor-tight.

43.3 e-Standards. On or before December 31, 1995:

43.3.1 1.—The owner or operator of a bulk gasoline marine tank vessel loading facility subject to ~~this section~~ 43.0 of this regulation shall ensure that each loading berth is equipped with a vapor collection system that is designed to collect all VOC vapors displaced from marine tank vessels during loading, ballasting, or housekeeping.

43.3.2 2.—Each vapor collection system shall be designed to prevent any VOC vapors collected at one loading berth from passing to another loading berth.

43.3.3 3.—The owner or operator of a bulk gasoline marine tank vessel loading facility subject to ~~this section~~ 43.0 of this regulation shall comply with ~~paragraph (c.)(3.)(i.), (c.)(3.)(ii.), or (c.)(3.)(iii.)~~ 43.3.3.1, 43.3.3.2, or 43.3.3.3 of this section regulation.

43.3.3.1 i.—Reduce total VOC emissions by 98 weight-percent using a combustion device. If a boiler or process heater is used to comply with ~~this paragraph~~ 43.3 of this regulation, the vent stream shall be introduced into the flame zone of the boiler or process heater.

43.3.3.2 ii.—Combust the VOC emissions in a flare that meets the requirements of 40 CFR 60.18 (7/1/92).

43.3.3.3 iii.—Reduce VOC emissions by 95 weight-percent % using a vapor recovery device.

43.3.4 4.—Loading of gasoline into marine tank vessels shall be limited to marine tank vessels that have been approved by the United States Coast Guard for connection to marine vapor control systems and are vapor tight. Vapor tightness shall be determined using the following procedures:

43.3.4.1 i.—Prior to initiating the loading process, the loading berth owner or operator shall obtain the vapor tightness documentation described in ~~paragraph (g.)~~ 43.7 of this section regulation for each marine tank vessel that is to be loaded at the loading berth subject to ~~this section~~ 43.0 of this regulation.

43.3.4.2 ii.—If there is no documentation of a successful vapor tightness test conducted on the marine tank vessel, the owner or operator of the loading berth subject to ~~this section~~ 43.0 of this regulation shall require that a vapor tightness test be conducted during the last 20% of loading of the marine tank vessel or shall not load the marine tank vessel.

43.3.4.3 iii.—Within ~~3~~ three weeks after the loading has occurred, the loading berth owner or operator shall notify the owner or operator of each non-vapor-tight marine tank vessel loaded at the

loading berths subject to ~~this section~~ 43.0 of this regulation that the marine tank vessel is not vapor-tight.

43.3.4.4 ~~iv.~~The loading berth owner or operator shall take steps to assure that the non-vapor-tight marine tank vessel will not be reloaded at the loading berth subject to ~~this section~~ 43.0 of this regulation until vapor tightness documentation for that marine tank vessel is obtained.

43.3.5 ~~5.~~The owner or operator of a bulk gasoline marine tank loading facility subject to ~~this section~~ 43.0 of this regulation shall limit loading of gasoline to marine tank vessels equipped with vapor collection equipment that is compatible with the vapor collection system of the bulk gasoline marine tank loading facility.

43.3.6 ~~6.~~The owner or operator of a bulk gasoline marine tank loading facility subject to ~~this section~~ 43.0 of this regulation shall limit loading of gasoline to marine tank vessels whose vapor collection system is connected to the vapor collection system of the bulk gasoline marine tank loading facility.

43.3.7 ~~7.~~The owner or operator of a bulk gasoline marine tank loading facility subject to ~~this section~~ 43.0 of this regulation shall ensure that the maximum normal operating pressure of the marine tank vessel vapor collection equipment shall not exceed 0.8 times the set relief pressure of the pressure-vacuum vents in the vessel compartment. This level is not to be exceeded when measured by the procedures described in ~~paragraph (e.)~~(12.) 43.5.12 of this section regulation.

43.3.8 ~~8.~~Each calendar month, the owner or operator shall inspect the vapor collection system, the vapor control system, and each loading berth that loads gasoline into marine tank vessels for total organic compound liquid and vapor leaks during product transfer operations. For purposes of ~~this paragraph~~ 43.3 of this regulation, detection methods incorporating sight, sound, or smell are acceptable. Each detection of a leak shall be tagged and recorded and the source of the leak repaired within 15 days. A first attempt at repair shall be made no later than 5 calendar days after the leak is detected.

43.3.9 ~~9.~~Loading of gasoline marine tank vessels shall be restricted to the use of submerged fill.

43.4 ~~d.~~Monitoring requirements.

43.4.1 ~~1.~~The owner or operator of a bulk gasoline marine tank vessel loading facility that uses an incinerator to comply with the VOC emission reduction specified under ~~paragraph (c.)~~(3.)~~(i.)~~ 43.3.3.1 of this section regulation shall install, calibrate, maintain, and operate according to manufacturer's specifications a temperature monitoring device equipped with a continuous recorder and having an accuracy of $\pm 1\%$ ~~percent~~ of the

temperature being monitored expressed in Celsius or $\pm 0.5^\circ$, whichever is greater.

43.4.1.1 i.—Where an incinerator other than a catalytic incinerator is used, a temperature monitoring device shall be installed in the firebox.

43.4.1.2 ii.—Where a catalytic incinerator is used, temperature monitoring devices shall be installed in the gas stream immediately before and after the catalyst bed.

43.4.2 2.—The owner or operator of a bulk gasoline marine tank vessel loading facility that uses a flare to comply with ~~paragraph (c.)(3.)(ii.)~~ 43.3.3.2 of this ~~section~~ regulation shall install, calibrate, maintain, and operate according to manufacture's specifications a heat-sensing device, such as an ultra-violet sensor or thermocouple, at the pilot light to indicate the continuous presence of a flame.

43.4.3 3.—The owner or operator of a bulk gasoline marine tank vessel loading facility that uses a boiler or process heater to comply with ~~paragraph (c.)(3.)(i.)~~ 43.3.3.1 of this ~~section~~ regulation shall install, calibrate, maintain, and operate according to manufacturer's specifications the following equipment, or monitor and record operating parameters described as follows:

43.4.3.1 i.—A temperature monitoring device in the firebox equipped with a continuous recorder and having an accuracy of ~~$\pm 1\%$ percent~~ of the temperature being measured expressed in degrees Celsius or $\pm 0.5^\circ\text{C}$, whichever is greater, for boilers or process heaters of less than 44 megawatts (MW) (150 million British thermal units per hour [BTU/hr]) heat input design capacity.

43.4.3.2 ii.—Monitor and record the periods of operation of the boiler or process heater if the design capacity of the boiler or process heater is 44 MW (150 million BTU/hr) or greater. The records shall be readily available for inspection.

43.4.4 4.—The owner or operator of a bulk gasoline marine tank vessel loading facility that uses a carbon adsorption system to comply with ~~paragraph (c.)(3.)(iii.)~~ 43.3.3.3 of this ~~section~~ regulation shall install, calibrate, maintain, and operate according to manufacture's specifications the following equipment:

43.4.4.1 i.—An integrating steam flow monitoring device having an accuracy of ~~$\pm 10\%$ percent~~ if steam regeneration is used, or a vacuum monitoring device with timing capability having an accuracy of ~~$\pm 5\%$ percent~~ of full scale if vacuum regeneration is used, and a carbon bed temperature monitoring device having an accuracy of ~~$\pm 1\%$ percent~~ of the temperature being measured

expressed in degrees Celsius or $\pm 0.5^{\circ}\text{C}$, whichever is greater, both equipped with a continuous recorder, or

43.4.4.2 ii.—An organic monitoring device used to indicate the concentration level of organic compounds exiting the recovery device based on a detection principle such as infrared, photoionization, or thermal conductivity, and equipped with a continuous recorder.

43.4.5 5.—The owner or operator of a bulk gasoline marine tank vessel loading facility subject to ~~this section~~ 43.0 of this regulation who wishes to demonstrate compliance with the percent reduction requirements specified in ~~paragraph (c.) (3.) (i.) and (c.) (3.) (iii.)~~ 43.3.3.1 and 43.3.3.3 of this ~~section~~ regulation using control devices other than an incinerator, boiler, process heater, carbon adsorber, or flare shall provide the Department with information describing the operation of the control device and the process parameter(s) or parameters that would indicate proper operation and maintenance of the device. The Department may request further information and shall specify appropriate monitoring procedures or requirements.

43.4.6 6.—The owner or operator of a bulk gasoline marine tank vessel loading facility subject to ~~this section~~ 43.0 of this regulation that uses a vent system that contains valves that could divert a vent stream from a control device used to comply with the requirements of ~~this section~~ 43.0 of this regulation shall do the following:

43.4.6.1 i.—Install a flow indicator immediately downstream of each valve that if opened would allow a vent stream to bypass the control device and be emitted, either directly or indirectly, to the atmosphere. The flow indicator shall be capable of recording flow at least every 15 minutes, or

43.4.6.2 ii.—Monitor the valves once a month, checking the position of the valves and the condition of the car seal, and identify all times when the car seals have been broken and the valve position changed (i.e., from open to closed for valves in the vent piping to the control device and closed to open for valves that allow the stream to be vented directly or indirectly to the atmosphere).

43.5 e.—Test method and procedures for control devices. The following methods from 40 CFR, Part 60, App. A. (7/1/92), shall be used as reference methods to demonstrate compliance with ~~paragraphs (c.) (3.) (i) and (iii)~~ 43.3.3.1 and 43.3.3.3 of this ~~section~~ regulation:

43.5.1 4.—Method 1 or 1A, as appropriate, for selection of the sampling sites. The control device sampling site for determining vent stream molar composition or VOC reduction efficiency shall be prior to the inlet of the control device and after the recovery system.

43.5.2 2.—Method 2, 2A, 2C, or 2D, as appropriate, for determining the volumetric flow rates, and Method 18 for determining the vent gas composition.

43.5.3 3.—Method 25A or 25B, as appropriate, for determining the total organic compounds concentration upstream and downstream of the control device. The calibration gas shall be either propane or butane. This test shall be conducted for at least 30 minutes during the transfer of the last 50% percent of total liquid cargo. For events of less than one hour duration, the test shall include the entire last 50% percent of total liquid cargo.

43.5.4 4.—All testing equipment shall be prepared and installed as specified in the appropriate test methods.

43.5.5 5.—Immediately prior to each performance test required for determination of compliance with ~~paragraph (c.)(3.)~~ 43.3.3 of this section regulation, all potential sources of vapor leakage in the vapor collection system equipment shall be monitored for detectable emissions according to the procedures in **Appendix F** of this regulation. The monitoring shall be conducted only while a vapor tight marine tank vessel is being loaded. All leaks shall be repaired prior to conducting the performance test.

43.5.6 6.—An emission testing interval shall consist of each 5 five minute period during the performance test. For each interval:

43.5.6.1 i.—The reading from each measurement instrument shall be recorded.

43.5.6.2 ii.—The volume exhausted and the average total organic compounds concentration upstream and downstream of the control device 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.

43.5.7 7.—The mass emitted during each testing interval shall be calculated as follows:

$$M_{ei} = 10^{-6} K V_{es} C_e \quad (43-1)$$

where:

M_{ei} = Mass of total organic compounds (milligrams [mg]) emitted during testing interval i.

V_{es} = Volume of air-vapor mixture exhausted (cubic meters [m^3]), at standard conditions.

C_e = Total organic compounds concentration (measured as carbon) at the exhaust vent (ppmv).

K = Density of calibration gas (milligrams/cubic meter [mg/m^3]) at standard conditions.

= 1.83×10^6 for propane

= 2.41×10^6 for butane

s = Standard conditions, 20°C and 760 millimeters of mercury (mm Hg).

43.5.8 8.—The total organic compounds mass emission rate before and after the control device shall be calculated as follows:

$$E = \frac{\sum_{i=1}^n M_i}{T} \quad (43-2)$$

where:

E = Mass of total organic compounds emitted, kilograms per hour (kg/hr).

M_i = Mass of total organic compounds emitted during testing interval i , kg.

T = Total time of all testing intervals, hr.

n = Number of testing intervals.

43.5.9 9.—The percent reduction across the control device shall be calculated as follows:

$$R = \frac{E_b - E_a}{E_b} \times 100 \quad (43-3)$$

where:

R = Efficiency of control device, %

E_b = Mass flow of total organic compounds prior to control device, kg/hr

E_a = Mass flow of total organic compounds after control device, kg/hr

43.5.10 10.—The owner or operator may adjust the emission results to exclude the methane and ethane content in the exhaust vent by any method approved by the Department.

43.5.11 11.—When a flare is used to seek to comply with ~~paragraph (c.)(3.)(ii.)~~ 43.3.3.2 of this ~~section~~ regulation, the flare shall comply with the requirements of 40 CFR 60.18 (7/1/92).

43.5.12 12.—The test procedure for determining compliance with ~~paragraph (c.)(7.)~~ 43.3.7 of this ~~section~~ regulation is as follows:

43.5.12.1 i.—Calibrate and install a pressure measurement device that is capable of measuring up to the relief set pressure of the pressure-vacuum vents.

43.5.12.2 ii.—Connect the pressure measurement device to a pressure tap in the bulk gasoline marine tank vessel loading facility vapor collection system, located as close as possible to the connection with the marine tank vessel.

43.5.12.3 ~~iii.~~ During the performance test, record the pressure every 5 record the highest instantaneous pressure that occurs during each loading cycle.

43.6 ~~f.~~ Test methods and procedures for marine tank vessels. The following test methods shall be used to comply with the marine tank vessel vapor tightness requirements specified in ~~paragraph (c.)~~(4.) 43.3.4 of this ~~section~~ regulation:

43.6.1 ~~4.~~ Each marine tank vessel shall be pressurized with dry air or inert gas to not less than 1.0 psig and not more than the pressure of the lowest relief valve setting.

43.6.2 ~~2.~~ Once the pressure is obtained, the dry air or inert gas source shall be shut off and the pressure reading recorded.

43.6.3 ~~3.~~ At the end of 30 minutes, the pressure in the marine tank vessel and piping shall be measured and recorded. The change in pressure shall be calculated as follows:

$$\Delta P = P_i - P_f \quad (43-4)$$

where:

ΔP = Change in pressure, inches of water (in. H₂O).

P_i = Initial pressure in marine tank vessel after air/gas is shut off, in. H₂O.

P_f = Pressure in marine tank vessel at the end of the 30 minute period, in. H₂O.

43.6.4 ~~4.~~ The change in pressure, ΔP , shall be compared to the pressure calculated as follows:

$$\Delta PM = 0.861 P_{ia} \frac{L}{V} \quad (43-5)$$

where:

ΔPM = Maximum allowable pressure change, in. H₂O.

P_{ia} = Initial pressure in marine tank after air/gas is shut off, pounds per square inch absolute (psia).

L = Maximum permitted loading rate of vessel, barrels per hour.

V = Total volume of marine tank, barrels.

43.6.5 ~~5.~~ If $\Delta P \leq \Delta PM$, the marine tank vessel is vapor tight.

43.6.6 ~~6.~~ If $\Delta P > \Delta PM$, the marine tank vessel is not vapor tight and the source of the leak must be identified and repaired prior to retesting.

43.7 ~~g.~~ Recordkeeping. The owner or operator of a bulk gasoline marine tank vessel loading facility subject to ~~this section~~ 43.0 of this regulation shall keep the records specified in ~~this paragraph~~ 43.7 of this regulation in a readily accessible

location for at least ~~5~~ five years. These records shall be made available to the Department immediately upon verbal or written request.

43.7.1 ~~1.~~—An operator or owner subject to ~~this section 43.0 of this regulation~~ seeking to demonstrate compliance with ~~paragraph (c.)(3.)(i.)~~ 43.3.3.1 of this ~~section~~ regulation through using either a thermal or catalytic incinerator shall record:

43.7.1.1 ~~i.~~—The average firebox temperature of the incinerator (or the average temperature upstream and downstream of the catalyst bed), measured at least every ~~2~~ two minutes of the loading cycle if the time period of the loading cycle is less than ~~3~~ three hours or every 15 minutes if the total time period of the loading cycle is equal to or greater than ~~3~~ three hours. The measured temperature shall be averaged over the loading cycle.

43.7.1.2 ~~ii.~~—The percent reduction of total organic compounds determined as specified in ~~paragraph (e.)(8.) and (e.)(9.)~~ 43.5.8 and 43.5.9 of this ~~section~~ regulation.

43.7.1.3 ~~iii.~~—The duration of each loading cycle.

43.7.2 ~~2.~~—An operator or owner subject to ~~this section 43.0 of this regulation~~ seeking to demonstrate compliance with ~~paragraph (c.)(3.)(i.)~~ 43.3.3.1 of this ~~section~~ regulation through use of a boiler or process heater shall record:

43.7.2.1 ~~i.~~—A description of the location at which the vent stream is introduced into the boiler or process heater.

43.7.2.2 ~~ii.~~—The average combustion temperature of the boiler or process heater with a design capacity of less than 44 MW (150 million BTU/hr) measured at least every ~~2~~ two minutes of the loading cycle if the time period of the loading cycle is less than ~~3~~ three hours or every 15 minutes if the total time period of the loading cycle is equal to or greater than ~~3~~ three hours. The measured temperature shall be averaged over the loading cycle.

43.7.2.3 ~~iii.~~—The duration of each loading cycle.

43.7.3 ~~3.~~—An operator or owner subject to ~~this section 43.0 of this regulation~~ seeking to demonstrate compliance with ~~paragraph (c.)(3.)(ii.)~~ 43.3.3.2 of this ~~section~~ regulation through use of a smokeless flare or other flare design (i.e., steam-assisted, air-assisted or nonassisted) shall record:

43.7.3.1 ~~i.~~—All visible emission readings, heat content determinations, flow rate measurements, and exit velocity determinations made during the compliance test.

43.7.3.2 ~~ii.~~Continuous records of the flare pilot flame monitoring.

43.7.3.3 ~~iii.~~Records of all periods of operation during which the pilot flame is absent during the loading cycle.

43.9.3.4 ~~iv.~~The duration of each loading cycle.

43.7.3.5 ~~v.~~Any flare system that is designed to cease operation upon loss of pilot and that automatically shuts down vessel loading and isolates the vessel vent stream from the flare by closing automatic block valves shall be exempt from the requirements of ~~(ii) and (iii) above~~ 43.9.3.2 and 43.9.3.3 of this regulation.

43.7.4 ~~4.~~An operator or owner subject to ~~this section~~ 43.0 of this regulation seeking to demonstrate compliance with ~~paragraph (c.)(3.)(iii.)~~ 43.3.3.3 of this section regulation through use of a carbon adsorber where an organic monitor is not used shall record:

43.7.4.1 ~~i.~~The total steam mass flow measured at least every 15 minutes and averaged over each loading cycle or the continuous records of the vacuum during regeneration.

43.7.4.2 ~~ii.~~The duration of the carbon bed regeneration cycle.

43.7.4.3 ~~iii.~~Continuous records of the carbon bed temperature after regeneration.

43.7.4.4 ~~iv.~~The duration of each loading cycle.

43.7.5 ~~5.~~An operator or owner subject to ~~this section~~ 43.0 of this regulation seeking to demonstrate compliance with ~~paragraph (c.)(3.)(iii.)~~ 43.3.3.3 of this section regulation through use of a carbon adsorber where an organic monitor is used shall record:

43.7.5.1 ~~i.~~Continuous records of the organic compounds concentration in the exhaust gases.

43.7.5.2 ~~ii.~~The duration of each loading cycle.

43.7.6 ~~6.~~The owner or operator subject to ~~this section~~ 43.0 of this regulation shall keep up-to-date, readily accessible, continuous records of the equipment operating parameters specified to be monitored under ~~paragraph (d.)~~ 43.4 of this section regulation, as well as permanent, up-to-date, readily accessible, continuous records of periods of operation during which the parameter boundaries established during the most recent performance test are exceeded. The Department may at any time require a report of these data. Periods of operation during which parameter boundaries established during the most recent performance test are exceeded are defined as follows:

43.7.6.1 ~~i.~~ For thermal incinerators, all periods during the loading cycle during which the average combustion temperature was more than 28°C below the average loading cycle temperature during the most recent performance test at which compliance with ~~paragraph (c.)(3.)(i.)~~ 43.3.3.1 of this ~~section~~ regulation was determined.

43.7.6.2 ~~ii.~~ For catalytic incinerators, all periods during the loading cycle during which the average temperature of the vent stream immediately before the catalyst bed is more than 28°C below the average temperature of the vent stream during the most recent performance test at which compliance with ~~paragraph (c.)(3.)(i.)~~ 43.3.3.1 of this ~~section~~ regulation was determined.

43.7.6.3 ~~iii.~~ All periods of operation during the loading cycle during which the average combustion temperature was more than 28°C below the average loading cycle temperature during the most recent performance test at which compliance with ~~paragraph (c.)(3.)(i.)~~ 43.3.3.1 of this ~~section~~ regulation was determined for boilers or process heaters with a designed heat input capacity of less than 44 MW (150 million BTU/hr).

43.7.6.4 ~~iv.~~ 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 (c.)(3.)(i.)~~ 43.3.3.1 of this ~~section~~ regulation.

43.7.6.5 ~~v.~~ For carbon adsorbers where an organic monitor is used, all ~~3~~ three-hour periods during the loading cycle during which the average organic compounds concentration or readings of organics in the exhaust gases is more than 20% ~~percent~~ greater than the average organic compounds concentration or reading measured by the organic monitoring device during the most recent performance test at which compliance with ~~paragraph (c.)(3.)(iii.)~~ 43.3.3.3 of this ~~section~~ regulation was determined.

43.7.6.6 ~~vi.~~ For carbon adsorbers where an organic monitor is not used:

43.7.6.6.1 ~~A.~~ All carbon bed regeneration cycles during which the total mass steam flow was below 10% ~~percent~~ of the total mass steam flow during the most recent compliance test that demonstrated that the facility was in compliance.

43.7.6.6.2 ~~B.~~ All carbon bed regeneration cycles during which the temperature of the carbon bed after regeneration (and after completion of any cooling cycle(s) or cycles) was greater than 10% ~~percent~~ of the carbon bed temperature (in degrees Celsius) during the most recent compliance test that demonstrated that the facility was in compliance.

43.7.7 7.—Each owner or operator subject to the provisions of ~~this section~~ 43.0 of this regulation using a boiler or process heater with a design heat input capacity of 44 MW (150 million BTU/hr) or greater to comply with ~~paragraph (c.)(3.)(i.)~~ 43.3.3.1 of this ~~section~~ regulation shall keep up-to-date, readily accessible records of all periods of operation of the boiler or process heater.

43.7.8 8.—Each owner or operator subject to the provisions of ~~this section~~ 43.0 of this regulation shall keep up-to-date, readily accessible, continuous records of the flare pilot flame monitoring data specified in ~~paragraph (d.)(2.)~~ 43.4.2 of this ~~section~~ regulation as well as up-to-date, readily accessible, records of all periods of operation in which the pilot flame is absent except as exempted under ~~paragraph (g.)(3.)(v.)~~ 43.7.3.5 of this regulation.

43.7.9 9.—Each owner or operator subject to the provisions of ~~this section~~ 43.0 of this regulation that uses a vent system with valves that could divert the vent stream from the control device shall keep readily accessible records of:

43.7.9.1 i.—All periods when flow is indicated if flow monitors are installed under ~~paragraph (d.)(6.)(i.)~~ 43.4.6.1 of this ~~section~~ regulation.

43.7.9.2 ii.—All times when maintenance is performed on car-sealed valves, when the car seal is broken, and when the valve position is changed (i.e., from open to closed for valves leading to the control device and closed to open for valves that vent the stream directly or indirectly to the atmosphere bypassing the control device) if valves are monitored under ~~paragraph (d.)(6.)(ii.)~~ 43.4.6.2 of this ~~section~~ regulation.

43.7.10 10.—The owner or operator of a bulk gasoline marine tank loading facility subject to ~~this section~~ 43.0 of this regulation shall keep up-to-date documentation of each marine tank vessel's vapor tightness test results by ~~paragraph (e.)(4.)(i.)~~ 43.3.4.1 of this ~~section~~ regulation to include as a minimum the following:

43.7.10.1 i.—Marine tank vessel owner(s) or owners, name(s) or names and address.

43.7.10.2 ii.—Marine tank vessel identification number.

43.7.10.3 iii.—Date and location of test.

43.7.10.4 iv.—Test results.

43.8 h.—Reporting requirements. The owner or operator of a bulk gasoline marine tank loading facility subject to ~~this section~~ 43.0 of this regulation shall:

43.8.1 1. ~~Comply with the initial compliance certification requirements of Section 5(a.) of Regulation No. 24~~ 5.1 of this regulation.

43.8.2 2. ~~Comply with the requirements of Section 5(b.) of Regulation No. 24~~ 5.2 of this regulation regarding excess emissions related to the control devices required to comply with ~~this section~~ 43.0 of this regulation, as well as any other State of Delaware exceedance reporting requirements.

Section 44—

44.0 Batch Processing Operations.

11/29/1994

44.1 a. Applicability.

44.1.1 1. ~~This Section applies~~ The provisions of 44.0 of this regulation apply to process vents associated with batch processing operations in the following affected manufacturing facilities with the corresponding primary Standard Industrial Classification ("SIC") Codes:

44.1.1.1 i. ~~Plastic Materials & Resins~~ (Standard Industrial Classification [SIC] 2821).

44.1.1.2 ii. ~~Medical Chemicals & Botanical Products~~ (SIC 2833).

44.1.1.3 iii. ~~Gum & Wood Chemicals~~ (SIC 2861).

44.1.1.4 iv. ~~Cyclic Crudes & Intermediates~~ (SIC 2865).

44.1.1.5 v. ~~Industrial Organic Chemicals~~ (SIC 2869).

44.1.1.6 vi. ~~Agricultural Chemicals~~ (SIC 2879).

44.1.2 2. ~~The requirements of this Section 44.0 of this regulation do not apply to pharmaceutical industry operations covered under Section 35 of Regulation 24 35.0 of this regulation.~~

44.1.3 3. ~~Except for the recordkeeping and reporting requirements listed in paragraphs (f) and (g) 44.6 and 44.7 of this Section regulation, the requirements of this Section 44.0 of this regulation do not apply to the following operations:~~

44.1.3.1 i. ~~Combined process vents from each batch process train with an annual mass emission total of 4,540 kilograms (kg) (10,000 pounds [lb]) of volatile organic compounds (VOCs) or less; or~~

44.1.3.2 ii. ~~Single unit operations which have annual mass emissions of 227 kg (500 lb) VOCs or less.~~

44.1.4 4. ~~Existing sources affected by this Section 44.0 of this regulation shall comply with the provisions of this Section 44.0 of this regulation as soon as practicable, but no later than April 1, 1996. New, modified, or reconstructed sources affected by this Section 44.0 of this regulation shall comply with the provisions of this Section 44.0 of this regulation upon start up.~~

44.1.5 5. ~~Any facility that becomes or is currently subject to the provisions of this Section 44.0 of this regulation by exceeding the~~

applicability threshold in ~~paragraph (a)(3)~~ 44.1.3 of this ~~Section~~ regulation shall remain subject to these provisions even if its emissions later fall below the applicability threshold.

44.1.6 ~~6~~—Any facility that is currently subject to a state or federal rule promulgated pursuant to the Clean Air Act Amendments of 1977 by exceeding an applicability threshold is and shall remain subject to these provisions, even if its throughput or emissions later fall below the applicability threshold.

44.2 ~~b~~—Definitions. As used in ~~this Section~~ 44.0 of this regulation, all terms not defined herein shall have the meaning given them in the November 15, 1990 Clean Air Act Amendments (CAAA), or in ~~Section 2 of Regulation 24~~ 2.0 of this regulation.

“**Aggregated**” means the summation of all process vents within a process that contain VOCs.

“**Annual mass emissions total**” means the sum of all non-fugitive VOC emissions, evaluated before control, from a vent. Annual mass emissions may be calculated from an individual process vent or from groups of process vents by using the emission estimation equations contained in **Appendix K** of ~~Regulation 24~~ this regulation and then multiplying this result by the expected duration and frequency of the emission or groups of emissions over the course of a year.

“**Average flow rate**” means the flow rate averaged over the amount of time that VOCs are emitted during emission events. For the evaluation of average flow rate from an aggregate of sources, the average flow rate is the weighted average of the average flow rates of the emission events and their annual venting time:

Weighted Average Flow Rate =

$$\frac{\sum (\text{average flowrate per emission event } i)(\text{annual duration of emission event } i)}{\sum (\text{annual duration of emission event } i)} \quad (44-1)$$

“**Batch cycle**” means a manufacturing event of an intermediate or product from start to finish in a batch process.

“**Batch process**” means a discontinuous process that involves the bulk movement of material through sequential manufacturing steps. Mass, temperature, concentration, and other properties of the material may vary with time and location in the process. Batch processes are typically characterized as "non-steady-state."

“**Batch process train**” means an equipment train that is used to produce a product or intermediate. A typical equipment train consists of equipment used for the synthesis, mixing, and purification of a material.

“Control device” means an air pollution abatement device, not a device such as a condenser that operates under reflux conditions, which is required for processing.

“Emissions before control” means the VOC emissions total prior to the application of a control device, or if no control device is used, the VOC emissions total. No credit for discharge of VOCs into wastewater shall be considered when the wastewater is further handled or processed with the potential for VOCs to be emitted to the atmosphere.

“Emission event” means a discrete venting episode that may be associated with a single unit of operation. For example, a displacement of vapor resulting from the charging of a vessel with VOCs will result in a discrete emission event that will last through the duration of the charge and will have an average flow rate equal to the rate of the charge. If the vessel is then heated, there will also be another discrete emission event resulting from the expulsion of vapor from the expansion caused by heating. Both emission events may occur in the same vessel or unit operation.

“Process” means, for the purpose of determining RACT applicability, any equipment within a contiguous area that is connected during the course of a year. "Connected" means a link between equipment, whether it is physical, such as a pipe, or whether it consists of a series of steps from which material is transferred from one unit operation to another unit operation.

“Process vent” means a point of emission from a piece of equipment within which a unit operation takes place. Typical process vents from batch processes include condenser vents, vacuum pumps, steam ejectors, and atmospheric vents from reactors and other process vessels. Relief valve discharges and equipment exhaust systems that discharge from unit operations would also be considered process vents.

“Semi-continuous operation” means an operation that is conducted in a steady-state mode but only for finite durations during the course of a year. For example, a steady-state distillation operation that functions for one month would be considered a semi-continuous operation.

“Single unit operation” means a discrete piece of equipment used in a processing step to prepare reactants, facilitate reactions, separate and purify products, or recycle materials.

“Volatility” means a physical property of materials which exhibits the following characteristics: low-volatility materials have a vapor pressure of less than or equal to 75 millimeters (mm) mercury (Hg) (3.0 inches [in] Hg) at 20 degrees Celsius (°C) (68 degrees Fahrenheit [°F]); moderate-volatility materials have a vapor pressure of greater than 75 mm Hg (3.0 in Hg) and less than or equal to 150 mm Hg (6.0 in Hg) at 20°C (68°F); and high-volatility materials have a vapor pressure of greater than 150 mm Hg (6.0 in Hg) at 20°C (68°F). To evaluate VOC volatility for single unit operations that service numerous VOCs or for processes handling multiple VOCs, the weighted average volatility can be calculated using the total amount of

each VOC used in a year, and the individual component vapor pressure, as shown in the following equation:

Weighted Average Volatility =

$$\frac{\sum \left[(\text{vapor pressure of VOC component } i) \frac{(\text{mass of VOC component } i)}{(\text{molecular weight of VOC component } i)} \right]}{\sum \frac{(\text{mass of VOC component } i)}{(\text{molecular weight of VOC component } i)}} \quad (44-2)$$

44.3 ~~e~~—Standards. Individual vents with an actual average flow rate less than the flow rate calculated using the RACT applicability equations (FR) provided in ~~paragraph (c)(3)~~ 44.3.3 of this ~~Section~~ regulation, as a function of uncontrolled annual VOC emissions (AE), shall reduce VOC emissions by 90% ~~percent~~. Vents in aggregate within a batch process having an actual weighted-average flow rate less than FR calculated using the RACT applicability equations in ~~paragraph (c)(3)~~ 44.3.3 of this ~~section~~ regulation, as a function of AE, shall reduce process VOC emissions by 90% ~~percent~~.

44.3.1 ~~1~~—Determination of Uncontrolled Annual VOC Emissions (AE). Determination of the uncontrolled annual VOC emissions (AE) may be achieved by developing engineering estimates of the uncontrolled emissions on a batch basis from a process vent, or from a group of process vents within a batch process train, and multiplying these estimates by the potential number of batch cycles per year. Engineering estimates shall follow the guidance provided in **Appendix K** of ~~Regulation 24~~ this regulation. Alternatively, if an emissions measurement is to be used to measure vent emissions, the measurement must conform with the requirements for measuring the inlet VOC mass flow rate, as described in ~~paragraphs (d)(2)(ii) and (d)(2)(iii)(A,B)~~ 44.4.2.2, 44.4.2.3.1 and 44.4.2.3.2 of this ~~Section~~ regulation.

44.3.2 ~~2~~—Determination of Average Flow Rate. To obtain a value for the actual average flow rate of individual vents or the actual weighted-average flow rate of aggregated vents in a batch process, an owner or operator may measure the flow rates or may estimate the flow rates using the estimation guidelines provided in **Appendix K** of ~~Regulation 24~~ this regulation. If measurements are used to estimate the flow rates, the measurements must conform with the requirements for measuring the incoming volumetric flow rates, as described in ~~paragraph (d)(2)(ii)~~ 44.4.2.2 of this ~~Section~~ regulation. If flow rates are estimated using manifold design parameters, the owner or operator shall demonstrate that equipment design accurately reflects actual operating conditions.

44.3.3 ~~3~~—RACT Applicability Equations. RACT applicability equations are specific to VOC volatility and are presented below:

$$FR = [0.07 \times (AE)] - 1,821$$

$$FR = [0.031 \times (AE)] - 494 \quad (44-3)$$

$$FR = [0.013 \times (AE)] - 301$$

where:

FR = Calculated Flow Rate (standard cubic feet per minute [scfm])

AE = Uncontrolled Annual VOC Emissions (pounds per year [lb/yr])

An owner or operator shall compare the calculated flow rate (FR) with the actual average flow rate or the actual weighted-average flow rate determined using the procedures described in ~~paragraph (c)(2)~~ 44.3.2 of this ~~Section~~ regulation, and if FR exceeds the actual average flow rate, the owner or operator shall reduce VOC emissions by 90% ~~percent~~.

44.4 ~~d.~~ Performance Testing.

44.4.1 ~~1.~~ For the purpose of demonstrating compliance with the control requirements of ~~this Section~~ 44.0 of this regulation, unit operations shall be performed at full operating conditions and flow rates during any performance test.

44.4.2 ~~2.~~ The following methods in 40 Code of Federal Regulations (CFR) Part 60, Appendix A (July 1, 1992), shall be used to demonstrate that the process vent or vents comply with the control efficiency requirement listed in ~~paragraph (c)~~ 44.3 of this ~~Section~~ regulation.

44.4.2.1 ~~i.~~ Method 1 or 1A, as appropriate, for the selection of the sampling sites if the flow measuring device is a rotameter. No traverse is necessary when the flow measuring device is an ultrasonic probe. The control device inlet sampling sites for the determination of vent stream VOC composition reduction efficiency shall be located before and after the control device.

44.4.2.2 ~~ii.~~ Method 2, 2A, 2C, or 2D, as appropriate, for the determination of the gas stream volumetric flow rate; flow measurements shall be made continuously.

44.4.2.3 ~~iii.~~ Method 25A or Method 18, if applicable, for the determination of VOC concentration in the control device inlet and outlet.

44.4.2.3.1 ~~A.~~ The sampling time for each run shall be the entire length of the batch cycle in which readings will be taken continuously, if Method 25A is used, or as often as is possible using Method 18, with a maximum of 4 one-minute intervals between measurements throughout the batch cycle.

44.4.2.3.2 ~~B.~~ The VOC emission rate of the process vent at the inlet to the control device shall be determined by combining continuous concentration and flow rate measurements at simultaneous points throughout the batch cycle.

44.4.2.3.3 ~~C.~~ The VOC emission rate of the process vent at the outlet of the control device shall be obtained by combining continuous concentration and flow rate measurements at simultaneous points throughout the batch cycle.

44.4.2.3.4 ~~D.~~ The efficiency of the control device shall be determined by integrating the mass rates obtained using the procedures specified in ~~paragraphs (d)(2)(iii)(B) and (d)(2)(iii)(C)~~ 44.4.2.3.2 and 44.4.2.3.3 of this Section regulation, over the time of the batch cycle, and dividing the difference in the inlet and outlet mass flow totals by the inlet mass flow total.

44.5 ~~e.~~ Monitoring Requirements.

44.5.1 ~~1.~~ An owner or operator of an affected facility that uses an incinerator to seek compliance with the VOC control requirement specified under ~~paragraph (e)~~ 44.3 of this Section regulation shall install, calibrate, maintain, and operate, according to the manufacturer's specifications, a temperature monitoring device that is equipped with a continuous recorder and that has an accuracy of $\pm 0.5^{\circ}\text{C}$.

44.5.1.1 ~~i.~~ Where an incinerator other than a catalytic incinerator is used, a temperature monitoring device shall be installed in the firebox.

44.5.1.2 ~~ii.~~ Where a catalytic incinerator is used, temperature monitoring devices shall be installed in the gas stream immediately before and after the catalyst bed.

44.5.2 ~~2.~~ An owner or operator of an affected facility that uses a flare to seek compliance with the VOC control requirement specified under ~~paragraph (e)~~ 44.3 of this Section regulation shall install, calibrate, maintain, and operate, according to the manufacturer's specifications, a heat sensing device, such as an ultraviolet sensor or thermocouple, at the pilot light to indicate the continuous presence of a flame.

44.5.3 ~~3.~~ An owner or operator of an affected facility that uses an absorber to seek compliance with the VOC control requirement specified under ~~paragraph (e)~~ 44.3 of this Section regulation shall install, calibrate, maintain, and operate, according to the manufacturer's specifications, at least one of the following devices:

44.5.3.1 i.—A scrubbing liquid temperature monitoring device that has an accuracy of $\pm 1\%$ percent of the temperature being monitored, expressed in °C, or ± 0.02 specific gravity units, and that is equipped with a continuous recorder; or

44.5.3.2 ii.—An organic monitoring device that indicates the concentration level of organic compounds exiting the recovery device based on a detection principle such as infrared photoionization or thermal conductivity, and that is equipped with a continuous recorder.

44.5.4 4.—An owner or operator of an affected facility that uses a condenser or refrigeration system to seek compliance with the VOC control requirement specified under ~~paragraph (e)~~ 44.3 of this ~~Section~~ regulation shall install, calibrate, maintain, and operate, according to the manufacturer's specifications, at least one of the following devices:

44.5.4.1 i.—A temperature monitoring device located at the condenser's vapor exit side that is equipped with a continuous recorder and that has an accuracy of $\pm 1\%$ percent of the temperature being monitored, expressed in °C or $\pm 0.5^\circ\text{C}$, whichever is greater; or

44.5.4.2 ii.—An organic monitoring device that indicates the concentration level of organic compounds exiting the recovery device based on a detection principle such as infrared photoionization or thermal conductivity, and that is equipped with a continuous recorder.

44.5.5 5.—An owner or operator of an affected facility that uses a carbon adsorber to seek compliance with the VOC control requirements specified under ~~paragraph (e)~~ 44.3 of this ~~Section~~ regulation shall install, calibrate, maintain, and operate, according to the manufacturer's specifications, at least one of the following devices:

44.5.5.1 i.—An integrating stream flow monitoring device that has an accuracy of $\pm 10\%$ percent, and a carbon bed temperature monitoring device that has an accuracy of $\pm 1\%$ percent of the temperature being monitored, expressed in °C or $\pm 0.5^\circ\text{C}$, whichever is greater, both equipped with a continuous recorder; or

44.5.5.2 ii.—An organic monitoring device that indicates the concentration level of organic compounds exiting the recovery device based on a detection principle such as infrared photoionization or thermal conductivity, and that is equipped with a continuous recorder.

44.6 f.—Recordkeeping Requirements.

44.6.1 1.—Each facility with a batch processing operation subject to ~~this Section~~ 44.0 of this regulation shall keep records for a minimum of five years of the following emission stream parameters for each process vent contained in the batch process:

44.6.1.1 i.—The annual mass emission total, and documentation verifying these values. If emission estimation equations are used, the documentation shall be the calculations coupled with the number of emission events per year. If the annual mass emission total is obtained from measurement in accordance with the performance testing specifications under ~~paragraph (d)~~ 44.4 of this ~~Section~~ regulation, VOC emission results may be submitted.

44.6.1.2 ii.—The average flow rate in scfm and documentation verifying these values.

44.6.2 2.—Each facility with a batch processing operation subject to ~~this Section~~ 44.0 of this regulation shall keep records of the following parameters, which are required to be measured during the performance test described under ~~paragraph (d)~~ 44.4 of this ~~Section~~ regulation, and are required to be monitored under ~~paragraph (e)~~ 44.5 of this ~~Section~~ regulation:

44.6.2.1 i.—Where an owner or operator subject to the provisions of ~~this Section~~ 44.0 of this regulation seeks to demonstrate compliance with ~~paragraph (c)~~ 44.3 of this ~~Section~~ regulation through the use of either a thermal or catalytic incinerator, records must be maintained on the average firebox temperature of the incinerator (or the average temperature upstream and downstream of the catalyst bed for a catalytic incinerator), measured continuously and averaged over the same time period of the performance testing.

44.6.2.2 ii.—Where an owner or operator subject to the provisions of ~~this Section~~ 44.0 of this regulation seeks to demonstrate compliance with ~~paragraph (c)~~ 44.3 of this ~~Section~~ regulation through the use of a smokeless flare, flare design (i.e., steam-assisted, air-assisted, or non-assisted), records must be maintained on all visible emission readings, heat-content determinations, flow rate measurements, and exit velocity determinations made during the performance test; on the continuous flare pilot flame monitoring; and on all periods of operations during which the pilot flame is absent.

44.6.2.3 iii.—Where an owner or operator subject to the provisions of ~~this Section~~ 44.0 of this regulation seeks to demonstrate compliance with ~~paragraph (c)~~ 44.3 of this ~~Section~~ regulation, the following records must be maintained:

44.6.2.3.1 A.—Where an absorber is the final control device, the exit specific gravity (or an alternative parameter that is a measure of the degree of absorbing liquid saturation, if approved by the Department), and the average exit temperature of the absorbing liquid, measured continuously and averaged over the same time period of the performance testing (both measured while the vent stream is routed normally).

44.6.2.3.2 B.—Where a condenser is the control device, the average exit (product side) temperature, measured continuously and averaged over the same time period of the performance testing while the vent stream is routed normally.

44.6.2.3.3 C.—Where a carbon adsorber is the control device, the total steam mass flow, measured continuously and averaged over the same time period of the performance testing (full carbon bed cycle); the temperature of the carbon bed after regeneration (and within 15 minutes of the completion of any cooling cycle(s) or cycles; and the duration of the carbon bed steaming cycle (all measured while the vent stream is routed normally).

44.6.2.3.4 D.—As an alternative to paragraphs (f)(2)(iii)(A), (f)(2)(iii)(B), and (f)(2)(iii)(C) 44.6.2.3.1, 44.6.2.3.2, and 44.6.2.3.3 of this ~~Section~~ regulation, the concentration level or reading indicated by the organic monitoring device at the outlet of the absorber, condenser, or carbon absorber, measured continuously and averaged over the same time period of the performance testing while the vent stream is routed normally.

44.7 g.—Reporting. An owner or operator of any facility containing sources subject to ~~this Section 44.0 of this regulation~~ shall comply with the reporting requirements provided in ~~Section 5 of Regulation 24~~ 5.0 of this regulation.

44.8 h.—Certification. An owner or operator of any facility containing sources subject to ~~this Section 44.0 of this regulation~~ shall submit to the Department an annual compliance certification based on a calendar year. The owner or operator of any new facility containing sources that become subject to ~~this Section 44.0 of this regulation~~, shall submit an initial compliance certification immediately upon startup of the facility, and every year thereafter, an annual certification.

44.8.1 1.—The annual compliance certification shall provide, at a minimum, the following information:

44.8.1.1 i.—The name and location of the facility.

44.8.1.2 ~~ii.~~—The address and telephone number of the person responsible for the facility.

44.8.1.3 ~~iii.~~—The identification of each batch process train ~~and/or~~ single unit operations.

44.8.2 ~~2.~~—For each batch process train and single unit operation, the annual compliance certification shall also provide, at a minimum, the following information:

44.8.2.1 ~~i.~~—The applicable emission limit, equipment specification, or work practice.

44.8.2.2 ~~ii.~~—The method of compliance.

44.8.2.3 ~~iii.~~—For each batch process train and single unit operation, the annual emissions total.

44.8.2.4 ~~iv.~~—The control system(~~s~~) or systems in use.

44.8.2.5 ~~v.~~—The design performance efficiency of the control system.

44.8.2.6 ~~vi.~~—A certification that each subject source at the facility is in compliance with the standard, equipment specification, or work practice.

44.8.2.7 ~~vii.~~—The time at which the facility's "day" begins if a time other than midnight local time is used to define a "day".

Section 45—

45.0 Industrial Cleaning Solvents.

11/29/1994

45.1 a. Applicability.

45.1.1 1. ~~This Section applies~~ The provisions of 45.0 of this regulation apply to all sources that use organic solvents for the purpose of cleaning. ~~Paragraphs (c), (d), and (e)~~ The provisions of 45.3, 45.4, and 45.5 of this Section regulation do not apply to the following sources:

45.1.1.1 i. ~~Any source that is covered under Section 33 33.0, Solvent Metal Cleaning, of Regulation 24~~ this regulation.

45.1.1.2 ii. Any non-manufacturing area cleaning operation.

45.1.1.3 iii. Any non-routine maintenance of manufacturing facilities and equipment.

45.1.1.4 iv. Any source that uses less than 4,540 kilograms (5 tons) of cleaning solvent per year.

45.1.2 2. Any facility that becomes or is currently subject to the provisions of ~~this Section 45.0 of this regulation~~ by exceeding the applicability threshold in ~~paragraph (a)(1)(iv)~~ 45.1.1.4 of this ~~Section regulation~~ shall remain subject to these provisions even if its emissions later fall below the applicability threshold.

45.1.3 3. Any facility that is currently subject to a state or federal rule promulgated pursuant to the Clean Air Act Amendments of 1977 by exceeding an applicability threshold is and shall remain subject to these provisions, even if its throughput or emissions later fall below the applicability threshold.

45.1.4 4. Existing sources shall comply with this regulation upon promulgation. New, reconstructed, or modified sources shall comply with the requirements of this regulation beginning fifteen months after startup and shall follow the time schedule for the solvent usage study, screening tests, and trial evaluations as specified in ~~this section 45.0 of this regulation~~.

45.2 b. Definitions. As used in ~~this Section 45.0 of this regulation~~, all terms not defined herein shall have the meaning given them in the November 15, 1990 Clean Air Act Amendments (CAAA), or in ~~Section 2 of Regulation 24 2.0 this regulation~~.

“Cleaning activity” means the physical removal of foreign material from substrate that is being cleaned.

“Cleaning of external surface” means the act of applying a solvent to an external surface for cleaning. The cleaning activities may include, but are not limited to, wiping and spraying. Unit operation systems in this category include, but are not limited to, floor cleaning, equipment cleaning, large manufactured component cleaning, small manufactured component cleaning, and spray-booth cleaning.

“Cleaning of internal surface” means the act of applying a solvent to an interior surface for cleaning. The cleaning activities may include, but are not limited to, flushing, purging, and spraying. Unit operation systems in this category include, but are not limited to, line cleaning, tank cleaning, spray-gun cleaning, and spray-booth cleaning.

“Dipping” means immersing an item in a container of solvent to remove contaminants or residue.

“Equipment, facility, and procedural change” means the use of alternative cleaning techniques and procedures, such as the use of high-pressure water equipment to reduce solvent stripping, floor scrubbers, removable or replaceable equipment covers, improved containment of volatile organic compounds (VOCs) from materials in storage/transfer/use, improved reclaim/reuse/recycle procedures, etc.

“Flushing” means pumping a solvent from a reservoir through a pipe or hose or through equipment (e.g., pipes, hoses, tanks) to remove contaminants or residue.

“Material change” means the use of caustic cleaners, cleaners with a low VOC content and/or low vapor pressure, peelable-type equipment/structure coatings, etc.

“Non-manufacturing area cleaning” means the cleaning of cafeterias, laboratories, pilot facilities, restrooms, office buildings, etc.

“Parts cleaning” means the spraying or wiping of solvent on a part or the dipping of a part in solvent for cleaning. Unit operation systems in this category include, but are not limited to, small manufactured component cleaning, tool cleaning, and maintenance equipment cleaning.

“Purging” means the cleaning of the interior of a spray gun and other attached equipment (e.g., hoses, paint cups) cleaned simultaneously with the spray gun.

“Spraying” means the application of a cleaning solvent to a surface through a nozzle.

“Unit operation system (UOS)” means the ensemble of equipment around which a material balance is performed. A UOS includes all possible points/sources that could result in losses to the atmosphere as a result of its being cleaned, including losses during dispensing of solvent, losses from residual solvent on or in

cleaning tools (such as rags), losses from solvent storage, etc. An item of equipment used for cleaning parts by definition is a unit operation; therefore, carry-out losses during removal of cleaned parts shall be considered in a material balance. A UOS may include more than one cleaning activity that, by itself, could be classified as a UOS.

45.3 ~~e~~-Standards.

45.3.1 ~~4~~-Solvent Usage Study. An owner or operator of a source that uses organic solvents for the purpose of cleaning shall conduct a Solvent Usage Study in accordance with the following procedures:

45.3.1.1 ~~i~~-Each type of cleaning operation involving the use of an organic solvent shall be categorized as one or more of the following operations:

45.3.1.1.1 ~~A~~-Cleaning of internal surfaces.

45.3.1.1.2 ~~B~~-Cleaning of external surfaces.

45.3.1.1.3 ~~C~~-Parts cleaning.

45.3.1.2 ~~ii~~-Each type of cleaning operation involving the use of an organic solvent shall be defined as a UOS that has a theoretical system boundary such that all solvent inputs, outputs, and evaporative losses may be calculated using a simple mass balance equation. The owner or operator shall submit the following information for each UOS as part of the Solvent Usage Study:

45.3.1.2.1 ~~A~~-Engineering drawings or sketches of all UOSs. The drawings or sketches shall indicate a system boundary, solvent input(~~s~~) or inputs, solvent output(~~s~~) or outputs, and solvent evaporative loss points.

45.3.1.2.2 ~~B~~-One mass balance equation, or equivalent, per UOS. Each equation shall have variables sufficient for calculating total VOC emissions from the UOS.

45.3.1.2.3 ~~C~~-A quantification of total VOC emissions from each UOS.

45.3.1.2.4 ~~D~~-Any relevant assumptions or approximations made in defining each UOS.

45.3.1.3 ~~iii~~-The Solvent Usage Study shall be completed and submitted to the Department within three months of the promulgation of ~~this Section~~ 45.0 of this regulation.

45.3.2 ~~2~~-Screening Tests. An owner or operator of a source that uses organic solvents for the purpose of cleaning shall conduct Screening

Tests to evaluate the performance of alternative (aqueous or lower VOC) cleaning solutions in accordance with the following procedures:

45.3.2.1 ~~i.~~—Screening Tests shall evaluate alternative cleaning solutions as possible substitutes for the current solvents used in the three cleaning operations, or UOSs, identified as the largest sources (or the number identified, if less than three) of uncontrolled VOC emissions by the Solvent Usage Study described in ~~paragraph (c)(1)~~ 45.3.1 of this Section regulation.

45.3.2.2 ~~ii.~~—Screening Tests shall be performed using one, or a combination of, the test methods presented in ~~paragraph (d)~~ 45.4 of this Section regulation. A Screening Test Plan shall be submitted to the Department for review within six months of the promulgation of ~~this Section~~ 45.0 of this regulation. The Department will accept, modify, or reject the Screening Test Plan within 90 days of receiving the plan. The Department may refuse to accept any testing for which it has not had an opportunity to review the test protocol or to observe the test.

45.3.2.3 ~~iii.~~—Once an owner or operator has a Screening Test Plan that has been accepted by the Department, Screening Tests shall be conducted. The results of such Screening Tests shall be submitted to the Department for review within twelve months of the promulgation of ~~this Section~~ 45.0 of this regulation. The Department will accept or reject the Screening Tests results within 90 days of receiving the results. The Department may accept the results of tests conducted after January 1, 1990, but started prior to the adoption of ~~this Section~~ 45.0 of this regulation, if review of the test methods and results show that a test protocol consistent with ~~paragraph (d)~~ 45.4 of this Section regulation was used.

45.3.2.4 ~~iv.~~—The Screening Tests results submitted to the Department shall include, at a minimum, the following information for each alternative cleaning solution examined:

45.3.2.4.1 ~~A.~~—The VOC content.

45.3.2.4.2 ~~B.~~—The results of the Screening Tests conducted using any of the methods presented in ~~paragraph (d)~~ 45.4 of this Section regulation and accepted by the Department in an approved Screening Test Plan.

45.3.2.4.3 ~~C.~~—The results of any other relevant evaluations performed.

45.3.2.5 ~~v.~~—Identical or similar UOSs may be compared, for the purpose of screening tests and trial evaluations, by establishing with the Department such similarity and receiving Department approval, and as such shall not require separate screening tests

and trial evaluations. The Department may consider the similarity of UOSs that are maintained by the owner or operator in a comparable facility or simulated pilot operation in another state.

45.3.3 ~~3~~—Trial Evaluations. An owner or operator of a source that uses organic solvents for the purpose of cleaning shall conduct Trial Evaluations for the alternative solvents which show the greatest degree of emission reductions, considering technical and economical feasibility, based on the Screening Tests results accepted by the Department. The Trial Evaluations shall be conducted in accordance with the following procedures:

45.3.3.1 ~~i~~—Trial data shall compare cleaning solvent usage both before and during the Trial Evaluations.

45.3.3.2 ~~ii~~—Each test trial shall evaluate potential material and equipment, facility, and procedural changes for reducing VOC emissions from cleaning solvent usage.

45.3.3.3 ~~iii~~—Following the Trial Evaluations, an owner or operator of the source shall prepare a Summary Report on the results of the Trial Evaluations. The Summary Report shall include the following information:

45.3.3.3.1 ~~A~~—A brief description of the steps taken under ~~paragraphs (c)(1) through (3)~~ 45.3.1 through 45.3.3 of this ~~Section~~ regulation to identify cleaning solvent usage and to evaluate material and equipment, facility, and procedural changes to reduce VOC emissions.

45.3.3.3.2 ~~B~~—The results of the Trial Evaluations. The Department may accept the results of any Trial Evaluations conducted after January 1, 1990, but started prior to the adoption to ~~this Section~~ 45.0 of this regulation, if review of the test methods and results show that a test protocol consistent with ~~paragraph (d)~~ 45.4 of this ~~Section~~ regulation was used.

45.3.3.3.3 ~~C~~—A Cleaning Solvent Proposal for the adoption of those material and equipment, facility, and procedural changes demonstrated to be feasible and reasonable in reducing VOC emissions. The Summary Report shall include a proposed schedule for implementing the Cleaning Solvent Proposal as soon as practicable, but no later than November 1, 1996.

45.3.3.4 ~~iv~~—Trial Evaluations shall be completed, and the Summary Report and the Cleaning Solvent Proposal shall be submitted to the Department for review, within twenty months of the promulgation of ~~this Section~~ 45.0 of this regulation, unless an

owner or operator demonstrates to the Department that such timing is unreasonable.

45.3.3.5 ~~v.~~—Identical or similar UOSs may be compared, for the purpose of screening tests and trial evaluations, by establishing with the Department such similarity and receiving Department approval, and as such shall not require separate screening tests and trial evaluations. The Department may consider the similarity of UOSs that are maintained by the owner or operator in a comparable facility or simulated pilot operation in another state.

45.3.3.6 ~~vi.~~—After receipt of the Summary Report and the Cleaning Solvent Proposal, the Department shall approve the report as soon as practicable, or shall notify the owner or operator of any concerns to be addressed.

45.3.3.7 ~~vii.~~—After final Department approval of the Summary Report, the changes will be incorporated into the permit conditions. The owner or operator shall implement the Cleaning Solvent Proposal and the approved schedule. Implementation shall be completed no later than November 1, 1996, unless the owner or operator demonstrates to the Department that such timing is unreasonable.

45.3.3.8 ~~viii.~~—An owner or operator may implement changes to its cleaning solvent proposal that have been approved and implemented under ~~(c)(3)(vi) and (c)(3)(vii)~~ 45.3.3.6 and 45.3.3.7 of this ~~Section~~ regulation, if the change results in no increase in emissions. In such case, no notification to the Department shall be required. The change, however, shall still be subject to any preconstruction permitting and operating permit approvals that may apply.

45.4 ~~d.~~—Test Methods. Compliance with ~~paragraph (c)(2)(iv)~~ 45.3.2.4 of this ~~Section~~ regulation shall be achieved by applying any of the following test methods:

45.4.1 ~~1.~~—American Society for Testing and Materials (ASTM) Method D-4828 for determining the practical washability of organic coatings.

45.4.2 ~~2.~~—Method for determining the performance of alternative cleaning fluids found in **Appendix M** of ~~Regulation 24~~ this regulation.

45.4.3 ~~3.~~—Any site-specific evaluation test, accepted by the Department, that is designed to compare cleaning solvent usage through material ~~and/or~~ procedural changes to potentially reduce VOC emissions.

45.5 ~~e.~~—Recordkeeping. An owner or operator of a source that uses organic solvents for the purpose of cleaning shall maintain the following records in a readily accessible location for at least ~~5~~ five years and shall make these records available to the Department upon verbal or written request:

45.5.1 1.—Detailed records of organic solvent usage for each UOS incorporated in a permit in accordance with the requirements listed in ~~paragraph (c)~~ 45.3 of this ~~Section~~ regulation.

45.5.2 2.—Records of organic solvent usage and monthly VOC emission calculations for each UOS incorporated in a permit.

45.6 f.—Reporting and Certification. An owner or operator of a source that uses organic solvents for the purpose of cleaning shall initially report to the Department the total quantity of solvent that it used for the calendar year prior to the promulgation date of ~~this Section~~ 45.0 of this regulation. This initial report shall be submitted to the Department within three months of the promulgation of ~~this Section~~ 45.0 of this regulation. Each year, the owner or operator shall submit subsequent reports to the Department by the promulgation date (month, day) of ~~this Section~~ 45.0 of this regulation. The initial and subsequent reports shall include the following information:

45.6.1 1.—The name and location of the facility.

45.6.2 2.—The address and telephone number of the person responsible for the facility.

45.6.3 3.—The tons of solvent used during the calendar year prior to the promulgation date of ~~this Section~~ 45.0 of this regulation and a copy of the calculations that were performed to estimate the amounts.

45.6.4 4.—A certification that the source is in compliance with ~~paragraphs (c), (d), and (e)~~ 45.3, 45.4, and 45.5 of this ~~Section~~ regulation or that these paragraphs do not apply based on the exclusions of ~~paragraph (a)(1)~~ 45.1.1 of this ~~Section~~ regulation.

46.0 Crude Oil Lightering Operations.

05/11/2007

46.1 Applicability.

46.1.1 The requirements in ~~Section~~ 46.0 of this regulation, with the exception of 46.3.7 of this regulation, apply to the owner or operator of a lightering service that carries out crude oil lightering operations in the waters of the State. The requirement in 46.3.7 of this regulation applies to the owner of the crude oil being lightered in the waters of the State.

46.1.2 While carrying out emergency lightering operations, the owner or operator of a lightering service subject to ~~Section~~ 46.0 of this regulation is subject only to the requirements of 46.8 of this regulation.

46.1.3 The owner or operator of a lightering service subject to ~~Section~~ 46.0 of this regulation may be required to obtain, revise, or amend permits issued by the Department pursuant to ~~Regulations 1102, 1125, and 1130~~ of 7 DE Admin Code 1102, 1125, and 1130, where applicable.

46.1.4 The requirements of ~~Section~~ 46.0 of this regulation are in addition to all other applicable State and Federal rules and regulations.

46.1.5 Nothing in ~~Section~~ 46.0 of this regulation shall be construed to require any act or omission that would be in violation of any rules or regulations of the United States Coast Guard or to prevent any act that is necessary to secure the safety of personnel, property, or the environment.

46.2 Definitions.

As used in ~~Section~~ 46.0 of this regulation, all terms not defined herein shall have the meaning given them in ~~Regulation 1101~~ 7 DE Admin Code 1101 or in ~~Section 2 2.0~~ of this regulation.

“Baseline volume” means the average annual volume, in barrels per year, of crude oil lightered in the waters of the State during calendar years 2004 and 2005. If an existing lightering service did not carry out lightering operations throughout 2004 and 2005, the baseline volume for that existing lightering service shall be the average annual volume of crude oil lightered in the waters of State during the 24 month period beginning with its first lightering operation after December 31, 2003.

“Controlled lightering operation” means a lightering operation in which the VOC emissions are being controlled by the use of a vapor balancing system.

“Depressurization venting” means the release of vapors to the atmosphere from the ship to be lightered, the service vessel or the vapor balancing system during controlled lightering operations.

“Emergency lightering operations” means the transfer of crude oil cargo to mitigate or prevent a cargo spill, to stabilize a vessel whose integrity has been

compromised, or to comply with the requirements of a Coast Guard Captain of the Port Order issued under the authority of the Ports and Waterways Safety Act, 33 USC 1221, as implemented by 33 CFR 160.111.

“Existing lightering service” means any lightering service that carried out a lightering operation in the waters of the State with an operating permit prior to the effective date of ~~Section~~ 46.0 of this regulation.

“Existing service vessel” means a service vessel that has been used in a lightering operation in the waters of the State prior to the effective date of ~~Section~~ 46.0 of this regulation.

“Lightering operation” means the transfer of crude oil from the cargo tank of a ship to be lightered to the cargo tank of a service vessel. Transfers of crude oil from the cargo tanks of a lightering service’s marine tank vessel to the cargo tanks of another marine tank vessel or reverse lightering is exempt from the requirements of ~~Section~~ 46.0 of this regulation.

“Lightering service” means any owner or operator that, under contract, carries out a lightering operation.

“Marine tank vessel” means any marine vessel, which is specifically constructed or converted to carry liquid bulk cargo in cargo tanks.

“New lightering service” means any lightering service that is not an existing lightering service.

“New service vessel” means a service vessel that is not an existing service vessel.

“Ozone Action Day” means a day that is predicted, based on forecasted weather conditions, to reach unhealthy ozone concentrations. Frequently called a Code Red Day, an Ozone Action Day is declared prior to 1430 hours (local time) for the following day.

“Service vessel” means the marine tank vessel receiving crude oil during a lightering operation.

“Ship to be lightered” means the marine tank vessel delivering crude oil during a lightering operation.

“Uncontrolled lightering” means the period or periods when VOC emissions are vented from the service vessel to the atmosphere during a lightering operation.

“Uncontrolled lightering operation” means a lightering operation conducted without vapor balancing.

“Vapor balancing” means the collection and transfer of vapors displaced by the incoming crude oil from the cargo tank of a service vessel into a cargo tank of the ship to be lightered.

“Vapor control system” means an arrangement of piping and equipment used to control vapor emissions collected from a marine tank vessel. For the purposes of ~~Section~~ 46.0 of this regulation, vapor control system, also, includes vapor balancing.

“Vapor leak” means a gaseous leak that is detectable by sight, sound, or smell.

“Vapor tight service vessel” means a marine tank vessel that has successfully demonstrated vapor tightness using the method in either paragraph (c)(1) or (c)(2) of 40 CFR 63.565 within the preceding twelve months.

“Waters of the State” means those waters within the boundaries of the State, including the 12 mile circle described from New Castle and extended to the low water mark on the eastern side of the Delaware River and extending below the 12 mile circle with the middle of the shipping channel through the Delaware River and Bay and extending to the Atlantic Ocean and including those waters of the territorial sea which are in direct contact with the coast of Delaware, extending from the line of ordinary low water seaward for a distance of ~~3~~ three geographical miles. This definition shall include any waters beyond the ~~3~~ three-mile mark as authorized by Federal Law.

46.3 Standards.

46.3.1 When carrying out a lightering operation, the owner or operator of a lightering service subject to ~~Section~~ 46.0 of this regulation shall collect and transfer the VOC emissions from the service vessel to the ship to be lightered by vapor balancing.

46.3.2 When vapor balancing, the owner or operator of a lightering service subject to ~~Section~~ 46.0 of this regulation shall only use vapor tight service vessels.

46.3.3 Prior to vapor balancing, the owner or operator of a lightering service subject to ~~Section~~ 46.0 of this regulation shall verify that all valves in the vapor balancing system of the service vessel are correctly positioned to allow the collection and control of VOC emissions.

46.3.4 During vapor balancing, the owner or operator of a lightering service subject to ~~Section~~ 46.0 of this regulation shall verify that there are no vapor leaks in the vapor balancing system of the service vessel. Whenever a vapor leak is detected:

46.3.4.1 A first attempt at repair shall be made prior to the completion of the lightering operation.

46.3.4.2 If a vapor leak in the vapor balancing system of the service vessel can not be repaired prior to the completion of the lightering operation, the leak shall be tagged and recorded.

46.3.4.3 The vapor leak shall be repaired prior to the date that the service vessel is next used in a lightering operation.

46.3.4.4 Following completion of the repair, the service vessel shall be leak tested using the method in either paragraph (c)(1) or (c)(2) of 40 CFR 63.565.

46.3.5 During lightering operations, the owner or operator of a lightering service subject to ~~Section~~ 46.0 of this regulation shall only use service vessels equipped with submerged fill pipes.

46.3.6 When vapor balancing, the owner or operator of a lightering service subject to ~~Section~~ 46.0 of this regulation shall request information from the operator of the ship to be lightered on the total number of depressurization ventings by the ship to be lightered during each lightering operation. The owner or operator of the lightering service is not responsible for enforcing the requirement that the operator of the ship to be lightered provide the depressurization venting information or for any inaccuracies in the information provided by the operator of the ship to be lightered.

46.3.7 When vapor balancing, the owner of the crude oil shall require the owner or operator of the ship to be lightered to provide the owner or operator of the lightering service the total number of depressurization ventings by the ship to be lightered at the conclusion of each lightering operation. The owner of the crude oil is not responsible for enforcing the requirement that the operator of the ship to be lightered provide the depressurization venting information or for any inaccuracies in the information provided by the operator of the ship to be lightered.

46.4 Compliance schedule.

46.4.1 The owner or operator of a lightering service subject to ~~Section~~ 46.0 of this regulation shall comply with the following requirements.

46.4.1.1 The owner or operator of an existing lightering service shall provide the following information to the Department not later than 90 days after the effective date of ~~Section~~ 46.0 of this regulation.

46.4.1.1.1 The name or identification of existing service vessels that are expected to be used in lightering operations in the waters of the State after 2006.

46.4.1.1.2 The expected date that the vapor balancing system will be installed on each existing service vessel or

the date the vapor balancing system was first used, if the existing service vessel is equipped with a vapor balancing system.

46.4.1.2 The owner or operator of a lightering service shall provide the following information to the Department upon the initial use of a new service vessel in the waters of the State.

46.4.1.2.1 The name or identification of the new service vessel.

46.4.1.2.2 The date that the new service vessel commenced lightering operations in the waters of the State.

46.4.1.2.3 A statement of whether the new service vessel is equipped with a vapor balancing system. If not equipped with a vapor balancing system, a statement on the expected date that the vapor balancing system will be installed on the new service vessel or the reason that a vapor balancing system will not be installed on that new service vessel.

46.4.1.3 Compliance with standards.

46.4.1.3.1 The owner or operator of a new lightering service shall comply with the requirements of 46.3 of this regulation upon initial lightering operation or the effective date of this regulation, whichever is later.

46.4.1.3.2 The owner or operator of an existing lightering service shall comply with the requirements of 46.3.1 of this regulation to the greatest extent practicable and shall comply with the requirements of 46.3.2 through 46.3.6 of this regulation when vapor balancing.

46.4.1.4 Maximum allowable uncontrolled lightering volume.

46.4.1.4.1 Beginning 12 months after the initial lightering operation or the effective date of this regulation, whichever is later, a new lightering service's 12-month rolling total volume of uncontrolled lightering shall not exceed ~~5 percent~~ 5% of the new lightering service's total volume lightered for that same 12-month period.

46.4.1.4.2 Beginning May 1, 2008, the 12-month rolling total volume of uncontrolled lightering shall not exceed an existing lightering service's baseline volume multiplied by the percentages listed in Table 46-1 of this regulation.

Table 46-1	
Beginning on	Maximum allowable uncontrolled lightering volume
May 1, 2008	80 %
May 1, 2010	61 %
May 1, 2012	43 %

46.4.1.5 The total volume of uncontrolled lightering for any given lightering operation shall be calculated using the following equation.

$$TUV = \sum_{i=1}^m (V)_i + \sum_{j=1}^n (EV)_j \quad \text{Eq. (46-1)}$$

where,

TUV = the total uncontrolled volume for each given lightering operation. This total volume is used in the determination of 12-month rolling total volume of uncontrolled lightering in 46.4.1.4 of this regulation.

V = the volume of crude oil transferred to the service vessel when displaced vapors are emitted directly to the atmosphere rather than collected and controlled by vapor balancing.

EV = the equivalent volume of crude oil transferred corresponding to the collected and controlled vapors emitted from the service vessel to the atmosphere as a result of depressurization venting. The equivalent volume of crude oil shall be calculated using paragraph (d)(2)(i)(D)(10) of 40 CFR 63.1257 or a method approved by the Department.

i = the individual uncontrolled venting when transferring crude oil.

j = the individual depressurization venting.

m = the total number of uncontrolled ventings of displaced vapors when transferring crude oil for each given lightering operation.

n = the total number of depressurization ventings for each given lightering operation.

46.4.1.6 VOC emissions reduction and audits.

Beginning in February 2010, the Department shall conduct an annual audit of lightering service records to identify the frequency and duration of VOC ventings from the ships to be lightered. If the Department finds that ventings from the ships to be lightered reduce the VOC emission reductions achieved by the lightering services to a level below the maximum allowable uncontrolled lightering volume required in Table 46-1 of this regulation, the Department shall implement solutions, which could include amending ~~Section~~ 46.0 of this regulation.

46.4.2 Ozone Action Day limitations.

Beginning May 1, 2007, uncontrolled lightering operations shall be curtailed as follows on any day that the Department declares an Ozone Action Day.

46.4.2.1 Uncontrolled lightering operations shall not be carried out from 0230 hours until 1630 hours (local time) of the declared Ozone Action Day. However, if uncontrolled lightering operations have begun prior to the declaration of the Ozone Action Day, those lightering operations may continue until 0230 hours (local time) or until the service vessel is fully loaded, whichever is later.

46.4.2.2 If the Department declares consecutive Ozone Action Days, the owner or operator of a lightering service shall, to the greatest extent practicable, minimize uncontrolled lightering operations on the second and subsequent consecutively declared Ozone Action Days as follows:

46.4.2.2.1 Carrying out controlled lightering operations, if vapor balancing compatible service vessels and ships to be lightered are available.

46.4.2.2.2 Rescheduling the uncontrolled lightering operations to the periods of 1630 hours to 0230 hours (local time) of the second and subsequent consecutively declared Ozone Action Days.

46.4.3 No later than January 1, 2014 and every ~~5~~ five years thereafter, the Department, owners or operators of existing lightering services subject to ~~Section~~ 46.0 of this regulation, and owners of crude oil subject to 46.3.7 of this regulation shall determine the feasibility of achieving a 5% ~~percent~~ maximum allowable uncontrolled lightering volume. If a 5% ~~percent~~ maximum allowable uncontrolled lightering volume is determined to be feasible, the Department shall amend the requirements of Table 46-1 of this regulation within two years. The amended requirements shall establish a maximum allowable uncontrolled lightering volume of 5% ~~percent~~.

46.4.4 If the feasible maximum allowable uncontrolled lightering volume determined in 46.4.3 of this regulation is greater than 5% ~~percent~~, the Department shall amend the requirements of Table 46-1 of this regulation within two years. The amended requirements shall establish the feasible maximum allowable uncontrolled lightering volume determined in 46.4.3 of this regulation.

46.4.5 Any changes to the requirements of Table 46-1 of this regulation shall be made in accordance with the requirements of 7 **Del. C.** Ch 60.

46.5 Compliance Plan.

46.5.1 Within 120 days after the effective date of ~~Section~~ 46.0 of this regulation or upon initial startup of each vapor balancing system, whichever is later, the owner or operator of a lightering service shall develop and implement a compliance plan that describes how initial and ongoing compliance will be demonstrated. The owner or operator of a lightering service shall make the compliance plan for each vapor balancing system available for inspection, upon request, by the Department.

46.5.2 Initial Compliance.

To demonstrate initial compliance, the owner or operator of a lightering service shall provide the Department with the information specified in 46.5.2.1 and 46.5.2.2 of this regulation.

46.5.2.1 A copy of the service vessel's vapor control system Approval Letter issued by or on behalf of the United States Coast Guard in accordance with 46 CFR 39.10-13 and 46 CFR 31.01-03 or United States Coast Guard approved equivalent.

46.5.2.2 A copy of the service vessel's initial test certification demonstrating vapor tightness using the method in either paragraph (c)(1) or (c)(2) of 40 CFR 63.565.

46.5.3 Ongoing Compliance.

The ongoing compliance demonstration plan shall include, at a minimum, the information specified in 46.5.3.1 through 46.5.3.5 of this regulation.

46.5.3.1 The recommended instrumentation for the continuous measurement and recording of the operating pressure of the service vessel.

46.5.3.2 The recommended operating and maintenance procedures for the vapor balancing system.

46.5.3.3 The recommended startup, shutdown, and malfunction plan for the vapor balancing system, which shall include the approved calculation methodology to determine the total uncontrolled volume in 46.4.1.5 of this regulation.

46.5.3.4 The recommended operating procedures to prevent inadvertent uncontrolled VOC emissions to demonstrate compliance with 46.3.3 of this regulation.

46.5.3.5 The recommended leak testing procedures to demonstrate compliance with 46.3.4 of this regulation.

46.5.4 To the extent practical, the lightering service's standard operating and maintenance manuals and standard log sheets may be used to satisfy

the requirements of the compliance plan, provided these manuals and log sheets contain all of the data necessary to meet the individual requirements of 46.5.3 of this regulation.

46.6 Equivalent methods of control.

46.6.1 Non-vapor balancing control technologies can be installed to control VOC emissions during lightering operations. New and existing lightering services may apply for the approval of an alternative control technology by submitting a complete request in accordance with the requirements of 46.6.2 and 46.6.3 of this regulation.

46.6.2 Upon receipt of a written request, the Department may approve the use of an alternative control technology to satisfy the requirements of 46.3.1 of this regulation.

46.6.3 The written request must contain a complete description of the alternative control technology, proposed compliance demonstration plan, proposed testing procedures, proposed recordkeeping requirements, and the expected startup date.

46.7 Recordkeeping.

The owner or operator of a lightering service subject to ~~Section~~ 46.0 of this regulation shall keep the records specified in ~~this paragraph~~ 46.7 of this regulation in a readily accessible location for at least five years. These records shall be made immediately available to the Department on verbal or written request. For the purposes of 46.7 of this regulation, the terms “readily accessible location” and “immediately available” may apply to records located on a service vessel.

46.7.1 The owner or operator of an existing lightering service subject to ~~Section~~ 46.0 of this regulation shall keep calculations, including documentation of data, required to determine the baseline volume of the lightering service.

46.7.2 The owner or operator of an existing lightering service subject to ~~Section~~ 46.0 of this regulation shall keep calculations, including documentation of data, required to determine the 12-month rolling total volume of uncontrolled lightering of their lightering service in accordance with 46.4.1.4 of this regulation.

46.7.3 Beginning on the effective date of ~~Section~~ 46.0 of this regulation or upon initial lightering operation in the waters of Delaware, whichever is later, the owner or operator of a lightering service subject to ~~Section~~ 46.0 of this regulation shall keep the following information for each lightering operation.

46.7.3.1 The dates and times that the lightering operation began and ended.

46.7.3.2 The lightering location.

46.7.3.3 The name or identification of the service vessel or vessels involved.

46.7.3.4 The name or identification of the ship to be lightered.

46.7.3.5 The name or identification of the owner of the crude oil to be transferred.

46.7.3.6 The total volume of crude oil transferred during the lightering operation.

46.7.3.7 The total uncontrolled volume of crude oil transferred during the lightering operation, including documentation of the data required to calculate the total uncontrolled volume in accordance with 46.4.1.5 of this regulation.

46.7.4 Beginning on the effective date of ~~Section~~ 46.0 of this regulation or upon the initial startup of a service vessel's vapor balancing system, whichever is later, the owner or operator of a lightering service shall keep the following information.

46.7.4.1 Vapor tightness documentation for the service vessel in accordance with 46.3.2 of this regulation. The documentation shall include, at a minimum, the information specified in 46.7.4.1.1 through 46.7.4.1.6 of this regulation.

46.7.4.1.1 The service vessel name or identification.

46.7.4.1.2 The name and address of the owner or operator of the service vessel.

46.7.4.1.3 The date and location of vapor tightness test.

46.7.4.1.4 The vapor tightness test method used.

46.7.4.1.5 The test results.

46.7.4.1.6 The tester's name and signature.

46.7.4.2 Records of the total number of depressurization ventings by the ship to be lightered in accordance with 46.3.6 of this regulation, when vapor balancing.

46.7.4.3 Operating logs and the pressure monitoring results for the vapor balancing system of the service vessel, when vapor balancing.

46.7.4.4 Records of the occurrence and duration of a malfunction of the vapor balancing system of the service vessel, when vapor balancing.

46.7.4.5 Records of any corrective action taken, as a result of a malfunction, that was inconsistent with the startup, shutdown, and malfunction plan, when vapor balancing.

46.7.4.6 Records or logs of inspections conducted to prevent inadvertent uncontrolled VOC emissions in accordance with 46.3.3 of this regulation, when vapor balancing.

46.7.4.7 Records or logs of leak test inspections conducted in accordance with 46.3.4 of this regulation, when vapor balancing.

46.7.4.8 Maintenance logs and records of any repairs made in accordance with 46.3.4 of this regulation.

46.7.4.9 Records identifying whether vapor balancing was or was not conducted.

46.7.4.10 If vapor balancing was not conducted, records identifying the reason that vapor balancing was not attempted.

46.7.4.11 If vapor balancing was conducted and there was an uncontrolled volume of crude oil transferred during the lightering operation, records identifying the reasons the lightering operation was not fully controlled.

46.8 Emergency lightering operation exemption.

The owner or operator of a lightering service shall be exempted from the requirements of ~~Section~~ 46.0 of this regulation while carrying out emergency lightering operations, except for the requirements of 46.8.1 and 46.8.2 of this regulation.

46.8.1 The owner or operator of a lightering service that carried out emergency lightering operations shall submit a written notification to the Department within 24 hours of the completion of the emergency lightering operations. The notification shall include, at minimum, the following information.

46.8.1.1 A brief description of the emergency, which may be limited to the following:

46.8.1.1.1 The name, organization, and telephone number of the individual requesting the emergency lightering operation,

46.8.1.1.2 The name and location of ship to be lightered, and

46.8.1.1.3 The circumstances of concern.

46.8.1.2 The name, organization, and telephone number of the individual submitting the written notification.

46.8.1.3 The written notification may be submitted to the Department by fax or electronic mail.

46.8.2 The owner or operator of a lightering service that carried out emergency lightering operations shall submit a written report to the Department within 30 days following the completion of the emergency lightering operations. The report shall include, at minimum, the following information.

46.8.2.1 A brief description of the emergency, which may be limited to the following:

46.8.2.1.1 The name, organization, and telephone number of the individual requesting the emergency lightering operation,

46.8.2.1.2 The name and location of the ship to be lightered, and

46.8.2.1.3 The circumstances of concern.

46.8.2.2 The names or identifications of the service vessels involved in the emergency lightering operations.

46.8.2.3 The dates and times that the emergency lightering operations started and ended.

46.8.2.4 The total volume of crude oil transferred during the emergency lightering operations.

46.8.2.5 A certification by a responsible official as to the truth, accuracy, and completeness of the written report.

46.8.2.6 The name and signature of the responsible official certifying the written report.

46.9 Reporting requirements.

46.9.1 The owner or operator of a lightering service subject to ~~Section~~ 46.0 of this regulation shall submit to the Department an initial compliance certification not later than 90 days after the effective date of ~~Section~~ 46.0 of this regulation or upon the initial startup of a vapor balancing system for

each service vessel, whichever is later. The initial compliance notification shall provide, at a minimum, the following information.

46.9.1.1 The name, address, and telephone number of the owner or operator of the service vessel.

46.9.1.2 The name or identification of the service vessel.

46.9.1.3 A copy of the service vessel's vapor control system Approval Letter issued by or on behalf of the United States Coast Guard in accordance with 46 CFR 39.10-13 and 46 CFR 31.01-03 or United States Coast Guard approved equivalent.

46.9.1.4 A copy of the service vessel's initial test certification demonstrating vapor tightness using the method in either paragraph (c)(1) or (c)(2) of 40 CFR 63.565.

46.9.2 Reports of excess emissions.

The owner or operator of a lightering service subject to ~~Section~~ 46.0 of this regulation shall, for each occurrence of an excess emission, submit a report to the Department within 30 calendar days of becoming aware of such occurrence. Excess emissions can include, but are not limited to, failing to operate the vapor balancing system when practicable, inadvertently or knowingly venting VOCs from the vapor balancing system to the atmosphere during controlled lightering operations, conducting uncontrolled lightering operations on an Ozone Action Day during prohibited times, exceeding the maximum allowable uncontrolled lightering volume percentages in Table 46-1 of this regulation, etc. The report shall contain the following information, in addition to complying with any other reporting requirements required by the Department.

46.9.2.1 The name of the owner or operator of the lightering service.

46.9.2.2 The name or identification of the service vessel.

46.9.2.3 The date and time of first observation of the excess emission.

46.9.2.4 The cause and duration of the excess emission.

46.9.2.5 The corrective actions taken or the schedule to correct the conditions that caused the excess emission.

46.9.2.6 The estimated quantity of excess emission (pounds per lightering operation) and the operating data and calculations used in determining the magnitude of the excess emission.

46.9.3 The owner or operator of an existing lightering service subject to ~~Section~~ 46.0 of this regulation shall submit its baseline volume to the Department before May 1, 2007.

46.9.4 Beginning on February 1, 2008 and annually thereafter, the owner or operator of an existing lightering service subject to ~~Section~~ 46.0 of this regulation shall submit a report to the Department identifying the total volume of crude oil transferred for both controlled and uncontrolled lightering operations for each month of the previous calendar year.

Section 47—

47.0 Offset Lithographic Printing.

11/29/1994

47.1 a. ~~Applicability.~~

47.1.1 1. ~~This Section applies~~ The provisions of 47.0 of this regulation apply to any offset lithographic printing facility, including heatset web, non-heatset web (non-newspaper), non-heatset sheet-fed, and newspaper (non-heatset web) facilities.

47.1.2 2. ~~This Section does~~ The provisions of 47.0 of this regulation do not apply to any offset lithographic printing facility whose total actual volatile organic compound (VOC) emissions from all lithographic printing operations (including emissions from cleaning solutions used on lithographic printing presses) are less than 6.8 kilograms (kg) (15 pounds [lb]) VOCs per day before the application of capture systems and control devices.

47.1.3 3. ~~This Section does~~ The provisions of 47.0 of this regulation do not apply to other types of printing operations, such as flexography, rotogravure, or letterpress.

47.1.4 4. ~~Existing sources affected by this Section~~ 47.0 of this regulation shall comply with the provisions of this Section 47.0 of this regulation as soon as practicable, but no later than April 1, 1996. New, modified, or reconstructed sources affected by ~~this Section~~ 47.0 of this regulation shall comply with the provisions of ~~this Section~~ 47.0 of this regulation upon startup.

47.1.5 5. ~~Any facility that becomes or is currently subject to the provisions of this Section~~ 47.0 of this regulation by exceeding the applicability threshold in ~~paragraph (a)(2)~~ 47.1.2 of this ~~Section~~ regulation shall remain subject to these provisions even if its emissions later fall below the applicability threshold.

47.1.6 6. ~~Any facility that is currently subject to a state or federal rule promulgated pursuant to the Clean Air Act Amendments of 1977 by exceeding an applicability threshold is and shall remain subject to these provisions, even if its throughput or emissions have fallen or later fall below the applicability threshold.~~

47.2 b. ~~Definitions.~~ As used in ~~this Section~~ 47.0 of this regulation, all terms not defined herein shall have the meaning given them in the November 15, 1990 Clean Air Act Amendments (CAAA), or in ~~Section 2 of Regulation 24~~ 2.0 of this regulation.

“**Alcohol**” means a chemical compound consisting of the hydroxyl (OH) group attached to an alkyl radical and having the general formula $C_nH_{2n+1}OH$, such as ethanol, n-propanol, and iso-propanol.

“Alcohol substitute” means a non-alcohol additive that contains VOCs and is used in the fountain solution to reduce the surface tension of water or to prevent piling (ink build-up).

“Batch” means a supply of fountain solution that is prepared continuously or as a batch and that is used without alteration until completely used or removed from the printing process.

“Cleaning solution” means a liquid that is used to remove ink and debris from the operating surfaces of the printing press and its parts.

“Dampening system” means equipment that is used to deliver the fountain solution to the lithographic plate.

“Fountain solution” means a mixture of water and non-volatile printing chemicals, and additives which reduce the surface tension of the water. The fountain solution wets the non-image areas so that the ink is maintained within the image areas.

“Heatset” means any operation in which heat is required to evaporate ink oil from the printing ink.

“Lithography” means a printing process in which the image and non-image areas are chemically differentiated; the image area is oil-receptive and the non-image area is water-receptive. This method differs from other printing methods, in which the image is a raised or recessed surface.

“Non-heatset” means any operation in which printing inks are set without the use of heat. For the purposes of ~~this Section~~ 47.0 of this regulation, ultraviolet-cured and electron beam-cured inks are considered non-heatset operations.

“Offset” means a printing process in which the ink film is transferred from the lithographic plate to an intermediary surface (blanket), which, in turn, transfers the ink film to the substrate.

“Press” means a printing production assembly that is composed of one or many units to produce a printed sheet or web.

“Sheet-fed” means a printing operation in which individual sheets of substrate are fed to the press sequentially.

“Total actual VOC emissions” means the quantity of VOCs emitted from all lithographic printing presses during a particular time period.

“Unit” means the smallest complete printing component of a printing press.

“Web” means a continuous roll of paper used as the printing substrate.

47.3 e-Standards.

47.3.1 4.—No owner or operator of a heatset offset lithographic printing press shall operate the printing press unless the owner or operator reduces VOC emissions from the press dryer exhaust vent by 90% (weight) of the uncontrolled total organics (minus methane and ethane), or maintains a maximum dryer exhaust outlet concentration of 20 parts per million by volume (ppmv) as methane (as C1), whichever is less stringent when the press is in operation.

47.3.2 2.—No owner or operator of an offset lithographic printing press that uses alcohol in the fountain solution shall operate the printing press unless the owner or operator meets one of the requirements listed under paragraphs ~~(c)(2)(i), (c)(2)(ii), (c)(2)(iii), and (c)(2)(iv)~~ 47.3.2.1, 47.3.2.2, 47.3.2.3, and 47.3.2.4 of this Section ~~regulation~~.

47.3.2.1 i.—For heatset web offset lithographic printing presses, the fountain solution alcohol content shall be maintained at 1.6% or less (by volume). Alternatively, a standard of 3% or less (by volume) alcohol may be used if the fountain solution containing alcohol is refrigerated to less than 15.6 degrees Celsius (°C) (60 degrees Fahrenheit [°F]).

47.3.2.2 ii.—For non-heatset web offset lithographic printing presses, the alcohol content in the fountain solution shall be eliminated. Alternatively, non-alcohol additives or alcohol substitutes may be used to accomplish the total elimination of alcohol use.

47.3.2.3 iii.—For sheet-fed offset lithographic printing presses, the alcohol content in the fountain solution shall be maintained at 5% or less (by volume). Alternatively, a standard of 8.5% or less (by volume) alcohol may be used if the fountain solution is refrigerated to below 15.6°C (60°F).

47.3.2.4 iv.—Any type of offset lithographic printing press shall be considered in compliance with this regulation if the only VOCs in the fountain solution are in non-alcohol additives or alcohol substitutes, so that the concentration of VOCs in the fountain solution is 3.0% or less (by weight). (The fountain solution shall not contain any alcohol.)

47.3.3 3.—No owner or operator of an offset lithographic printing press shall operate the printing press unless the owner or operator reduces VOC emissions from cleaning solutions by using a cleaning solution with a 30% or less (as used) VOC content. Alternatively, the use of cleaning solutions with a VOC composite partial vapor pressure less than 10 millimeters (mm) mercury (Hg) (0.4 inches [in] Hg) at 20°C (68°F) may be used. The VOC composite partial pressure is calculated as follows:

$$PP_C = \sum_{i=1}^n \frac{\frac{(W_i)(VP_i)}{MW_i}}{\frac{W_w}{MW_w} + \frac{W_e}{MW_e} + \sum_{i=1}^n \frac{W_i}{MW_i}} \quad (47-1)$$

Where:

W_i = Weight of the i th VOC compound, in grams (g);

W_w = Weight of water, in g;

W_e = Weight of exempt compound, in g;

MW_i = Molecular weight of the i th VOC compound, in grams per gram-

mole $\left(\frac{g}{g\text{-mole}}\right)$;

MW_w = Molecular weight of water, in $\left(\frac{g}{g\text{-mole}}\right)$;

MW_e = Molecular weight of exempt compound, in $\left(\frac{g}{g\text{-mole}}\right)$;

PP_C = VOC composite partial pressure at 20°C, in mmHg

VP_i = Vapor pressure of the i th VOC compound at 20°C, in mmHg

47.4 d.—Control Devices. An owner or operator of an offset lithographic printing press equipped with a control system shall ensure that:

47.4.1 1.—The capture system and control device are operated at all times that the printing press is in operation, and the owner or operator demonstrates compliance with ~~this Section 47.0 of this regulation~~ through the applicable coating analysis and capture system and control device efficiency test methods specified in **Appendix B, Appendix D, and Appendix E of Regulation 24 of this regulation** and in accordance with the capture efficiency test methods specified in **Appendix D of Regulation 24 this regulation**.

47.4.2 2.—The control device is equipped with the applicable monitoring equipment specified in 2.0 of Appendix D-(b) of Regulation 24 this regulation, and the monitoring equipment is installed, calibrated, operated, and maintained according to the vendor's specifications at all times the control device is in use.

47.5 e.—Test Methods and Procedures.

47.5.1 1.—The VOC content of each ink, the alcohol content of each fountain solution, and the efficiency of each capture system and control device shall be determined by the applicable test methods and procedures specified in **Appendix A through Appendix D of Regulation 24 this regulation** to establish the records required under ~~paragraph (f) 47.6 of this Section regulation~~.

47.5.2 2.—To demonstrate compliance with the emission control requirements of ~~this Section~~ 47.0 of this regulation, the affected facility shall be run at maximum operating conditions and flow rates during any emission testing.

47.5.3 3.—Emission tests for facilities using an add-on dryer exhaust control device shall include an initial test when the control device is installed and operating that demonstrates compliance with either the 90% (by weight) reduction or the 20 ppmv emission limit.

47.5.4 4.—To determine compliance with ~~paragraph (c)(2)~~ 47.3.2 of this ~~Section~~ regulation, the owner or operator of an offset lithographic printing facility shall perform the following procedures:

47.5.4.1 i.—A sample shall be taken of the fountain solution (as used) from the fountain tray or reservoir that contains a fresh batch of fountain solution (after mixing), for each unit or centralized reservoir, to determine the alcohol content of the fountain solution in accordance with ~~paragraphs (c)(2)(i) through (c)(2)(iii)~~ 47.3.2.1 through 47.3.2.3 of this ~~Section~~ regulation, before the fountain solution is used.

47.5.4.2 ii.—A direct measurement of the alcohol content of the fountain solution ~~sample(s)~~ or samples shall be performed in accordance with the method specified in **Appendix L** of ~~Regulation 24~~ this regulation.

47.5.4.3 iii.—Alternatively, a sample of the fountain solution (as used) may be taken from the fountain tray or reservoir of fountain solution during use and measured with a hydrometer or refractometer that has been standardized with tests performed in accordance with ~~paragraphs (e)(4)(i) and (e)(4)(ii)~~ 47.5.4.1 and 47.5.4.2 of this ~~Section~~ regulation. The unit shall be considered in compliance with ~~paragraphs (c)(2)(i) through (c)(2)(iii)~~ 47.3.2.1 through 47.3.2.3 of this ~~Section~~ regulation if the refractometer or hydrometer measurement is less than or equal to the measurement obtained by the method specified in **Appendix L** of ~~Regulation 24~~ this regulation plus 10% percent.

47.5.4.4 iv.—The VOC content of a fountain solution containing alcohol substitutes or non-alcohol additives shall be established with proper recordkeeping and the manufacturer's laboratory analysis of the VOC content of the concentrated alcohol substitute and included in facility records. Records shall include the amount of concentrated substitute added per quantity of fountain water; the date and time of preparation if the fountain solution is mixed as a batch; and the calculated VOC content of the final solution to fulfill the requirements listed in ~~paragraph (c)(2)(iv)~~ 47.3.2.4 of this ~~Section~~ regulation.

47.5.5 ~~5.~~—To determine compliance with ~~paragraphs (c)(2)(i) and (c)(2)(iii)~~ 47.3.2.1 and 47.3.2.3 of this ~~Section~~ regulation, an owner or operator of an offset lithographic printing facility shall use a thermometer or other temperature detection device capable of reading to 0.28°C (0.5°F) to ensure that a refrigerated fountain solution containing alcohol is below 15.6°C (60°F) at all times.

46.5.6 ~~6.~~—To determine compliance with ~~paragraph (c)(3)~~ 47.3.3 of this ~~Section~~ regulation, an owner or operator of an offset lithographic printing press shall:

47.5.6.1 ~~i.~~—Take a sample of the cleaning solution (as used) to demonstrate compliance with the cleaning solution VOC content limitations listed in ~~paragraph (c)(3)~~ 47.3.3 of this ~~Section~~ regulation. If the cleaning solution is used as received from the supplier without dilution or alteration, the manufacturer's technical information may be used to demonstrate compliance.

47.5.6.2 ~~ii.~~—Use the method specified in **Appendix L** of ~~Regulation 24~~ this regulation to determine the VOC content of the cleaning solution (as used). Alternatively, the VOC content and VOC partial pressure of the cleaning solution may be established using the manufacturer's technical data. If the cleaning solution is prepared through the dilution of concentrated materials, the blending ratio and VOC content of the concentrate may be used to determine the "as used" VOC content of the cleaning solution.

47.6 ~~f.~~—Recordkeeping and Reporting.

47.6.1 ~~4.~~—Requirements for Sources Below Threshold Emission Limit. Any owner or operator of any offset lithography printing press that emits less than the threshold limit according to ~~paragraph (a)~~ 47.1 of this ~~Section~~ regulation shall comply with the following requirements:

47.6.1.1 ~~i.~~—Initial Certification. The owner or operator shall certify to the Department that the facility emits less than the threshold limit according to ~~paragraph (a)~~ 47.1 of this ~~Section~~ regulation. Such certification shall include the following information:

47.6.1.1.1 ~~A.~~—The name and location of the facility.

47.6.1.1.2 ~~B.~~—The address and telephone number of the person responsible for the facility.

47.6.1.1.3 ~~C.~~—A declaration that the facility is not subject to the requirements of ~~this Section~~ 47.0 of this regulation because of the criteria listed in ~~paragraph (a)~~ 47.1 of this ~~Section~~ regulation.

47.6.1.1.4 ~~D.~~—The calculations demonstrating that total actual VOC emissions from all offset lithographic printing presses at the facility are and will be less than 6.8 kg (15 lb) per day before the application of capture systems and control devices.

47.6.1.1.5 ~~E.~~—A description of the instrument and/or method by which the owner or operator accurately measured or calculated the volume of ink applied and the amount that can potentially be applied each year on each printing press.

47.6.1.2 ~~ii.~~—Recordkeeping. The owner or operator shall collect and record all of the following information each year for each offset lithographic printing press and maintain the information at the facility for a period of ~~5~~ five years:

47.6.1.2.1 ~~A.~~—The name and identification number of each ink, as applied, each year on each printing press.

47.6.1.2.2 ~~B.~~—The weight of VOC per volume of coating solids and the volume of solids of each ink, as applied, each year on each printing press.

47.6.1.2.3 ~~C.~~—The total actual VOC emissions as calculated in ~~paragraph (f)(1)(i)(D)~~ 47.6.1.1.4 of this ~~Section~~ regulation using the VOC content for that year.

47.6.1.3 ~~iii.~~—Reporting. Upon promulgation of ~~this Section 47.0 of this regulation~~, any record showing that total actual emissions of VOCs from all offset lithographic printing presses exceed 6.8 kg (15 lb) per day before the application of capture systems and control devices shall be reported by sending a copy of the record to the Department within 45 calendar days after the exceedance occurs. This requirement is in addition to any other State of Delaware exceedance reporting requirements.

47.6.2 ~~2.~~—Requirements for Sources Above Threshold Emission Limit. Any owner or operator of any offset lithography printing press that emits greater than the threshold limit according to ~~paragraph (a) 47.1~~ of this ~~Section~~ regulation shall comply with the following requirements:

47.6.2.1 ~~i.~~—Initial Certification. The owner or operator shall certify to the Department that the facility emits greater than the threshold limit according to ~~paragraph (a) 47.1~~ of this ~~Section~~ regulation. Such certification shall include the following information:

47.6.2.1.1 ~~A.~~—The name and location of the facility.

47.6.2.1.2 ~~B.~~—The address and telephone number of the person responsible for the facility.

47.6.2.1.3 ~~C.~~—The calculations demonstrating that total actual VOC emissions from all offset lithographic printing presses at the facility are and shall be greater than 6.8 kg (15 lb) per day before the application of capture systems and control devices.

47.6.2.1.4 ~~D.~~—A description of the instrument ~~and/or~~ method by which the owner or operator accurately measured or calculated the volume of ink applied and the amount that can potentially be applied each year on each printing press.

47.6.2.2 ~~ii.~~—Recordkeeping. The owner or operator shall collect and record all of the following information each year for each offset lithographic printing press and maintain the information at the facility for a period of ~~5~~ five years:

47.6.2.2.1 ~~A.~~—The name and identification number of each ink, as applied, each year on each printing press.

47.6.2.2.2 ~~B.~~—The weight of VOCs per volume of coating solids and the volume of solids of each ink, as applied, each year on each printing press.

47.6.2.2.3 ~~C.~~—The total actual VOC emissions as calculated in ~~paragraph (f)(1)(i)(D)~~ 47.6.1.1.4 of this ~~Section~~ regulation using the VOC content for that year.

47.6.3 ~~3.~~—Requirements for Sources Using an Add-On Dryer Exhaust Control Device.

47.6.3.1 ~~i.~~—The owner or operator of a heatset offset lithographic printing press shall install, calibrate, maintain, and operate a temperature monitoring device, according to the manufacturer's instructions, at the outlet of the control device. The monitoring temperature shall be set during the testing required to certify compliance with the requirements of ~~paragraph (d)~~ 47.4 of this ~~Section~~ regulation. Monitoring shall be performed only when the unit is operational.

47.6.3.2 ~~ii.~~—The temperature monitoring device shall be equipped with a continuous recorder and shall have an accuracy of 0.28°C (0.5°F).

47.6.3.3 ~~iii.~~—The dryer pressure shall be maintained lower than the press room area pressure such that air flows into the dryer at all times when the press is operating. A 100% emissions capture

efficiency for the dryer shall be demonstrated using an air flow direction measuring device.

47.6.4 4.—Requirements for Monitoring Fountain Solution VOC Concentration. The alcohol concentration in the fountain solution shall be monitored to provide data that can be correlated to the amount of material used when the fountain solution complies with the limits listed in ~~paragraphs (c)(2)(i) through (c)(2)(iv)~~ 47.3.2.1 through 47.3.2.4 of this ~~Section~~ regulation. One of the following methods shall be used to frequently measure the concentration of alcohol in the fountain solution:

47.6.4.1 i.—The owner or operator of any offset lithographic printing press shall monitor the alcohol concentration of the fountain solution with a refractometer that is corrected for temperature at least once per 8-hour shift or once per batch, whichever is longer. The refractometer shall have a visual, analog, or digital readout with an accuracy of 0.5%. A standard solution shall be used to calibrate the refractometer for the type of alcohol used in the fountain. Alternatively, the refractometer shall be standardized with measurements performed to determine compliance, according to the procedures described in ~~paragraphs (e)(4)(i) and (e)(4)(ii)~~ 47.5.4.1 and 47.5.4.2 of this ~~Section~~ regulation.

47.6.4.2 ii.—Alternatively, the owner or operator of any offset lithographic printing press shall monitor the alcohol concentration of the fountain solution with a hydrometer equipped with a temperature correction at least once per 8-hour shift or once per batch, whichever is longer. The hydrometer shall have a visual, analog, or digital readout with an accuracy of 0.5%. A standard solution shall be used to calibrate the hydrometer for the type of alcohol used in the fountain. Alternatively, the hydrometer shall be standardized with measurements performed to determine compliance, according to the procedures described in ~~paragraphs (e)(4)(i) and (e)(4)(ii)~~ 47.5.4.1 and 47.5.4.2 of this ~~Section~~ regulation.

47.6.4.3 iii.—The VOC content of the fountain solution may be monitored with a conductivity meter if it is determined that a refractometer or hydrometer cannot be used for the type of VOCs in the fountain solution. The conductivity meter reading for the fountain solution shall be referenced to the conductivity of the incoming water.

47.6.4.4 iv.—If, through recordkeeping for a period of 6 months or more, the printing process is shown to consistently meet the requirements in ~~paragraphs (c)(2)(iv) and (e)(4)~~ 47.3.2.4 and 47.5.4 of this ~~Section~~ regulation, the monitoring requirement may be waived or extended to a longer period of time upon prior approval by the Department.

47.6.5 ~~5~~—Requirements for Monitoring Fountain Solution Temperature.

47.6.5.1 ~~i~~—The owner or operator of any offset lithographic printing press using refrigeration equipment on the fountain shall install, maintain, and continuously operate a temperature monitor of the fountain solution reservoir.

47.6.5.2 ~~ii~~—The temperature monitor shall be attached to a continuous recording device such as a strip chart, recorder, or computer.

47.6.6 ~~6~~—Requirements for Monitoring Cleaning Solution. For any offset lithographic printing press with continuous cleaning equipment, flow meters shall be used to monitor the water and cleaning solution flow rates. The flow meters shall be calibrated so that the VOC content of the mixed solution is accurately measured to fulfill the requirements of ~~paragraph (e)(3)~~ 47.3.3 of this ~~Section~~ regulation.

47.6.7 ~~7~~—Requirements for Monitoring Other Key Parameters. The owner or operator of any offset lithographic printing press shall record daily, and make available to the Department upon verbal or written request, the following key parameters:

47.6.7.1 ~~i~~—The type of control device operating on the heatset offset lithographic printing press and the operating parameters specified in ~~paragraph (f)(3)~~ 47.5.3 of this ~~Section~~ regulation.

47.6.7.2 ~~ii~~—The equipment standard selected to comply with the requirements listed in ~~paragraphs (c)(2)(i) through (c)(2)(iv) and paragraph (e)(3)~~ 47.3.2.1 through 47.3.2.4 and 47.3.3 of this ~~Section~~ regulation.

47.6.7.3 ~~iii~~—The VOC content of the fountain and cleaning solutions, to comply with the requirements listed in ~~paragraphs (e)(4), (f)(4), and (f)(6)~~ 47.5.4, 47.6.4, and 47.6.6 of this ~~Section~~ regulation.

47.6.7.1 ~~iv~~—The temperature of the fountain solution, to comply with the requirements listed in ~~paragraph (f)(5)~~ 47.6.5 of this ~~Section~~ regulation, if applicable.

47.6.7.5 ~~v~~—For manual cleaning methods, the amount of cleaning solution and the amount of water added per batch of cleaning solution mixed.

47.6.7.6 ~~vi~~—For automatic cleaning methods, the flow rates of water and cleaning solution concentrate, as specified in ~~paragraph (f)(6)~~ 47.6.6 of this ~~Section~~ regulation.

47.6.7.7 vii. ~~Corrective actions taken when exceedances of any parameters monitored according to the requirements of paragraphs (d) or (e) 47.4 or 47.5 of this Section regulation, occur.~~

Section 48—

48.0 Reactor Processes and Distillation Operations in the Synthetic Organic Chemical Manufacturing Industry.

11/29/1994

48.1 a—Applicability.

48.1.1 1. ~~This Section applies~~ The provisions of 48.0 of this regulation apply to any vent stream that originates from a process unit in which a reactor process or distillation operation is located at a facility within the synthetic organic chemical manufacturing industry (SOCMI).

48.1.2 2. ~~This Section does~~ The provisions of 48.0 of this regulation do not apply to the following operations:

48.1.2.1 i. ~~Any reactor process or distillation operation that is designed and operated in a batch mode is not subject to the provisions of this Section~~ 48.0 of this regulation.

48.1.2.2 ii. ~~Any reactor process or distillation operation that is part of a polymer manufacturing operation is not subject to the provisions of this Section~~ 48.0 of this regulation.

48.1.2.3 iii. ~~Any reactor process or distillation operation that operates in a process unit with a total design capacity of less than 4 one gigagram per year (1,100 tons per year) for all chemicals produced within that unit is not subject to the provisions of this Section~~ 48.0 of this regulation except for the reporting/recordkeeping requirements listed in ~~paragraph (f)(4)~~ 48.5.4 of this Section regulation.

48.1.2.4 iv. ~~Any vent stream for a reactor process or distillation operation with a flow rate less of than 0.0085 standard cubic meters per minute (scmm) or a total volatile organic compound (VOC) concentration of less than 500 parts per million by volume (ppmv) is not subject to the provisions of this Section~~ 48.0 of this regulation except for the performance testing requirement listed in ~~paragraphs (d)(4)(ii) and (d)(9)~~ 48.4.4.2 and 48.4.9 of this regulation, and the reporting/recordkeeping requirements listed in ~~paragraph (f)(3)~~ 48.5.3 of this Section regulation.

48.1.3 3. ~~Existing sources affected by this Section~~ 48.0 of this regulation shall comply with the provisions of ~~this Section~~ 48.0 of this regulation as soon as practicable, but no later than April 1, 1996. New, modified, or reconstructed sources affected by ~~this Section~~ 48.0 of this regulation shall comply with the provisions of ~~this Section~~ 48.0 of this regulation upon start-up.

48.1.4 4. ~~Any facility that becomes or is currently subject to the provisions of this Section~~ 48.0 of this regulation by exceeding the

applicability threshold in ~~paragraph (a)(2)~~ 48.1.2 of this ~~Section~~ regulation shall remain subject to these provisions even if its emissions later fall below the applicability threshold.

48.1.5 ~~5~~—Any facility that is currently subject to a state or federal rule promulgated pursuant to the Clean Air Act Amendments of 1977 by exceeding an applicability threshold is and shall remain subject to these provisions, even if its throughput or emissions have fallen or later fall below the applicability threshold.

48.2 ~~b~~—Definitions. As used in ~~this Section~~ 48.0 of this regulation, all terms not defined herein shall have the meaning given them in the November 15, 1990 Clean Air Act Amendments (CAAA), or in ~~Section 2 of Regulation 24~~ 2.0 of this regulation.

“Batch mode” means a non-continuous operation or process in which a discrete quantity or batch of feed is charged into a process unit and distilled or reacted at one time.

“Boiler” means any enclosed combustion device that extracts useful energy in the form of steam.

“By compound” means by individual stream components, not carbon equivalents.

“Continuous recorder” means a data recording device that records an instantaneous data value at least once every 15 minutes.

“Distillation operation” means an operation in which one or more feed stream~~(s)~~ or streams are separated into two or more exit stream~~(s)~~ or streams. Each exit stream has component concentrations different from those in the feed stream~~(s)~~ or streams. The separation is achieved by the redistribution of the components between the liquid and vapor phase as they approach equilibrium within the distillation unit.

“Distillation unit” means a device or vessel in which distillation operations occur, including all associated internal components (such as trays or packing) and accessories (such as reboilers, condensers, vacuum pumps, stream jets, etc.), plus any associated recovery system.

“Engineering assessment” means the use of documented estimation methods or procedures or sound judgment. Engineering assessment includes, but is not limited to, previous test results that are representative of current operating practices at the process unit, bench-scale or pilot-scale test data that are representative of the process under representative operating conditions, a specification or implication of the maximum flow rate within a permit limit applicable to the process vent, a design analysis based on accepted chemical engineering principles, measurable process parameters, or physical or chemical laws or properties. Examples for analytical methods include, but are not limited to, the use of material balances based on process stoichiometry to estimate the

maximum VOC concentration, the estimation of the maximum flow rate based on physical equipment design parameters such as pump or blower capacities, the estimation of the total organic compound (TOC) concentration based on saturation conditions, and the estimation of the maximum expected net heating value based on the stream concentration of each organic compound, or, alternatively, as if all TOCs in the stream were the compound with the highest heating value. All data, assumptions, and procedures used in engineering assessments shall be documented.

“Flame zone” means the portion of the combustion chamber in a boiler that is occupied by the flame envelope.

“Flow indicator” means a device that indicates whether gas flow is present in a vent stream.

“Halogenated vent stream” means any vent stream that is determined to have a total concentration of halogen atoms (by volume) contained in organic compounds of 200 ppmv or greater, as determined by Method 18 in **Appendix E** of ~~Regulation 24~~ this regulation or by engineering assessment or process knowledge that no halogenated organic compounds are present. For example, 150 ppmv of ethylene dichloride would contain 300 ppmv of total halogen atoms.

“Primary fuel” means the fuel that provides the principal heat input to the device. To be considered primary, the fuel must be able to sustain operation without the addition of other fuels.

“Process heater” means a device which transfers heat that is liberated by burning fuel to fluids contained in tubes, including all fluids except water that is heated to produce steam.

“Process unit” means equipment that is assembled and connected by pipes or ducts to produce, as intermediates or final products, one or more SOCOMI chemicals. A process unit can operate independently if it is supplied with sufficient feed or raw materials and sufficient product storage facilities.

“Product” means any compound or SOCOMI chemical that is produced as that chemical for sale as a product, by-product, co-product, or intermediate, or for use in the production of other chemicals or compounds.

“Reactor process” means a unit operation in which one or more chemicals, or reactants other than air, are combined or decomposed in such a way that their molecular structures are altered and one or more new organic compounds are formed.

“Recovery device” means an individual unit of equipment, such as an adsorber, a carbon adsorber, or a condenser, that is capable of and used for the purpose of recovering chemicals for use, reuse, or sale.

“Recovery system” means an individual recovery device or series of such devices applied to the same vent stream.

“Synthetic organic chemical manufacturing industry” or **“SOCMI”** means the industry that produces, as intermediates or final products, one or more of the chemicals listed at 40 Code of Federal Regulations (CFR) Part 60.489 (July 1, 1992).

“Total organic compounds” or **“TOC”** means those compounds measured according to the procedures of Method 18 in **Appendix E** of ~~Regulation 24~~ this regulation.

“Total resource effectiveness index value” or **“TRE index value”** means a measure of the supplemental total resource requirement per unit reduction of VOCs associated with a process vent stream, based on the vent stream flow rate, the emission rate of VOCs, the net heating value, and the corrosion properties (whether or not the vent stream contains halogenated compounds), as quantified by the equations provided in ~~paragraph (d)~~ 48.4 of this ~~Section~~ regulation. The TRE index is a decision tool used to determine if the annual cost of controlling a given vent gas stream is acceptable when considering the emissions reduction achieved.

“Vent stream” means any gas stream which discharges directly from a distillation operation or reactor process to the atmosphere or which discharges indirectly to the atmosphere after diversion through other process equipment. The definition of vent stream excludes relief valve discharges and equipment leaks including, but not limited to, pumps, compressors, and valves.

48.3 ~~e~~-Standards.

48.3.1 ~~4~~-For individual vent streams within a process unit with a TRE index value of less than or equal to 1.0, the owner or operator shall comply with the standards in ~~paragraphs (c)(1)(i), (c)(1)(ii), or (c)(1)(iii)~~ 48.3.1.1, 48.3.1.2, or 48.3.1.3 of this ~~Section~~ regulation.

48.3.1.1 ~~i~~-Reduce emissions of TOC (less methane and ethane) by 98 weight-percent ~~%~~, or to 20 ppmv, on a dry basis corrected to 3% ~~percent~~ oxygen, whichever is less stringent. If a boiler or process heater is used to comply with this standard, the vent stream shall be introduced into the flame zone of the boiler or process heater.

48.3.1.2 ~~ii~~-Combust emissions in a flare. Flares used to comply with this standard shall comply with the requirements of 40 CFR Part 60.18 (July 1, 1992). This flare operation requirement does not apply if a process, not subject to ~~this Section~~ 48.0 of this regulation, vents an emergency relief discharge into a common flare header and causes the flare servicing the process subject to ~~this Section~~ 48.0 of this regulation to be out of compliance with one or more of the provisions of 40 CFR Part 60.18 (July 1, 1992).

48.3.1.3 iii.—Use a product recovery device or process modification to increase the TRE index value to greater than 1.0 at the outlet of the final recovery device.

48.3.2 2.—For each individual vent stream within a process unit with a TRE index value of greater than 1.0, the owner or operator shall maintain vent stream parameters that result in a calculated TRE index value of greater than 1.0 without the use of a VOC control device. The TRE index shall be calculated at the outlet of the final recovery device.

48.4 d.—Test Methods and Procedures for Total Resource Effectiveness Index Value Determination, Performance Testing, and Exemption Testing. The following methods shall be used as reference methods to demonstrate compliance with ~~paragraph (c)~~ 48.3 of this ~~Section~~ regulation:

48.4.1 4.—The TRE index value of the vent shall be calculated using the following equation:

$$TRE = \frac{1}{E_{TOC}} [a + b(Q_s) + c(H_T) + d(E_{TOC})] \quad (48-1)$$

where:

TRE = TRE index value.

Q_s = Vent stream flow rate standard cubic meters per minute at a standard temperature of 20 degrees Celsius (°C).

H_T = Vent stream net heating value (megajoules per standard cubic meter), as calculated in ~~paragraph (d)(6)(vi)~~ 48.4.6.6 of this ~~Section~~ regulation.

E_{TOC} = Hourly emission rate of TOC (minus methane and ethane) (kilograms per hour), as calculated in ~~paragraph (d)(6)(iv)~~ 48.4.6.4 of this ~~Section~~ regulation.

a,b,c,d = Coefficients presented in Table 1 of 48.0 of this regulation.

48.4.1.1 i.—The owner or operator of a vent stream shall use the applicable coefficients in Table 4 48-1 of this regulation to calculate the TRE index value based on a flare, a thermal incinerator with 0% ~~percent~~ heat recovery, and a thermal incinerator with 70% ~~percent~~ heat recovery, and shall select the lowest TRE index value.

48.4.1.2 ii.—The owner or operator of a unit with a halogenated vent stream, determined as any stream with a total concentration of halogen atoms contained in organic compounds of 200 ppmv or greater, shall use the applicable coefficients in Table 4 48-1 of this regulation to calculate the TRE index value based on a thermal incinerator and a scrubber.

TABLE 4 48-1. COEFFICIENTS FOR TOTAL RESOURCE EFFECTIVENESS FOR NONHALOGENATED AND HALOGENATED VENT STREAMS

Type of Stream	Control Device Basis	Value of Coefficients			
		a	b	c	d
Non-halogenated	Flare	2.219	0.183	-0.005	0.359
	Thermal incinerator 0% percent heat recovery	3.075	0.021	-0.037	0.018
	Thermal incinerator 70% percent heat recovery	3.803	0.032	-0.042	0.007
Halogenated	Thermal incinerator and scrubber	5.470	0.181	-0.040	0.004

48.4.2 2—For the purpose of demonstrating compliance with the TRE index value, engineering assessment may be used to determine the process vent stream flow rate, the net heating value, and the TOC emission rate for the representative operating condition expected to yield the lowest TRE index value.

48.4.2.1 i—If the TRE index value calculated using such engineering assessment is greater than 4.0, the owner or operator shall not be required to perform the test methods and procedures specified in ~~paragraph (d)(4)~~ 48.4.4 of this ~~Section~~ regulation.

48.4.2.2 ii—If the TRE value calculated using such engineering assessment is less than or equal to 4.0, the owner or operator shall perform the test methods and procedures specified in ~~paragraph (d)(4)~~ 48.4.4 of this ~~Section~~ regulation.

48.4.3 3—For the purpose of demonstrating compliance with the control requirements of ~~this Section~~ 48.0 of this regulation, the process unit shall be run at representative operating conditions and flow rates during any performance test.

48.4.4 4—The following methods in **Appendix E** of ~~Regulation 24~~ this regulation, shall be used to demonstrate compliance with the emission limit or percent reduction efficiency requirement listed in ~~paragraph (c)(1)(i)~~ 48.3.1.1 of this ~~Section~~ regulation.

48.4.4.1 i—Method 1 or 1A, as appropriate, shall be used for the selection of the sampling sites. The control device inlet sampling site for the determination of vent stream molar composition or TOC (less methane and ethane) reduction efficiency shall be located after the last recovery device but prior to the inlet of the control device, prior to any dilution of the process vent stream, and prior to release to the atmosphere.

48.4.4.2 ii—Method 2, 2A, 2C, or 2D, as appropriate, shall be used for the determination of the gas stream volumetric flow rate.

48.4.4.3 iii.—The emission rate correction factor, integrated sampling, and analysis procedure of Method 3 shall be used to determine the oxygen concentration (%O_{2d}) for the purpose of determining compliance with the 20 ppmv limit. The sampling site shall be the same as that of the TOC samples, and samples shall be taken during the same time in which the TOC samples are taken. The TOC concentration (C_c), corrected to 3% percent oxygen (C_e), shall be computed using the following equation:

$$C_c = C_{\text{TOC}} \times \frac{17.9}{20.9 - \%O_{2d}} \quad (48-2)$$

where:

C_c = Concentration of TOC (minus methane and ethane), corrected to 3% percent oxygen on a dry basis (parts per million by volume).

C_{TOC} = Concentration of TOC (minus methane and ethane) on a dry basis (parts per million by volume).

%O_{2d} = Concentration of oxygen on a dry basis (percent % by volume).

48.4.4.4 iv.—Method 18 shall be used to determine the concentration of TOC (less methane and ethane) at the outlet of the control device when determining compliance with the 20 ppmv limit, or at both the control device inlet and the outlet when the reduction efficiency of the control device is to be determined.

48.4.4.4.1 A.—The minimum sampling time for each run shall be 1 hour, in which either an integrated sample or four grab samples shall be taken. If grab sampling is used, the samples shall be taken at 15-minute intervals.

48.4.4.4.2 B.—The emission reduction (R) of TOC (less methane and ethane) shall be determined using the following equation:

$$R = \frac{E_i - E_o}{E_i} \times 100 \quad (48-3)$$

where:

R = Emission reduction (percent by weight).

E_i = Mass rate of TOC (minus methane and ethane) entering the control device (kilograms of TOC per hour).

E_o = Mass rate of TOC (minus methane and ethane) discharged to the atmosphere (kilograms of TOC per hour).

48.4.4.4.3 ~~C~~—The mass rates of TOC (E_i , E_o) shall be computed using the following equations:

$$E_i = K_2 \left(\sum_{j=1}^n C_{ij} M_{ij} \right) Q_i \quad (48-4)$$

$$E_o = K_2 \left(\sum_{j=1}^n C_{oj} M_{oj} \right) Q_o \quad (48-5)$$

where:

C_{ij} , C_{oj} = Concentration of sample component J of the gas stream at the inlet and outlet of the control device, respectively, on a dry basis (parts per million by volume).

M_{ij} , M_{oj} = Molecular weight of sample component J of the gas stream at the inlet and outlet of the control device, respectively (grams per gram-mole).

Q_i , Q_o = Flow rate of the gas stream at the inlet and outlet of the control device, respectively (dry standard cubic meters per minute).

K_2 = Constant, 2.494×10^{-6} (parts per million)⁻¹(gram-moles per standard cubic meter)(kilograms per gram)(minutes per hour), where standard temperature for (gram-moles per standard cubic meter) is 20°C.

48.4.4.4.4 ~~D~~—The TOC concentration (C_{TOC}) is the sum of the individual components and shall be computed for each run using the following equation:

$$C_{TOC} = \sum_{j=1}^n C_j \quad (48-6)$$

where:

C_{TOC} = Concentration of TOC (minus methane and ethane) on a dry basis (parts per million by volume).

C_j = Concentration of sample component J on a dry basis (parts per million by volume).

n = Number of components in the sample.

48.4.4.5 ~~v~~—When a boiler or process heater with a design heat input capacity of 44 megawatts or greater, or a boiler or process heater into which the process vent stream is introduced with the primary fuel, is used to comply with the control requirements in ~~paragraph (c)(1)(i)~~ 48.3.1.1 of this ~~Section~~ regulation, an initial performance test shall not be required.

48.4.5 ~~5~~—When a flare is used to comply with the control requirements of ~~paragraph (c)(1)(ii)~~ 48.3.1.2 of this ~~Section~~ regulation, the flare shall comply with the requirements of 40 CFR Part 60.18 (July 1, 1992).

48.4.6 ~~6~~—The following test methods found in **Appendix E** of ~~Regulation 24~~ this regulation shall be used to determine compliance with the TRE index value.

48.4.6.1 ~~i~~—Method 1 or 1A, as appropriate, shall be used for the selection of the sampling sites.

48.4.6.1.1 ~~A~~—The sampling site for the vent stream molar composition determination and flow rate described in ~~paragraphs (d)(6)(ii) and (d)(6)(iii)~~ 48.4.6.2 and 48.4.6.3 of this ~~Section~~ regulation shall be, except for the situations outlined in ~~paragraph (d)(6)(i)(B)(1)~~ 48.4.6.1.2.1 of this ~~Section~~ regulation, after the final recovery device, if a recovery system is present, prior to the inlet of any control device, and prior to any post-reactor or post-distillation unit introduction of halogenated compounds into the process vent stream. No traverse site selection method is needed for vents smaller than 10 centimeters (3.9 inches) in diameter.

48.4.6.1.2 ~~B~~—If any gas stream other than the reactor or distillation vent stream is normally conducted through the final recovery device:

48.4.6.1.2.1 ~~(1)~~—The sampling site for the vent stream flow rate and molar composition shall be prior to the final recovery device and prior to the point at which any non-reactor or non-distillation stream or stream from a non-affected reactor or distillation unit is introduced. Method 18 shall be used to measure organic compound concentrations at this site.

48.4.6.1.2.2 ~~(2)~~—The efficiency of the final recovery device is determined by measuring the organic compound concentrations using Method 18 at the inlet to the final recovery device, after the introduction of all vent streams, and at the outlet of the final recovery device.

48.4.6.1.2.3 ~~(3)~~—The efficiency of the final recovery device determined according to ~~paragraph (d)(6)(i)(B)(2)~~ 48.4.6.1.2.2 of this ~~Section~~ regulation shall be applied to the organic compound concentrations measured according to ~~paragraph (d)(6)(i)(B)(1)~~ 48.4.6.1.2.1 of this

~~Section~~ regulation to determine the concentrations of organic compounds from the final recovery device attributable to the reactor or distillation vent stream. The resulting organic compound concentrations shall then be used to perform the calculations outlined in ~~paragraph~~ ~~(d)(1)~~ 48.4.1 of this ~~Section~~ regulation.

48.4.6.2 ~~ii.~~—The molar composition of the vent stream shall be determined as follows:

48.4.6.2.1 ~~A.~~—Method 18 shall be used to measure the concentration of organic compounds, including those containing halogens.

48.4.6.2.2 ~~B.~~—American Society for Testing and Materials (ASTM) Method D1946-77 shall be used to measure the concentration of carbon monoxide and hydrogen.

48.4.6.2.3 ~~C.~~—Method 4 shall be used to measure the content of water vapor.

48.4.6.3 ~~iii.~~—The volumetric flow rate shall be determined using Method 2, 2A, 2C, or 2D, as appropriate.

48.4.6.4 ~~iv.~~—The emission rate of TOC (minus methane and ethane) (E_{TOC}) in the vent stream shall be calculated using the following equation:

$$E_{\text{TOC}} = K_2 \left(\sum_{j=1}^n C_j M_j \right) Q_s \quad (48-7)$$

where:

E_{TOC} = Emission rate of TOC (minus methane and ethane) in the sample (kilograms per hour).

K_2 = Constant, 2.494×10^{-6} (parts per million)⁻¹(gram-moles per standard cubic meter)(kilograms per gram)(minutes per hour), where standard temperature for (gram-moles per standard cubic meter) is 20°C.

C_j = Concentration of compound J, on a dry basis (parts per million), as measured by Method 18, as indicated in ~~paragraph~~ ~~(d)(4)(iv)~~ 48.4.4.4 of this ~~Section~~ regulation.

M_j = Molecular weight of sample J (grams per gram-mole).

Q_s = Vent stream flow rate (standard cubic meters per minute) at a temperature of 20°C.

48.4.6.5 ~~v.~~—The total process vent stream concentration (by volume) of compounds containing halogens (ppmv by compound)

shall be summed from the individual concentrations of compounds containing halogens that were measured by Method 18.

48.4.6.6 ~~vi.~~—The net heating value of the vent stream shall be calculated using the following equation:

$$H_T = K_1 \sum_{j=1}^n C_j H_j (1 - B_{ws}) \quad (48-8)$$

where:

H_T = Net heating value of the sample (megajoules per standard cubic meter), where the net enthalpy per mole of vent stream is based on combustion at 25°C and 760 millimeters of mercury, but the standard temperature for determining the volume corresponding to one mole is 20°C, as in the definition of Q_s (vent stream flow rate).

K_1 = Constant, 1.740×10^{-7} (parts per million)⁻¹(gram-moles per standard cubic meter)(megajoules per kilocalorie), where standard temperature for (gram-moles per standard cubic meter) is 20°C.

B_{ws} = Water vapor content of the vent stream, proportion by volume; except that if the vent stream passes through a final steam jet and is not condensed, it shall be assumed that $B_{ws} = 0.023$ in order to correct to 2.3% percent moisture.

C_j = Concentration on a dry basis of compound J (parts per million), as measured for all organic compounds by Method 18 and measured for hydrogen and carbon monoxide by the ASTM Method D1946-77.

H_j = Net heat of combustion of compound J (kilocalories per gram-mole), based on combustion at 25°C and 760 millimeters of mercury. The heats of combustion of vent stream components shall be determined using ASTM Method D2382-76 if published values are not available or cannot be calculated.

48.4.7 ~~7.~~—Each owner or operator of an affected facility seeking to comply with ~~paragraphs (c)(1)(iii) of this Section or (c)(2)~~ 48.3.1.1 or 48.3.2 of this ~~Section~~ regulation shall recalculate the flow rate and TOC concentration for that affected facility whenever process changes are made. Examples of process changes include changes in production capacity, feedstock type, or catalyst type, or whenever there is replacement, removal, or addition of recovery equipment. The flow rate and VOC concentration shall be recalculated based on test data, or on best engineering estimates of the effects of the change to the recovery system.

48.4.8 ~~8.~~—Where the recalculated values yield a TRE index of less than or equal to 1.0, the owner or operator shall notify the Department within 4 one week of the recalculation and shall conduct a performance test according to the methods and procedures specified in ~~paragraph (d)(4)~~ 48.4.4 of this ~~Section~~ regulation.

48.4.9 9. For the purpose of demonstrating that a process vent stream has a VOC concentration of less than 500 ppmv, the following procedures shall be used:

48.4.9.1 i. The sampling site shall be selected as specified in ~~paragraph (d)(4)(i)~~ 48.4.4.1 of this ~~Section~~ regulation.

48.4.9.2 ii. Method 18 or Method 25A in **Appendix E** of ~~Regulation 24~~ this regulation shall be used to measure the VOC concentration; alternatively, any other method or data that has been validated according to the protocol in Method 301 of 40 CFR, Part 63, Appendix A may be used.

48.4.9.3 iii. Where Method 18 is used, the following procedures shall be used to calculate ppmv TOC concentrations:

48.4.9.3.1 A. The minimum sampling time for each run shall be 1 hour, in which either an integrated sample or four grab samples shall be taken. If grab sampling is used, the samples shall be taken at approximately equal intervals of time, such as at 15-minute intervals during the run.

48.4.9.3.2 B. The concentration of TOC (minus methane and ethane) shall be calculated using Method 18 according to ~~paragraph (d)(4)(iv)~~ 48.4.4.4 of this ~~Section~~ regulation.

48.4.9.4 iv. Where Method 25A is used, the following procedures shall be used to calculate (ppmv) TOC concentrations:

48.4.9.4.1 A. Method 25A shall be used only if a single VOC is greater than 50% ~~percent~~ of total VOCs, by volume, in the process vent stream.

48.4.9.4.2 B. The process vent stream composition may be determined by either process knowledge or by test data collected using an appropriate EPA Method or a data collection method validated according to the protocol in Method 301 of 40 CFR Part 63, Appendix A (July 1, 1992). Examples of information that could constitute process knowledge include calculations based on material balances, process stoichiometry, or previous test results, provided that the results are still relevant to the current process vent stream conditions.

48.4.9.4.3 C. The VOC used as the calibration gas for Method 25A shall be the single VOC present at greater than 50% ~~percent~~ of the total VOC by volume.

48.4.9.4.4 ~~D.~~—The span value for Method 25A shall be 50 ppmv.

48.4.9.4.5 ~~E.~~—Use of Method 25A is acceptable if the response from the high-level calibration gas is at least 20 times the standard deviation of the response from the zero calibration gas when the instrument is zeroed on the most sensitive scale.

48.4.9.4.6 ~~F.~~—The concentration of TOC shall be corrected to 3% ~~percent~~ oxygen using the procedures and equation provided in ~~paragraph (d)(4)(iii)~~ 48.4.4.3 of this ~~Section~~ regulation.

48.4.9.5 ~~v.~~—The owner or operator shall demonstrate that the concentration of TOC (including methane and ethane) measured by Method 25A is less than 250 ppmv with a VOC concentration of less than 500 ppmv to qualify for the low-concentration exclusion.

48.5 ~~e.~~—Monitoring Requirements.

48.5.1 ~~1.~~—The owner or operator of an affected facility that uses an incinerator to seek compliance with the TOC emission limit or the percent reduction specified in ~~paragraph (c)(1)(i)~~ 48.3.1.1 of this ~~Section~~ regulation shall install, calibrate, maintain, and operate, according to manufacturer's specifications, a temperature monitoring device that is equipped with a continuous recorder and that has an accuracy of $\pm 1\%$ ~~percent~~ of the temperature being measured, expressed in degrees Celsius or $\pm 0.5^{\circ}\text{C}$, whichever is greater.

48.5.1.1 ~~i.~~—Where an incinerator other than a catalytic incinerator is used, a temperature monitoring device shall be installed in the firebox.

48.5.1.2 ~~ii.~~—Where a catalytic incinerator is used, temperature monitoring devices shall be installed in the gas stream immediately before and after the catalyst bed.

48.5.2 ~~2.~~—The owner or operator of an affected facility that uses a flare to seek compliance with ~~paragraph (c)(1)(ii)~~ 48.3.1.2 of this ~~Section~~ regulation shall install, calibrate, maintain, and operate, according to manufacturer's specifications, a heat-sensing device, such as an ultraviolet beam sensor or a thermocouple, at the pilot light to indicate the continuous presence of a flame.

48.5.3 ~~3.~~—The owner or operator of an affected facility that uses a boiler or process heater with a design heat input capacity of less than 44 megawatts to seek compliance with ~~paragraph (c)(1)(i)~~ 48.3.1.1 of this ~~Section~~ regulation shall install, calibrate, maintain, and operate, according to manufacturer's specifications, a temperature monitoring device in the

firebox. The monitoring device shall be equipped with a continuous recorder and shall have an accuracy of $\pm 1\%$ ~~percent~~ of the temperature being measured, expressed in degrees Celsius or $\pm 0.5^{\circ}\text{C}$, whichever is greater. Any boiler or process heater in which all vent streams are introduced with primary fuel is not subject to this requirement.

48.5.4 4.—The owner or operator of an affected facility that seeks to demonstrate compliance with the TRE index value limit specified in ~~paragraphs (c)(1)(iii) or (c)(2)~~ 48.3.1.3 or 48.3.2 of this ~~Section~~ regulation shall install, calibrate, maintain, and operate, according to manufacturer's specifications, the following equipment:

48.5.4.1 i.—Where an absorber is the final recovery device in the recovery system, the following monitoring equipment is required.

48.5.4.1.1 A.—A scrubbing liquid temperature monitor equipped with a continuous recorder.

48.5.4.1.2 B.—A specific gravity monitor equipped with continuous recorders.

48.5.4.2 ii.—Where a condenser is the final recovery device in the recovery system, a condenser exit (product side) temperature monitoring device that is equipped with a continuous recorder and that has an accuracy of $\pm 1\%$ ~~percent~~ of the temperature being monitored, expressed in degrees Celsius or $\pm 0.5^{\circ}\text{C}$, whichever is greater.

48.5.4.3 iii.—Where a carbon adsorber is the final recovery device unit in the recovery system, an integrating regeneration stream flow monitoring device with an accuracy of $\pm 10\%$ ~~percent~~, that is capable of recording the total regeneration stream mass flow for each regeneration cycle; and a carbon bed temperature monitoring device with an accuracy of $\pm 1\%$ ~~percent~~ of the temperature being monitored, expressed in degrees Celsius, or $\pm 0.5^{\circ}\text{C}$, that is capable of recording the carbon bed temperature after each regeneration and within 15 minutes of completing any cooling cycle.

48.5.4.4 iv.—Where an absorber is used to scrub halogenated streams after an incinerator, boiler, or process heater, the following monitoring equipment is required for the scrubber.

48.5.4.4.1 A.—A pH monitoring device equipped with a continuous recorder.

48.5.4.4.2 B.—Flow meters equipped with a continuous recorder to be located at the scrubber influent for liquid flow and at the scrubber inlet for gas stream flow.

48.5.5 ~~5~~—The owner or operator of a process vent using a vent system that contains bypass lines that could divert a vent stream away from the combustion device shall either:

48.5.5.1 ~~i~~—Install, calibrate, maintain, and operate a flow indicator that provides a record of vent stream flow at least once every 15 minutes (the flow indicator shall be installed at the entrance to any bypass line that could divert the vent stream away from the combustion device to the atmosphere); or

48.5.5.2 ~~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 vent stream is not diverted through the bypass line.

48.6 ~~f~~—Reporting/Recordkeeping Requirements.

48.6.1 ~~4~~—Each owner or operator with a reactor process or distillation operation subject to ~~this Section 48.0 of this regulation~~ shall keep records of the following parameters that are measured during a performance test or TRE determination, as specified in ~~paragraph (d) 48.4 of this Section regulation~~, and that are required to be monitored, as specified in ~~paragraph (e) 48.5 of this Section regulation~~.

48.6.1.1 ~~i~~—Where an owner or operator subject to the provisions of ~~this Section 48.0 of this regulation~~ seeks to demonstrate compliance with ~~paragraph (c)(1)(i) 48.3.1.1 of this Section regulation~~ through the use of either a thermal or catalytic incinerator:

48.6.1.1.1 ~~A~~—The average firebox temperature of the incinerator (or the average temperature upstream and downstream of the catalyst bed for a catalytic incinerator), measured at least every 15 minutes and averaged over the same time period of the performance testing.

48.6.1.1.2 ~~B~~—The percent reduction of TOC achieved by the incinerator, determined as specified in ~~paragraph (d)(4) 48.4.4 of this Section regulation~~; or the concentration of TOC (ppmv, by compound) at the outlet of the control device, on a dry basis, corrected to 3% ~~percent~~ oxygen, determined as specified in ~~paragraph (d)(4) 48.4.4 of this Section regulation~~.

48.6.1.2 ~~ii~~—Where an owner or operator subject to the provisions of ~~this Section 48.0 of this regulation~~ seeks to demonstrate compliance with ~~paragraph (c)(1)(i) 48.3.1.1 of this Section regulation~~ through the use of a boiler or process heater:

48.6.1.2.1 ~~A~~—A description of the location at which the vent stream is introduced into the boiler or process heater.

48.6.1.2.2 ~~B~~—The average combustion temperature of the boiler or process heater with a design heat input capacity of less than 44 megawatts measured at least every 15 minutes and averaged over the same time period of the performance testing.

48.6.1.2.3 ~~C~~—Any boiler or process heater in which all vent streams are introduced with primary fuel is not subject to these requirements.

48.6.1.3 ~~iii~~—Where an owner or operator subject to the provisions of ~~this Section 48.0 of this regulation~~ seeks to demonstrate compliance with ~~paragraph (c)(1)(ii)~~ 48.3.1.2 of this ~~Section regulation~~ through the use of a smokeless flare; flare design (i.e., steam-assisted, air-assisted, or non-assisted), all visible emission readings, heat content determinations, flow rate measurements, and exit velocity determinations made during the performance test, continuous records of the flare pilot flame monitoring, and records of all periods of operations during which the pilot flame is absent.

48.6.1.4 ~~iv~~—Where an owner or operator subject to the provisions of ~~this Section 48.0 of this regulation~~ seeks to demonstrate compliance with ~~paragraphs (c)(1)(iii) or (c)(2)~~ 48.3.1.3 or 48.3.2 of this ~~Section regulation~~:

48.6.1.4.1 ~~A~~—Where an absorber is the final recovery device in the recovery system, the exit specific gravity (or alternative parameter which is a measure of the degree of absorbing liquid saturation, if approved by the Department), and the average exit temperature of the absorbing liquid, measured at least every 15 minutes and averaged over the same time period of the performance testing (both measured while the vent stream is normally routed and constituted).

48.6.1.4.2 ~~B~~—Where a condenser is the final recovery device in the recovery system, the average exit (product side) temperature, measured at least every 15 minutes and averaged over the same time period of the performance testing while the vent stream is routed and constituted normally.

48.6.1.4.3 ~~C~~—Where a carbon adsorber is the final recovery device in the recovery system, the total stream mass or volumetric flow, measured at least every 15 minutes and averaged over the same time period of the

performance testing (full carbon bed cycle), the temperature of the carbon bed after regeneration (and within 15 minutes of completion of any cooling cycle~~(s)~~ or cycles), and the duration of the carbon bed steaming cycle (all measured while the vent stream is routed and constituted normally).

48.6.1.4.4 ~~D.~~ As an alternative to ~~paragraphs (f)(1)(iv)(A), (f)(1)(iv)(B), or (f)(1)(iv)(C)~~ 48.6.1.4.1, 48.6.1.4.2, or 48.6.1.4.3 of this ~~Section~~ regulation, the concentration level or reading indicated by the organics monitoring device at the outlet of the absorber, condenser, or carbon adsorber, measured at least every 15 minutes and averaged over the same time period as the performance testing while the vent stream is normally routed and constituted.

48.6.1.4.5 ~~E.~~—All measurements and calculations performed to determine the flow rate and the VOC concentration, heating value, and TRE index value of the vent stream.

48.6.2 ~~2.~~—Each owner or operator with a reactor process or distillation operation seeking to comply with ~~paragraphs (e)(1)(iii) or (e)(2)~~ 48.3.1.3 or 48.3.2 of this ~~Section~~ regulation shall also keep records of the following information:

48.6.2.1 ~~i.~~—Any changes in production capacity, feedstock type, or catalyst type, or of any replacement, removal, and addition of recovery equipment or reactors and distillation units.

48.6.2.2 ~~ii.~~—Any recalculation of the flow rate, TOC concentration, or TRE index value performed according to ~~paragraph (d)(7)~~ 48.4.7 of this ~~Section~~ regulation.

48.6.3 ~~3.~~—Each owner or operator with a reactor process or distillation operation seeking to comply with the flow rate or VOC concentration exemption level specified in ~~paragraph (a)(2)(iv)~~ 48.1.2.4 of this ~~Section~~ regulation shall keep records to indicate that the stream flow rate is less than 0.0085 scmm or that the VOC concentration is less than 500 ppmv.

48.6.4 ~~4.~~—Each owner or operator with a reactor process or distillation operation seeking to comply with the production capacity exemption level of ~~4~~ one gigagram per year (1,100 tons per year) shall keep records of the design production capacity or of any changes in equipment or process operations that may affect the design production capacity of the affected process unit.

48.6.5 ~~5.~~—Each owner or operator with a reactor process of distillation operation subject to the provisions of ~~this Section~~ 48.0 of this regulation shall comply with the following requirements:

48.6.5.1 ~~i.~~ Initial compliance certification as specified in ~~Section 5(a) of Regulation 24~~ 5.1 of this regulation.

48.6.5.2 ~~ii.~~ Reports of excess emissions as specified in ~~Section 5(b) of Regulation 24~~ 5.2 of this regulation, in addition to any other excess emissions reporting mandated by the State of Delaware.

~~Section 49—~~

49.0 Control of Volatile Organic Compound Emissions from Volatile Organic Liquid Storage Vessels

11/29/1994

49.1 ~~a~~—Applicability.

49.1.1 ~~1~~—Except as provided for in ~~(a)(2)~~ 49.1.2 of this regulation, ~~this Section applies~~ the provisions of 49.0 of this regulation apply to each storage vessel with a capacity equal to or greater than 40,000 gallons (gal) that is used to store volatile organic liquids (VOLs).

49.1.2 ~~2~~—~~This Section does~~ The provisions of 49.0 of this regulation do not apply to:

49.1.2.1 ~~i~~—Storage vessels with a capacity less than 5,000 gal.

49.1.2.2 ~~ii~~—Storage vessels with a capacity equal to or greater than 5,000 gal and less than 40,000 gal provided that records are maintained consistent with ~~(e)(2)~~ 49.5.2 of this regulation.

49.1.2.3 ~~iii~~—Storage vessels with a capacity equal to or greater than 40,000 gal storing a liquid with a maximum true vapor pressure less than 1.0 psia provided that records are maintained consistent with ~~(e)(2)~~ 49.5.2 of this regulation.

49.1.2.4 ~~iv~~—Storage vessels with a capacity equal to or greater than 40,000 gal storing a liquid with a maximum true vapor pressure equal to or greater than 1.0 psia but less than 1.5 psia provided that records are maintained consistent with ~~(e)(1), (e)(2), and (e)(3)~~ 49.5.1, 49.5.2, and 49.5.3 of this regulation (if applicable).

49.1.2.5 ~~v~~—Storage vessels whose emissions to the atmosphere are covered by:

49.1.2.5.1 ~~A~~—Any other section of this regulation.

49.1.2.5.2 ~~B~~—Any federal rule.

49.1.2.6 ~~vi~~—Storage vessels at coke oven by-product plants.

49.1.2.7 ~~vii~~—Pressure vessels which operate without emissions to the atmosphere.

49.1.2.8 ~~viii~~—Storage vessels permanently attached to mobile vehicles such as trucks, railcars, barges, or ships.

49.1.2.9 ~~ix~~—Storage vessels used to store beverage alcohol.

49.1.3 ~~3.~~ Any owner or operator currently permitted under Regulation No. 2 7 DE Admin Code 1102 to operate a storage vessel covered by this Section 49.0 of this regulation shall submit to the Department, within 90 days of the effective date of ~~this Section 49.0 of this regulation~~, an application to amend the current permit and to comply with the provisions of ~~this Section 49.0 of this regulation~~.

49.1.4 ~~4.~~ Any owner or operator of a non-permitted storage vessel subject to the provisions of ~~this Section 49.0 of this regulation~~, on and after the effective date of ~~this Section 49.0 of this regulation~~, shall immediately submit to the Department an application for a permit to construct, modify, reconstruct and/or operate the storage vessel.

49.1.5 ~~5.~~ Any owner or operator of a permitted or a non-permitted storage vessel that becomes subject to the provisions of ~~this Section 49.0 of this regulation~~ after the effective date of ~~this Section 49.0 of this regulation~~ shall submit to the Department an application for a permit or an application to amend the current permit to comply with the provisions of ~~this Section 49.0 of this regulation~~, and shall receive approval of his application from the Department prior to constructing, modifying, reconstructing and/or operating the storage vessel.

49.2 ~~b.~~ Definitions. As used in ~~this Section 49.0 of this regulation~~, all terms not defined herein shall have the meaning given them in the November 15, 1990 Clean Air Act Amendments, or in ~~Section No. 2 2.0~~ of this regulation.

“**Fill**” means the introduction of VOL into a storage vessel but not necessarily to complete capacity.

“**Mechanical Shoe Seal**” means a metal sheet held vertically against the wall of the storage vessel by springs or weighted levers and connected by braces to the floating roof.

49.3 ~~c.~~ Standards.

49.3.1 ~~1.~~ The owner or operator of each storage vessel with a capacity equal to or greater than 40,000 gal which contains a VOL that, as stored, has a maximum true vapor pressure equal to or greater than 1.5 psia but less than 11.1 psia shall equip the storage vessel with the equipment specified in either ~~(c)(1)(i), (c)(1)(ii), (c)(1)(iii), or (c)(1)(iv)~~ 49.3.1.1, 49.3.1.2, 49.3.1.3, or 49.3.1.4 of this regulation; whichever is applicable.

49.3.1.1 ~~i.~~ Each fixed roof tank shall be equipped with an internal floating roof as specified below, or a vapor control system as specified in ~~(c)(1)(iii)~~ 49.3.1.3 of this regulation, or an equivalent system as specified in ~~(C)(1)(iv)~~ 49.3.1.4 of this regulation.

49.3.1.1.1 ~~A.~~ Each internal floating roof shall meet all of the specifications stated in ~~(c)(1)(i)(B) through (c)(1)(i)(L)~~

49.3.1.1.2 through 49.3.1.1.12 of this regulation according to the following schedule:

49.3.1.1.1.1 4.—Each fixed roof tank that is not equipped with an internal floating roof as of the effective date of ~~this Section 49.0 of this regulation~~ shall be in compliance with this standard prior to filling the tank following the next scheduled tank cleaning, and no later than April 1, 1996.

49.3.1.1.1.2 2.—Each fixed roof tank that is equipped with an internal floating roof as of the effective date of ~~this Section 49.0 of this regulation~~ shall be in compliance with this standard prior to filling the tank following the next scheduled tank cleaning, and no later than 10 years after the effective date of ~~this Section 49.0 of this regulation~~.

49.3.1.1.1.3 3.—Each fixed roof tank for which construction is to commence after the effective date of ~~this Section 49.0 of this regulation~~ shall be in compliance with this standard prior to initially filling the tank.

49.3.1.1.1.4 4.—Each existing fixed roof tank that becomes subject to the provisions of ~~this Section 49.0 of this regulation~~ after the effective date of ~~this Section 49.0 of this regulation~~ shall be in compliance with this standard prior to filling the tank.

49.3.1.1.2 B.—The internal floating roof shall rest or float on the liquid surface, but not necessarily in complete contact with it.

49.3.1.1.3 C.—The internal floating roof shall be floating on the liquid surface at all times except during those intervals when the storage vessel is being completely emptied and subsequently filled.

49.3.1.1.4 D.—When the internal floating roof is resting on the leg supports the process of filling or emptying shall be continuous and shall be accomplished as rapidly as possible.

49.3.1.1.5 E.—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:

49.3.1.1.5.1 1.—A foam-or liquid-filled seal mounted in contact with the liquid (liquid-mounted seal).

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

49.3.1.1.5.3 3.—A mechanical shoe seal.

49.3.1.1.6 F.—Each opening in a noncontact internal floating roof except for the automatic bleeder vents (vacuum breaker vents) and the rim space vents shall provide a projection below the liquid surface.

49.3.1.1.7 G.—Each opening in the internal floating roof except for leg sleeves, automatic bleeder vents, rim space vents, column wells, ladder wells, sample wells, and stub drains shall be equipped with a cover, seal, or lid which shall be maintained in a closed position at all times (i.e., no visible gap) except when the device is in actual use. The cover or lid shall be equipped with a gasket.

49.3.1.1.8 H.—Covers on each access hatch and automatic gauge float well shall be bolted except when they are in actual use.

49.3.1.1.9 I.—Automatic bleeder vents shall be equipped with a gasket and shall 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.

49.3.1.1.10 J.—Rim space vents shall be equipped with a gasket and shall be set to open only when the internal floating roof is being floated off the roof leg supports or at the manufacturer's recommended setting.

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

49.3.1.1.12 ~~L.~~—Each penetration of the internal floating roof that allows for passage of a ladder shall have a gasketed sliding cover.

49.3.1.2 ~~ii.~~—Each external floating roof tank shall be equipped with an external floating roof as specified below, or a vapor control system as specified in ~~(e)(1)(iii)~~ 49.3.1.3 of this regulation, or an equivalent system as specified in ~~(C)(1)(iv)~~ 49.3.1.4 of this regulation.

49.3.1.2.1 ~~A.~~—Each external floating roof tank shall meet all of the specifications stated in ~~(e)(1)(ii)(B)~~ through ~~(e)(1)(ii)(I)~~ 49.3.1.2.2 through 49.3.1.2.9 of this regulation according to the following schedule:

49.3.1.2.1.1 ~~1.~~—Each existing external floating roof tank shall be in compliance with this standard prior to filling the tank following the next scheduled tank cleaning, and no later than 10 years after the effective date of ~~this Section 49.0~~ of this regulation.

49.3.1.2.1.2 ~~2.~~—Each external floating roof tank for which construction is to commence after the effective date of ~~this Section 49.0~~ of this regulation shall be in compliance with this standard prior to initially filling the tank.

49.3.1.2.1.3 ~~3.~~—Each existing external floating roof tank that becomes subject to the provisions of ~~this Section 49.0~~ of this regulation after the effective date of ~~this Section 49.0~~ of this regulation shall be in compliance with this standard prior to filling the tank.

49.3.1.2.2 ~~B.~~—The roof shall be floating on the liquid surface at all times except during those intervals when the storage vessel is being completely emptied and subsequently filled.

49.3.1.2.3 ~~C.~~—When the roof is resting on the leg supports the process of filling or emptying shall be continuous and shall be accomplished as rapidly as possible.

49.3.1.2.4 ~~D.~~—Each external floating roof shall be equipped with a closure device between the wall of the storage vessel and the roof edge.

49.3.1.2.4.1 ~~1.~~—The closure device shall 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.

49.3.1.2.4.2 ~~2~~—The primary seal shall be either a mechanical shoe seal or a liquid mounted seal.

49.3.1.2.4.3 ~~3~~—One end of the mechanical shoe seal, if used, shall extend into the stored liquid, and the other end shall extend a minimum vertical distance of 24 in. above the stored liquid surface.

49.3.1.2.4.4 ~~4~~—As determined by the method in ~~(d)(2)(iii)(A)~~ 49.4.2.3.1 of this regulation the width of any portion of any gap between the tank wall and:

49.3.1.2.4.4.1 ~~i~~—The primary seal shall not exceed 1.5 in.

49.3.1.2.4.4.2 ~~ii~~—The secondary seal shall not exceed 0.5 in.

49.3.1.2.4.5 ~~5~~—As determined by the method in ~~(d)(2)(iii)(B)~~ 49.4.2.3.2 of this regulation the accumulated area of gaps between the tank wall and:

49.3.1.2.4.5.1 ~~i~~—The primary seal shall not exceed 10 in² ~~in~~ inch² per foot of tank diameter.

49.3.1.2.4.5.2 ~~ii~~—The secondary seal shall not exceed 1.0 in² ~~in~~ inch² per foot of tank diameter.

49.3.1.2.5 ~~E~~—Each opening in a noncontact external floating roof except for the automatic bleeder vents (vacuum breaker vents) and the rim space vents shall provide a projection below the liquid surface.

49.3.1.2.6 ~~F~~—Each opening in the roof except for leg sleeves, automatic bleeder vents, rim space vents, and roof drains shall be equipped with a cover, seal, or lid which shall be maintained in a closed position at all times (i.e., no visible gap) except when the device is in actual use. The cover or lid shall be equipped with a gasket.

49.3.1.2.7 ~~G~~—Automatic bleeder vents shall be equipped with a gasket and shall 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.

49.3.1.2.8 ~~H.~~ Rim space vents shall be equipped with a gasket and shall be set to open only when the roof is being floated off the roof leg supports or at the manufacturer's recommended setting.

49.3.1.2.9 ~~I.~~ 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.

49.3.1.3 ~~iii.~~ As an alternative to installing the internal floating roof specified in ~~(c)(1)(i)~~ 49.3.1.1, or the external floating roof specified in ~~(c)(1)(ii)~~ 49.3.1.2, or as required by ~~(c)(2)(i)~~ 49.3.2.1, or where the control technologies specified in ~~(c)(1)(i) and (c)(1)(ii)~~ 49.3.1.1 and 49.3.1.2 of this regulation are not appropriate (e.g. horizontal storage vessels), emissions shall be controlled with a closed vent system and a control device.

49.3.1.3.1 ~~A.~~ Each closed vent system and control device shall meet the specifications stated in ~~(c)(1)(iii)(B) through (c)(1)(iii)(D)~~ 49.3.1.3.2 through 49.3.1.3.4 of this regulation according to the following schedule:

49.3.1.3.1.1 ~~1.~~ Each fixed roof tank that is not equipped with an internal floating roof as of the effective date of ~~this Section 49.0 of this regulation~~ shall be in compliance with this standard prior to filling the tank following the next scheduled tank cleaning, and no later than April 1, 1996.

49.3.1.3.1.2 ~~2.~~ Each fixed roof tank that is equipped with an internal floating roof as of the effective date of ~~this Section 49.0 of this regulation~~, and each external floating roof tank shall be in compliance with this standard prior to filling the tank following the next scheduled tank cleaning, and no later than 10 years after the effective date of ~~this Section 49.0 of this regulation~~.

49.3.1.3.1.3 ~~3.~~ Each tank for which construction is to commence after the effective date of ~~this Section 49.0 of this regulation~~ shall be in compliance with this standard prior to initially filling the tank.

49.3.1.3.1.4 4.—Each existing tank that becomes subject to the provisions of ~~this Section 49.0~~ of this regulation after the effective date of ~~this Section 49.0~~ of this regulation shall be in compliance with this standard prior to filling the tank.

49.3.1.3.2 B.—The closed vent system shall:

49.3.1.3.2.1 1.—Collect all VOC vapors and gases discharged from the storage vessel.

49.3.1.3.2.2 2.—Operate with no detectable emission as indicated by an instrument reading of less than 500 ppm above background and visual inspections, as determined by the methods specified in **Appendix F** of this Regulation.

49.3.1.3.3 C.—The control device shall reduce the inlet VOC emissions by 95 weight % ~~percent~~ or greater.

49.3.1.3.4 D.—If a flare is used as the control device, it shall meet the specifications described in 40 CFR Part 60, paragraph 60.18 (July 1, 1992).

49.3.1.4 iv.—If, in the Department's judgment, an alternative means of emission limitation will achieve a reduction in emissions at least equivalent to the reduction in emissions achieved by ~~(c)(1)(i), (c)(1)(ii), or (c)(1)(iii)~~ 49.3.1.1, 49.3.1.2, or 49.3.1.3 of this regulation, whichever is applicable, the owner or operator shall:

49.3.1.4.1 A.—Be in compliance with the applicable standard according to the following schedule:

49.3.1.4.1.1 1.—Each fixed roof tank that is not equipped with an internal floating roof as of the effective date of ~~this Section 49.0~~ of this regulation shall be in compliance with the applicable standard prior to filling the tank following the next scheduled tank cleaning, and no later than April 1, 1996.

49.3.1.4.1.2 2.—Each fixed roof tank that is equipped with an internal floating roof as of the effective date of ~~this Section 49.0~~ of this regulation, and each external floating roof tank shall be in compliance with the applicable standard prior to filling the tank following the next scheduled tank cleaning, and no later than 10

years after the effective date of ~~this Section 49.0~~ of this regulation.

49.3.1.4.1.3 3.—Each tank for which construction is to commence after the effective date of ~~this Section 49.0 of this regulation~~ shall be in compliance with the applicable standard prior to initially filling the tank.

49.3.1.4.1.4 4.—Each tank that becomes subject to the provisions of ~~this Section 49.0 of this regulation~~ after the effective date of ~~this Section 49.0 of this regulation~~ shall be in compliance with this standard prior to filling the tank.

49.3.1.4.2 B.—Submit to the Department a written application including, at a minimum:

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

49.3.1.4.2.2 2.—An engineering evaluation that the Department determines is an accurate method of determining equivalence.

49.3.1.4.3 C.—The Department may condition the approval on requirements that may be necessary to ensure operation and maintenance to achieve the same emissions reduction as specified in ~~paragraphs (c)(1)(i), (c)(1)(ii), or (c)(1)(iii)~~ 49.3.1.1, 49.3.1.2, or 49.3.1.3 of this regulation.

49.3.2 2.—The owner or operator of each storage vessel with a capacity equal to or greater than 40,000 gal which contains a VOL that, as stored, has a maximum true vapor pressure equal to or greater than 11.1 psia shall equip the storage vessel with one of the following:

49.3.2.1 i.—A closed vent system and control device as specified in ~~(c)(1)(iii)~~ 49.3.1.3 of this regulation.

49.3.2.2 ii.—A alternative system equivalent to the system specified in ~~(c)(1)(iii)~~ 49.3.1.3, as provided for in ~~(c)(1)(iv)~~ 49.3.1.4 of this regulation.

49.4 d.—Inspections. The owner or operator of each storage vessel subject to ~~(c)(1)(i) through (c)(1)(iii)~~ 49.3.1.1 through 49.3.1.3 of this regulation shall meet

the requirements of ~~(d)(1) through (d)(4)~~ below 49.4.1 through 49.4.4 of this regulation; whichever is applicable.

49.4.1 1. ~~After installing the control equipment required to meet (c)(1)(i) 49.3.1.1 of this regulation (fixed roof tank with an internal floating roof), the owner or operator shall, at a minimum:~~

49.4.1.1 i. ~~Prior to initially filling the storage vessel, conduct an inspection as specified in (d)(1)(iv) 49.4.1.4 of this regulation.~~

49.4.1.2 ii. ~~Conduct periodic inspections according to the following schedule:~~

49.4.1.2.1 A. ~~Inspect the storage vessel once every 12 months as specified in (d)(1)(v) 49.4.1.5 of this regulation, and~~

49.4.1.2.2 B. ~~Inspect the storage vessel each time the storage vessel is emptied and degassed, but at no time less frequently than once every 10 years, as specified in (d)(1)(iv) 49.4.1.4 of this regulation.~~

49.4.1.3 iii. ~~For each vessel equipped with both a primary seal and a secondary seal the owner or operator may, in lieu of (d)(1)(ii) 49.4.1.2 of this regulation, inspect the storage vessel each time the storage vessel is emptied and degassed, but at no time less frequently than once every 5 five years, as specified in (d)(1)(iv) 49.4.1.4 of this regulation.~~

49.4.1.4 iv. ~~The inspection required by (d)(1)(i), (d)(1)(ii)(B), or (d)(1)(iii) 49.4.1.1, 49.4.1.2.2, or 49.4.1.3 of this regulation shall consist of a visual inspection of the internal floating roof, the primary seal, the secondary seal (if one is in service), gaskets, slotted membranes and sleeve seals (if any).~~

49.4.1.4.1 A. ~~If the internal floating roof has defects, the primary seal or the secondary seal is detached, or there are holes, tears, or other openings in the seal or the seal fabric, or the gaskets do not 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~~ 49.4.1.4.1 of this regulation exist.~~

49.4.1.4.2 B. ~~The repair shall be made before the storage vessel is filled with VOL.~~

49.4.1.4.3 C. ~~The owner or operator shall notify the Department in writing at least 30 days prior to the filling of the storage vessel for which the inspection specified in~~

~~(d)(1)(iv)~~ 49.4.1.4 of this regulation is required to afford the Department the opportunity to inspect the storage vessel prior to filling.

49.4.1.4.3.1 4.—If the inspection described in ~~(d)(1)(iv)~~ 49.4.1.4 of this regulation is not planned and the owner or operator could not have known about the inspection 30 days in advance of filling the tank, the owner or operator shall notify the Department at least 7 seven days prior to the filling of the storage vessel.

49.4.1.4.3.2 2.—Notification shall be made by telephone immediately followed by written documentation demonstrating why the inspection was unplanned.

49.4.1.5 v.—The inspection required by ~~(d)(1)(ii)(A)~~ 49.4.1.2.1 of this regulation shall consist of a visual inspection of the internal floating roof and the primary seal or the secondary seal (if one is in service) through access and roof hatches on the fixed roof.

49.4.1.5.1 A.—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 item~~(s)~~ (or items) or empty and remove the storage vessel from service within 45 days.

49.4.1.5.2 B.—If a failure that is detected during inspections required in ~~(d)(1)(v)~~ 49.4.1.5 of this regulation cannot be repaired within 45 days and if the vessel cannot be emptied within 45 days, a 30-day extension may be requested from the Department in the inspection report required by ~~(e)(4)(ii)~~ 49.5.4.2 of this regulation.

49.4.1.5.3 C.—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.

49.4.2 2.—After installing the control equipment required to meet ~~(e)(1)(ii)~~ 49.3.1.2 of this regulation (external floating roof) the owner or operator shall, at a minimum:

49.4.2.1 i.—Conduct the following inspection and measurement:

49.4.2.1.1 A. Inspect the tank in accordance with ~~(d)(2)(ii)~~ 49.4.2.2 of this regulation prior to the initial fill and each time the storage vessel is emptied and degassed.

49.4.2.1.2 B. Determine the seal gap widths and the gap areas by the method described in ~~(d)(2)(iii)~~ 49.4.2.3 of this regulation according to the following schedule:

49.4.2.1.2.1 1. Gaps between the tank wall and the primary seal shall be measured during the hydrostatic testing of the vessel or within 60 days of the initial fill with VOL, and at least once every 5 ~~five~~ years thereafter.

49.4.2.1.2.2 2. Gaps between the tank wall and the secondary seal shall be measured within 60 days of the initial fill with VOL and at least once per year thereafter.

49.4.2.1.2.3 3. If any source 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 ~~(d)(2)(i)(B)(1.)~~ and ~~(d)(2)(i)(B)(2.)~~ 49.4.2.1.2.1 and 49.4.2.1.2.2 of this regulation.

49.4.2.2 ii. Visually inspect the external floating roof, the primary seal, the secondary seal, and the fittings.

49.4.2.2.1 A. If the external floating roof has defects, the primary seal or the secondary seal is detached, or there are holes, tears, or other openings in the seal or the seal fabric, or the gaskets do not 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 49.4.2.2.1 of this regulation exist.

49.4.2.2.2 B. The repair shall be made before the storage vessel is filled with VOL.

49.4.2.2.3 C. The owner or operator shall notify the Department in writing at least 30 days prior to the filling of the storage vessel for which the inspection specified in ~~(d)(2)(ii)~~ 49.4.2.2 of this regulation is required to afford the Department the opportunity to inspect the storage vessel prior to filling.

49.4.2.2.3.1 1. If the inspection is not planned and the owner or operator could not have known

about the inspection 30 days in advance of filling the tank, the owner or operator shall notify the Department at least 7 seven days prior to the refilling of the storage vessel.

49.4.2.2.3.2 ~~2~~—Notification shall be made by telephone immediately followed by written documentation demonstrating why the inspection was unplanned.

49.4.2.3 ~~iii~~—Seal gap widths and the gap areas shall be determined for the primary seal and for the secondary seal by the following methods:

49.4.2.3.1 ~~A~~—Seal gap width.

49.4.2.3.1.1 ~~1~~—Measure each seal gap width around the entire circumference of the tank in each place where a 1/8 inch (~~in~~) diameter uniform probe passes freely (without forcing or binding) between the seal and the wall of the storage vessel.

49.4.2.3.1.2 ~~2~~—The roof shall be floating off the roof leg supports during the measurement.

49.4.2.3.1.3 ~~3~~—Each seal gap width shall be measured by using probes of various widths.

49.4.2.3.2 ~~B~~—Seal gap surface area.

49.4.2.3.2.1 ~~1~~—For each gap measured in accordance with ~~(d)(2)(iii)(A)~~ 49.4.2.3.1 of this regulation, measure the corresponding circumferential distance of the gap.

49.4.2.3.2.2 ~~2~~—Determine the surface area of each gap by multiplying the gap width by its respective circumferential distance.

49.4.2.3.2.3 ~~3~~—Calculate the gap surface area ratio for the tank by adding the gap surface area of each gap, and then dividing the sum by the nominal diameter of the tank.

49.4.2.3.3 ~~C~~—The owner or operator shall notify the Department in writing at least 30 days in advance of any gap measurements required by ~~(d)(2)(i)(B)~~ 49.4.2.1.2 of this regulation to afford the Department the opportunity to have an observer present.

49.4.2.3.4 D.—The owner or operator shall make necessary repairs or empty the storage vessel within 45 days if any seals do not meet the standards listed in ~~(e)(1)(ii)(D)(4)~~ and ~~(e)(1)(ii)(D)(5)~~ 49.3.1.2.4.4 and 49.3.1.2.4.5 of this regulation:

49.4.2.3.4.1 1.—If a failure cannot be repaired within 45 days and if the vessel cannot be emptied within 45 days, a 30-day extension may be requested from the Department in the inspection report required by ~~(e)(5)(ii)~~ 49.5.5.2 of this regulation.

49.4.2.3.4.2 2.—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.

49.4.3 3.—The owner or operator of each storage vessel that is equipped with a closed vent system and control device, other than a flare, as specified in ~~(e)(1)(iii)~~ 49.3.1.3 of this regulation shall:

49.4.3.1 i.—Submit to the Department for approval an operating plan containing all of the information listed below.

49.4.3.1.1 A.—Documentation demonstrating that the control device will achieve the required control efficiency during maximum loading conditions.

49.4.3.1.1.1 1.—This documentation shall include a description of the gas stream which enters the control device, including flow and VOC content under varying liquid level conditions (dynamic and static); and the manufacturer's design specifications for the control device.

49.4.3.1.1.2 2.—If the control device or the closed vent capture system receives vapors, gases, or liquids other than fuels from sources that are not covered by ~~this Section~~ 49.0 of this regulation, the efficiency demonstration is to include consideration of all vapors, gases, and liquids received by the closed vent capture system and control device.

49.4.3.1.1.3 3.—If an enclosed combustion device with a minimum residence time of 0.75

seconds and a minimum temperature of 816°C is used to meet the 95% percent requirements, documentation that those conditions will exist is sufficient to meet the requirements ~~paragraph (e)(3)(i)(A)~~ in 49.4.3.1.1 of this regulation.

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

49.4.3.2 ii.—Operate the closed vent system and control device and monitor the parameters of the closed vent system and control device in accordance with the operating plan submitted to the Department unless the operating plan was modified by the Department during the review process. In this case, the modified plan applies.

49.4.4 4.—The owner or operator of each storage vessel that is equipped with a closed vent system and a flare as described in ~~(e)(1)(iii)~~ 49.3.1.3 of this regulation shall meet the requirements as specified in 40 CFR Part 60, paragraph 60.18 (July 1, 1992).

49.5 e.—Recordkeeping. The owner or operator of each storage vessel subject to the standards in ~~paragraph (e)~~ 49.3 of this regulation shall keep records consistent with ~~(e)(1), (e)(2), and (e)(3)~~ 49.5.1, 49.5.2, and 49.5.3 (if applicable) of this regulation, and the records required by ~~(e)(4) through (e)(7)~~ 49.5.4 through 49.5.7 of this regulation, whichever is applicable. All records, except for the records required by ~~(e)(2) and by (e)(6)(i)~~ 49.5.2 and by 49.5.6.1 of this regulation, shall be kept for at least ~~5~~ five years and shall immediately be submitted to the Department upon verbal or written request. The records required by ~~(e)(2) and by (e)(6)(i)~~ 49.5.2 and by 49.5.6.1 of this regulation shall be kept for the life of the source.

49.5.1 1.—The owner or operator of each storage vessel shall maintain the following records:

49.5.1.1 i.—The type of liquid stored.

49.5.1.2 ii.—The period of storage.

49.5.1.3 iii.—The maximum true vapor pressure of that VOL during the respective storage period.

49.5.2 2.—The owner or operator of each storage vessel shall maintain records showing the dimensions of the storage vessel and an analysis showing the capacity of the storage vessel.

49.5.3 ~~3~~—The owner or operator of each vessel storing a mixture of indeterminate or variable composition shall:

49.5.3.1 ~~i~~—Prior to the initial fill of the vessel, determine the maximum true vapor pressure for the range of anticipated liquid compositions to be stored.

49.5.3.2 ~~ii~~—For vessels in which the vapor pressure of the anticipated liquid composition is greater than 1.0 psia but less than 1.5 psia, conduct an initial physical test of the vapor pressure; and a physical test at least once every ~~6~~ six months thereafter as determined by one of the following methods:

49.5.3.2.1 ~~A~~—ASTM Method D2879—83; or

49.5.3.2.2 ~~B~~—ASTM Method D323—82; or

49.5.3.2.3 ~~C~~—As measured by an appropriate method as approved by the Department.

49.5.4 ~~4~~—After installing control equipment in accordance with ~~(e)(1)(i)~~ 49.3.1.1 of this regulation (fixed roof tank with an internal floating roof), the owner or operator shall:

49.5.4.1 ~~i~~—Keep a record of each inspection performed as required by ~~(d)(1)(i), (d)(1)(ii), or (d)(1)(iii)~~ 49.4.1.1, 49.4.1.2, or 49.4.1.3 of this regulation. Each record shall identify:

49.5.4.1.1 ~~A~~—The storage vessel on which the inspection was performed.

49.5.4.1.2 ~~B~~—The date the vessel was inspected.

49.5.4.1.3 ~~C~~—The observed condition of each component of the control equipment (seals, internal floating roof, and fittings).

49.5.4.2 ~~ii~~—If any of the conditions described in ~~(d)(1)(iv)(A) or in (d)(1)(v)(A)~~ 49.4.1.4.1 or in 49.4.1.5.1 of this regulation are detected a report shall be furnished to the Department pursuant to ~~Section (5)(b)~~ 5.2 of this regulation.

49.5.5 ~~5~~—After installing control equipment in accordance with ~~(e)(1)(ii)~~ 49.3.1.2 of this regulation (external floating roof), the owner or operator shall:

49.5.5.1 ~~i~~—Keep a record of each inspection performed as required by ~~(d)(2)(i)(A)~~ 49.4.2.1.1 of this regulation. Each record shall identify:

49.5.5.1.1 ~~A~~—The storage vessel on which the inspection was performed.

49.5.5.1.2 ~~B~~—The date the vessel was inspected.

49.5.5.1.3 ~~C~~—The observed condition of each component of the control equipment (seals, internal floating roof, and fittings).

49.5.5.2 ~~ii~~—Keep a record of each gap measurement performed as required by ~~paragraph (d)(2)(i)(B)~~ 49.4.2.1.2 of this regulation. Each record shall identify:

49.5.5.2.1 ~~A~~—The storage vessel in which the measurement was performed.

49.5.5.2.2 ~~B~~—The date of measurement.

49.5.5.2.3 ~~C~~—The raw data obtained in the measurement.

49.5.5.2.4 ~~D~~—The calculations described in ~~(d)(2)(iii)(B)~~ 49.4.2.3.2 of this regulation.

49.5.5.3 ~~iii~~—If any condition stated in ~~(d)(2)(ii)(A)~~ 49.4.2.2.1 of this regulation exists or if any measurement or calculation indicates that any gap exceeds the limitations specified in ~~(e)(1)(ii)(D)(4)~~ or ~~(e)(1)(ii)(D)(5)~~ 49.3.1.2.4.4 or 49.3.1.2.4.5 of this regulation, a report shall be submitted to the Department pursuant to ~~Section (5)(b)~~ 5.2 of this regulation.

49.5.6 ~~6~~—After installing control equipment in accordance with ~~(e)(1)(iii)~~ 49.3.1.3 of this regulation (closed vent system and control device), other than a flare, the owner or operator shall keep the following records.

49.5.6.1 ~~i~~—A copy of the operating plan required in ~~(d)(3)(i)~~ 49.4.3.1 of this regulation.

49.5.6.2 ~~ii~~—A record of the measured values of the parameters monitored in accordance with ~~(d)(3)(ii)~~ 49.4.3.2 of this regulation.

49.5.6.3 ~~iii~~—If any measurement or calculation indicates that the standard in ~~(e)(1)(iii)~~ 49.3.1.3 of this regulation was exceeded, a report shall be provided to the Department pursuant to ~~Section (5)(b)~~ 5.2 of this regulation.

49.5.7 ~~7~~—After installing a closed vent system and a flare to comply with ~~paragraph (e)(1)(iii)~~ 49.3.1.3 of this regulation (closed vent system and control device) the owner or operator shall meet the following requirements.

49.5.7.1 i.—Submit to the Department a report containing the measurements required by 40 CFR Part 60 paragraph 60.18(f)(1), (2), (3), (4), (5), and (6) (July 1, 1992) as required by 40 CFR Part 60 paragraph 60.8 (July 1, 1992). This report shall be submitted within 6 months of the initial startup date.

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

49.5.7.3 iii.—If any record indicates that the pilot flame was absent, a report shall be provided to the Department pursuant to ~~Section (5)(b)~~ 5.2 of this regulation.

49.6 f.—Reporting. The owner or operator of any facility containing sources subject to ~~this Section~~ 49.0 of this regulation shall comply with the requirements of ~~Section No. 5~~ 5.0 of this regulation.

Section 50—

50.0 Other Facilities that Emit Volatile Organic Compounds (VOCs).

11/29/1994

50.1 a. Applicability.

50.1.1 1. ~~This Section applies~~ The provisions of 50.0 of this regulation apply to any facility that emits VOCs and that is not subject to ~~Section 40 through Section 49~~ 10.0 through 49.0 of this regulation or to any Federally-approved State rule. A facility is subject to ~~this Section~~ 50.0 of this regulation if it has sources not regulated by the sections or rules listed above or not regulated as specified in ~~paragraph (a)(4)~~ 50.1.4 of this ~~Section~~ regulation or not exempted as specified in ~~paragraph (a)(5)~~ 50.1.5 of this ~~section~~ regulation that as a group have maximum theoretical VOC emissions of 25 tons or more per calendar year in New Castle or Kent Counties, or 50 tons or more per calendar year in Sussex County, in the absence of control devices.

50.1.2 2. ~~The owner or operator of a facility whose emissions are below the applicability threshold in paragraph (a)(1)~~ 50.1.1 of this ~~Section~~ regulation shall comply with the appropriate certification, recordkeeping, and reporting requirements of ~~paragraph (d)~~ 50.4 of this ~~Section~~ regulation.

50.1.3 3.

50.1.3.1 i. Any facility that becomes or is currently subject to the provisions of ~~this Section~~ 50.0 of this regulation by exceeding the applicability threshold in ~~paragraph (a)(1)~~ 50.1.1 of this ~~Section~~ regulation will remain subject to these provisions even if its throughput or emissions later fall below the applicability threshold.

50.1.3.2 ii. Any facility that is currently subject to a state or federal rule promulgated pursuant to the Clean Air Act Amendments of 1977 by exceeding the applicability threshold is and will remain subject to those provisions, even if its throughput or emissions have fallen or later fall below the applicability threshold.

50.1.4 4. ~~The control requirements in this Section~~ 50.0 of this regulation do not apply to coke ovens (including by-product recovery plants), fuel combustion sources, barge loading facilities, jet engine test cells, vegetable oil processing facilities, wastewater treatment facilities, and iron and steel production.

50.1.5 5. ~~The control requirements in this Section~~ 50.0 of this regulation do not apply to the following source categories for which the U.S. EPA must issue Control Technique Guidelines (CTGs) by November 15, 1993 under the non-attainment provisions of Title I of the November 15, 1990 Clean Air Act Amendments:

50.1.5.1 i. ~~Wood furniture coatings.~~

50.1.5.2 ~~ii~~–Industrial wastewater.

50.1.5.3 ~~iii~~–Shipbuilding and repair.

50.2 ~~b~~–Standards. The owner or operator of any source at a facility subject to ~~this Section~~ 50.0 of this regulation shall do one of the following:

50.2.1 ~~1~~–Install and operate emission capture and control techniques or, if appropriate, use complying coatings that achieve an overall reduction in VOC emissions of at least 81 weight ~~%~~ percent. For purposes of ~~this subsection~~ 50.2 of this regulation, fugitive emissions from leaks of equipment which resemble the equipment found in the Synthetic Organic Chemical Manufacturing Industry (SOCMI) or Petroleum Refinery Equipment shall not be subject to the requirement for 81 weight ~~%~~ percent overall control or included in the calculation of 81 weight ~~%~~ percent provided that the controls and technologies specified in ~~Section 40~~ 40.0 (pertaining to SOCMI leaks) or ~~Section 29~~ 29.0 (pertaining to Petroleum Refinery Equipment leaks) of this regulation, respectively, are followed. A technical support document, adequately justifying the emission capture and control techniques, shall be submitted to the Department.

50.2.2 ~~2~~–For any coating unit, limit the daily-weighted average VOC content to 0.40 kilograms VOC per liter (kg VOC/L) (3.5 pounds VOC per gallon [lb VOC/gal]) or less of coating, as applied (excluding water and exempt compounds), as calculated in **Appendix C** of this regulation. A technical support document, adequately justifying the daily-weighted average VOC content, as applied, shall be submitted to the Department.

50.2.3 ~~3~~–Comply with an alternative control plan that has been approved by the Administrator of the U.S. EPA as part of a State Implementation Plan (SIP) or Federal Implementation Plan (FIP) revision. The alternative control plan shall:

50.2.3.1 ~~i~~–Be submitted within ~~6~~ six months of the effective date of the rule.

50.2.3.2 ~~ii~~–Be accompanied by a demonstration of the technical or economic infeasibility of complying with the requirements in ~~paragraph (b)(1) or (b)(2)~~ 50.2.1 or 50.2.2 of this Section regulation.

50.3 ~~e~~–Test methods and procedures. The owner or operator of any source subject to ~~this Section~~ 50.0 of this regulation shall demonstrate compliance with ~~paragraph (b)~~ 50.2 of this regulation by using the applicable test methods specified in **Appendix A** through **Appendix F** of this regulation.

50.4 ~~d~~–Reporting and Recordkeeping Requirements for Exempt Non-Control Technique Guideline (Non-CTG) Sources.

50.4.1 ~~1.~~ Coating Sources. An owner or operator of a coating unit that is exempt from the emission limitations in ~~paragraph (b)~~ 50.2 of this ~~Section~~ regulation shall comply with the certification, recordkeeping, and reporting requirements in ~~Section 4(b)~~ 4.2 of this regulation.

50.4.2 ~~2.~~ Non-Coating Sources. An owner or operator of a non-coating source that is exempt from the emission limitations in ~~paragraph (b)~~ 50.2 of this ~~Section~~ regulation shall submit, upon request by the Department records that document that the source is exempt from these requirements.

50.4.2.1 ~~i.~~ These records shall be submitted to the Department within 30 calendar days from the date of request.

50.4.2.2 ~~ii.~~ If such records are not available, the source is considered to be subject to the limits in ~~paragraph (b)~~ 50.2 of this ~~Section~~ regulation.

50.5 ~~e.~~ Reporting and Recordkeeping Requirements for Subject Non-CTG Coating Sources.

50.5.1 ~~1.~~ An owner or operator of a coating unit subject to ~~this Section 50.0~~ of this regulation and complying with ~~paragraph (b)(1)~~ 50.2.1 of this ~~Section~~ regulation by the use of complying coatings shall comply with the certification, recordkeeping, and reporting requirements in ~~Section 4(c)~~ 4.3 of this regulation.

50.5.2 ~~2.~~ An owner or operator of a coating unit subject to ~~this Section 50.0~~ of this regulation and complying with ~~paragraph (b)(2)~~ 50.2.2 of this ~~Section~~ regulation by daily-weighted averaging shall comply with the certification, recordkeeping, and reporting requirements in ~~Section 4(d)~~ 4.4 of this regulation.

50.5.3 ~~3.~~ An owner or operator of a coating unit subject to ~~this Section 50.0~~ of this regulation and complying with ~~paragraphs (b)(1) or (b)(3)~~ 50.2.1 or 50.2.3 of this ~~Section~~ regulation by using control devices shall comply with the testing, reporting, and recordkeeping requirements in ~~Section 4(e)~~ 4.5 of this regulation.

50.6 ~~f.~~ Reporting and Recordkeeping Requirements for Subject Non-CTG, Non-Coating Sources.

50.6.1 ~~1.~~ The owner or operator of the subject VOC sources shall perform all testing and maintain the results of all tests and calculations required under ~~paragraphs (b) and (c)~~ 50.2 and 50.3 of this ~~Section~~ regulation to demonstrate that the subject source is in compliance.

50.6.2 ~~2.~~ The owner or operator of the subject VOC source shall maintain these records in a readily accessible location for a minimum of ~~5~~ five years and shall make these records available to the Department immediately upon verbal or written request.

50.6.3 3.—The owner or operator of any facility containing sources subject to ~~this Section 50.0 of this regulation~~ shall comply with the requirements in ~~Section 5~~ 5.0 of this regulation.

APPENDIX A

11/29/1994

Test Methods and Compliance Procedures: General Provisions.

1.0 ~~a.~~ Test methods. The owner or operator of any volatile organic compound (VOC) source required to comply with ~~Section 10 through Section 50~~ 10.0 through 50.0 of this regulation shall, at the owner's or operator's expense, demonstrate compliance by using the methods of **Appendix A** through **Appendix G** of this regulation or alternative methods that are approved by the Department as part of a State Implementation Plan (SIP) or Federal Implementation Plan (FIP) revision and shall meet all the requirements of this ~~Section~~ appendix.

2.0 ~~b.~~ Preparation of test plan and quality assurance (QA) program. At least 30 days before the initiation of a required test under **Appendix D** of this regulation, the owner or operator shall submit a test plan that shall be approved by the Department before the results of the test are considered acceptable. This test plan shall include the following minimum information:

2.1 ~~1.~~ The purpose of the proposed test and the applicable ~~subSection of Section 13 through Section 43~~ provisions of 13.0 through 43.0 of this regulation.

2.2 ~~2.~~ A detailed description of the facility to be tested, including a line diagram of the facility, locations of test sites, and facility operation conditions for the test.

2.3 ~~3.~~ A detailed description of the test methods and procedures, equipment, and sampling sites, i.e., a test plan which includes a detailed description of the process and control device operating parameters to be collected during the test.

2.4 ~~4.~~ A timetable for the following:

2.4.1 ~~i.~~ Date for the compliance test.

2.4.2 ~~ii.~~ Date of submittal of preliminary results to the Department (not later than 60 days after sample collection).

2.4.3 ~~iii.~~ Date of submittal of final test report (not later than 90 days after completion of on-site sampling).

2.5 ~~5.~~ Proposed corrective actions should the test results show noncompliance.

2.6 ~~6.~~ Internal QA program. The internal QA program shall include, at a minimum, the activities planned by routine operators and analysts to provide an assessment of test data precision. An example of internal QA is the sampling and analysis of replicable samples.

2.7 ~~7~~–External QA program.

2.7.1 ~~i~~–The external QA program shall include, at a minimum, application of plans for a test method performance audit (PA) during the compliance test.

2.7.2 ~~ii~~–The external QA program may also include systems audits, which include the opportunity for on-site evaluation by the Department of instrument calibration, data validation, sample logging, and documentation of quality control data and field maintenance activities.

2.7.3 ~~iii~~–The PA's shall consist of blind audit samples provided by the Department and analyzed during the compliance test to provide a measure of test data bias.

2.7.3.1 ~~A~~–The Department shall require the owner or operator to analyze QA samples during each compliance test when audit samples are available.

2.7.3.2 ~~B~~–Information concerning the availability of audit materials for a specific compliance test may be obtained by contacting the Department.

2.7.3.3 ~~C~~–The evaluation criteria applied to the interpretation of the PA results and the subsequent remedial actions required of the owner or operator are the sole responsibility of the Department.

3.0 ~~e~~–Process operation. The owner or operator shall be responsible for providing:

3.1 ~~1~~–Sampling ports, pipes, lines, or appurtenances for collecting samples and data required by the test methods and procedures.

3.2 ~~2~~–Safe access to the sample and data collection locations.

3.3 ~~3~~–Light, electricity, and the utilities required for sample and data collection.

4.0 ~~d~~–Summary of results. No later than 60 days after the sample collection, the owner or operator shall submit preliminary results to the Department.

5.0 ~~e~~–Final report. No later than 90 days after completion of the on-site sampling, the owner or operator shall submit a test report to the Department. The test report shall include the following minimum information:

5.1 ~~1~~–Process description.

5.2 ~~2~~–Air pollution capture system and control device description.

5.3 ~~3~~–Process conditions during testing, to include operating data for the air pollution control devices (APCD).

5.4 ~~4~~–Test results and example calculations.

5.5 ~~5~~–Description of sampling locations and test methods.

5.6 ~~6~~–QA measures.

5.7 ~~7~~–Field and analytical data.

APPENDIX B

Test Methods and Compliance Procedures: Determining the Volatile Organic Compound (VOC) Content of Coatings and Inks.

1.0 ~~a~~—Sampling procedures shall follow the guidelines presented in "Standard Procedure for Collection of Coating and Ink Samples for VOC Content Analysis by Reference Method 24 and Reference Method 24A," EPA-340/1-91-010.

2.0 ~~b~~—The analytical methods and procedures specified below shall be used to determine the VOC content of each coating, as applied:

2.1 ~~1~~—

2.1.1 ~~i~~—Method 24 of 40 CFR Part 60, Appendix A (July 1, 1992), shall be used to determine total volatile content, water content, and density of coatings. For determining total volatile content, all samples shall be oven-dried at 110° C for 4 one hour.

2.1.2 ~~ii~~—To determine the total volatile content, water content, and density of multi-component coatings, the following procedures shall be used in addition to Method 24 of 40 CFR Part 60, Appendix A (July 1, 1992):

2.1.2.1 ~~A~~—The components shall be mixed in a storage container in the same proportions as those in the coating, as applied. The mixing shall be accomplished by weighing the components in the proper proportion into a container that is closed between additions and during mixing. About 100 milliliters (ml) of coating shall be prepared in a container just large enough to hold the mixture prior to withdrawing a sample.

2.1.2.2 ~~B~~—For determining volatile content, a sample shall be withdrawn from the mixed coating and then transferred to a dish where the sample shall stand for at least 4 one hour, but no more than 24 hours, prior to being oven-dried at 110° C for 4 one hour.

2.1.2.3 ~~C~~—For determining the water content and density of multi-component coatings, samples shall be taken from the same 100-ml mixture of coating and shall be analyzed by the appropriate ASTM methods referenced in Method 24 of 40 CFR, Part 60, Appendix A (July 1, 1992).

2.2 ~~2~~—Method 24 of 40 CFR Part 60, Appendix A (July 1, 1992), shall be used in determining total volatile content, water content, and density of any flexographic or packaging rotogravure printing ink and related coatings. Alternatively, Method 24A of 40 CFR Part 60, Appendix A (July 1, 1992), may be used.

2.3 ~~3~~—Method 24A of 40 CFR Part 60, Appendix A (July 1, 1992), shall be used in determining total volatile content, water content, and density of any publication rotogravure printing ink and related coatings.

2.4 ~~4~~—The following additional procedure shall be used in analyzing a coating sample: "Standard Procedure for Analysis of Coating and Ink Samples," EPA-340/1-91-011.

3.0 ~~e~~—Use of adaptations to test methods. Use of an adaptation to any of the analytical methods specified in ~~paragraph (b) 2.0~~ of this ~~Section~~ appendix shall be approved by the Department on a case-by-case basis. An owner or operator shall submit sufficient documentation for the Department to find that the analytical methods specified in ~~paragraphs (b)(1), (b)(2), and (b)(3) 2.1, 2.2, and 2.3~~ of this appendix will yield inaccurate results and that the proposed adaptation is appropriate.

4.0 ~~d~~—Each sample collected for analysis shall meet the following criteria:

4.1 ~~1~~—Each sample shall be at least 250 ml (~~& eight~~ fluid ounces [oz]) taken into a 250-ml (8-oz) container at a location and time such that the sample will be representative of the coating or ink, as applied (i.e., the sample shall include any dilution solvent or VOC added during the manufacturing process).

4.2 ~~2~~—If a sample larger than 250 ml (~~& eight~~ oz) is obtained, the sample container shall be of a size such that the sample completely fills the container.

4.3 ~~3~~—The container shall be tightly sealed immediately after the sample is taken.

4.4 ~~4~~—Any solvent or other VOC added after the sample is taken shall be measured and accounted for in the calculations in ~~paragraph (e) 3.0~~ of this Section appendix.

4.5 ~~5~~—For multi-component coatings, separate samples of each component shall be obtained.

5.0 ~~e~~—Calculations for determining the VOC content of coatings and inks from data as determined by Method 24 or 24A of 40 CFR Part 60, Appendix A (July 1, 1992), shall follow the guidance provided in the following documents:

5.1 ~~1~~—"A Guideline for Surface Coating Calculations," EPA-340/1-86-016.

5.2 ~~2~~—"Procedures for Certifying Quantity of Volatile Organic Compounds Emitted by Paint, Ink and Other Coatings," (Revised June 1986) EPA-450/3-84-019.

APPENDIX C

Test Methods and Compliance Procedures: Alternative Compliance Methods for Surface Coating.

1.0 a. Daily-weighted average. The daily-weighted average VOC content, in units of mass of VOC per unit volume of coating, excluding water and exempt compounds, as applied, of the coatings used on a day on a coating unit, line, or operation shall be calculated using the following equation:

$$\text{VOC}_w = \frac{\sum_{i=1}^n V_i C_i}{V_T} \quad \text{(C-1)}$$

where:

VOC_w = The daily-weighted average VOC content of the coatings, as applied, used on a coating unit, line, or operation in units of kilograms of VOC per liter of coating (kg VOC/L) (pounds of VOC per gallon of coating [lb VOC/gal]), excluding water and exempt compounds.

n = The number of different coatings, as applied, each day on a coating unit, line, or operation.

V_i = The volume of each coating, as applied, each day on a coating unit, line, or operation in units of L (gal), excluding water and exempt compounds.

C_i = The VOC content of each coating, as applied, each day on a coating unit, line, or operation in units of kg VOC/L of coating (lb VOC/gal), excluding water and exempt compounds.

V_T = The total volume of all coating, as applied, each day on a coating unit, line, or operation in units of L (gal), excluding water and exempt compounds.

2.0 b. [Reserved]

3.0 e. Overall emission reduction efficiency for control systems. The overall emission reduction efficiency needed to demonstrate compliance is determined each day as follows:

3.1 4. Obtain the emission limitation from the applicable Section provisions in 10.0 through 50.0 of this regulation.

3.2 2. Calculate the emission limitation on a solids basis according to the following equation:

$$S = \frac{c}{1 - \left(\frac{c}{d}\right)} \quad \text{(C-2)}$$

where:

S = The VOC emission limitation in terms of kg VOC/L of coating solids (lb VOC/gal).

- c = The VOC emission limitation in terms of kg VOC/L of coating (lb/gal), excluding water and exempt compounds.
- d = The density of VOC for converting emission limitation to a solids basis. The density equals 0.882 kg/L (7.36 lb/gal).

3.3 ~~3~~—Calculate the required overall emission reduction efficiency of the control system for the day according to the following equation:

$$E = \left[\frac{\text{VOC}_a - S}{\text{VOC}_a} \right] \times 100 \quad \text{(C-3)}$$

where:

E = The required overall emission reduction efficiency of the control system for the day.

VOC_a = (1) The maximum VOC content of the coatings, as applied, used each day on the subject coating unit, line, or operation, in units of kg VOC/L of coating solids (lb VOC/gal), as determined by the applicable test methods and procedures specified in **Appendix B** of this regulation. (2) Alternatively, the daily-weighted average VOC content, as applied, of the coatings used each day on the subject coating unit, line, or operation, in units of kg VOC/L of coating solids (lb VOC/gal), as determined by the applicable test methods and procedures specified in **Appendix B** of this regulation and the procedure in ~~paragraph (c)(4)~~ 3.4 of this Section appendix.

S = VOC emission limitation in terms of kg VOC/L of coating solids (lb VOC/gal).

3.4 ~~4~~—The daily-weighted average VOC content, as applied, of the coatings used on a coating unit, line, or operation in units of mass of VOC per unit volume of coating solids shall be calculated by the following equation:

$$\text{VOC}_{ws} = \frac{\sum_{i=1}^n V_i W_{\text{VOC}i} D_i}{\sum_{i=1}^n V_i V S_i} \quad \text{(C-4)}$$

where:

VOC_{ws} = The daily-weighted average VOC content, as applied, of the coatings used on a coating unit, line, or operation in units of mass of VOC per unit volume of coating solids.

n = The number of different coatings, as applied, used in a day on a coating unit, line, or operation.

V_i = The volume of each coating (i), as applied, used in a day on a coating unit, line, or operation in units of liters (L) (gallons [gal]).

W_{VOCi} = The weight fraction of VOC in each coating (i), as applied, used in a day on a coating unit, line, or operation in units of kg VOC/kg coating (lb/lb).

- D_i = The density of each coating (i) as applied, used in a day on a coating unit, line, or operation in units of kg coating/L of coating (lb/gal).
- VS_i = The volume fraction solids content of each coating (i), as applied, used in a day on a coating unit, line, or operation in units of L solids/L coating (gal/gal).

APPENDIX D

11/29/1994

Test Methods and Compliance Procedures: Emission Capture and Destruction or Removal Efficiency and Monitoring Requirements.

1.0 ~~a.~~ Determining the efficiency of volatile organic compound (VOC) capture systems.

1.1 ~~4.~~ For purposes of this ~~paragraph~~ appendix, the following definitions and abbreviations apply:

“Gas/gas method” means either of two methods for determining capture that rely only on gas phase measurements. One method requires construction of a temporary total enclosure (TTE) to ensure all potential fugitive emissions are measured while the other method uses the room or building that houses the source as an enclosure.

“Hood” means a partial enclosure or canopy for capturing and exhausting, by means of a draft, the organic vapors or other fumes rising from a coating process or other source.

“Liquid/gas Method” means either of two methods for determining capture that require both gas phase and liquid phase measurements and analysis. One liquid/gas method requires construction of a temporary enclosure, and the other uses the building or room that houses the facility as an enclosure.

“Process line” means any coating unit, coating line, coating operation, or printing press.

“PTE” is a permanent total enclosure, which contains a process that emits VOC and meets the specifications given in this ~~Appendix “D”~~ appendix, Method 30.

“TTE” is a temporary total enclosure that is built around a process that emits VOC and meets the specifications given in this ~~Appendix D~~ appendix, Method 30.

“BE” is a building or room enclosure that contains a process that emits VOCs. If a BE is to substitute for a PTE or TTE, the appropriate requirements given in this ~~Appendix D~~ appendix shall be met.

1.2 ~~2.~~ Applicability.

1.2.1 ~~i.~~ The requirements of ~~paragraph (a)(3)~~ 1.3 of this appendix shall apply to all regulated VOC emitting processes using a control system except as provided below.

1.2.2 ~~ii~~—If a source owner or operator installs a PTE that meets EPA specifications, and that directs all VOC to a control device, the capture efficiency is assumed to be 100% percent, and the source is exempted from the requirements described in ~~paragraph (a)(3)~~ 1.3 of this appendix. The method given in this ~~Appendix D appendix~~ shall be used to determine whether a structure is a PTE. This does not exempt a source from performing any control device efficiency testing required under this regulation. In addition, source shall demonstrate that all criteria for a PTE are met during the testing for capture efficiency.

1.2.3 ~~iii~~—If a source owner or operator uses a control device designed to collect and recover VOC (e.g., carbon adsorber), an explicit measurement of capture efficiency is not necessary if the conditions given below are met. The overall emission reduction efficiency of the control system shall be determined each day by directly comparing the input liquid VOC (L) to the recovered liquid VOC. The procedure for use in this situation is specified in 40 CFR 60.433 (July 1, 1992) with the following modifications:

1.2.3.1 ~~A~~—The source owner or operator shall obtain data each day for the solvent usage and solvent recovery and determine the solvent recovery efficiency of the system each day using a ~~7~~ seven-day rolling period. The recovery efficiency for each day is computed as the ratio of the total recovered solvent for that day and the prior 6 consecutive operating days to the total solvent usage for the same ~~7~~ seven-day period used for the recovered solvent, rather than a 30-day weighted average as given in 40 CFR 60.433 (July 1, 1992). This ratio shall be expressed as a percentage. This shall be done within 72 hours following each 24-hour period. A source that believes that the ~~7~~ seven -day rolling period is not appropriate may use the method provided in **Appendix I** of this regulation to determine an alternative multiday rolling period. In no event shall the rolling period determined under this method exceed a 30-day rolling period.

1.2.3.2 ~~B~~—If the solvent recovery system controls multiple process lines, the source owner or operator shall demonstrate that the overall control (i.e., the total recovered solvent VOC divided by the sum of liquid VOC input to all process lines venting to the control system) meets or exceeds the most stringent standard applicable for any process line venting to the control system.

1.3 ~~3~~—Specific Requirements.

1.3.1 ~~i~~—The capture efficiency shall be measured using one of the four protocols given in ~~paragraphs (a)(3)(iii)(A) through (a)(3)(iii)(E)~~ 1.3.3.1 through 1.3.3.5 of this Section appendix.

1.3.2 ~~ii~~—Any error margin associated with a test protocol may not be incorporated into the results of a capture efficiency test.

1.3.3 ~~iii~~ Any source required to comply with this ~~Section~~ appendix shall use one of the following protocols to measure capture efficiency, unless a suitable alternative protocol is approved by the U.S. EPA as part of a SIP or FIP revision:

1.3.3.1 ~~A~~ Gas/gas method using TTE. Method 30, given in this ~~Appendix D~~ appendix, shall be used to determine whether a temporary enclosure is a TTE. The capture efficiency equation to be used for this protocol is:

$$CE = \frac{G}{G + F} \quad \text{(D-1)}$$

where:

CE = Capture efficiency, decimal fraction.

G = Mass of VOC captured and delivered to control device using a TTE.

F = Mass of fugitive VOC that escapes from a TTE.

Either Method 30B or Method 30C of this ~~Appendix D~~ appendix is used to obtain G. Method 30D of this ~~Appendix D~~ appendix is used to obtain F.

1.3.3.2 ~~B~~ Liquid/gas method using TTE. Method 30, given in this ~~Appendix D~~ appendix, shall be used to determine whether a temporary enclosure is a TTE. The capture efficiency equation to be used for this protocol is:

$$CE = \frac{L - F}{L} \quad \text{(D-2)}$$

where:

CE = Capture efficiency, decimal fraction.

L = Mass of liquid VOC input to process.

F = Mass of fugitive VOC that escapes from a TTE.

Method 30A of this ~~Appendix D~~ appendix is used to obtain L. Method 30D of this ~~Appendix D~~ appendix is used to obtain F.

1.3.3.3 ~~C~~ Gas/gas method using the building or room (BE) in which the source is located as the enclosure and in which G and F are measured while operating only the source to be tested. All fans and blowers in the building or room shall be operated as they would be under normal production. The capture efficiency equation to be used for this protocol is:

$$CE = \frac{G}{G + F_B} \quad \text{(D-3)}$$

where:

CE = Capture efficiency, decimal fraction.

G = Mass of VOC captured and delivered to a control device.

F_B = Mass of fugitive VOC that escapes from building enclosure.

Either Method 30B or Method 30C of this ~~Appendix D~~ appendix is used to obtain G. Method 30E of this ~~Appendix D~~ appendix is used to obtain F_B.

1.3.3.4 ~~D~~.—Liquid/gas method using the building or room (BE) in which the source is located as the enclosure and in which L and F are measured while operating only the source to be tested. All fans and blowers in the building or room shall be operated as they would under normal production. The capture efficiency equation to be used for this protocol is:

$$CE = \frac{L - F_B}{L} \quad \text{(D-4)}$$

where:

CE = Capture efficiency, decimal fraction.

L = Mass of liquid VOC input to process.

F_B = Mass of fugitive VOC that escapes from building enclosure.

Method 30A of this ~~Appendix D~~ appendix is used to obtain L. Method 30E of this ~~Appendix D~~ appendix is used to obtain F_B.

1.3.3.5 ~~E~~.—Liquid/gas method using the collection device to determine the mass of gas collected. The Capture Efficiency equation to be used for this process is:

$$CE = \frac{C}{L} \quad \text{(D-5)}$$

where:

CE = Capture Efficiency, decimal fraction

C = Mass rate of VOC captured by collection system

L = Mass rate of liquid VOC input to process

1.4 ~~4~~—Recordkeeping and Reporting.

1.4.1 ~~i~~.—All sources complying with this ~~Section~~ appendix shall maintain on file a copy of the capture efficiency protocol submitted to the Department. All results of appropriate test methods and CE protocols shall be reported to the Department within 60 days of the test date. A copy of the results shall be kept on file with the source.

1.4.2 ~~ii~~.—If any changes are made to capture or control equipment, the source is required to notify the Department within 30 days of these changes

and a new capture efficiency and/or control device destruction or removal efficiency test may be required.

2.0 ~~b~~—Determining the destruction or removal efficiency of incinerators and carbon adsorbers.

2.1 ~~4~~—Testing.

2.1.1 ~~i~~—The control device destruction or removal efficiency shall be determined from data obtained by simultaneously measuring the inlet and outlet gas-phase VOC concentrations and gas volumetric flow rates in accordance with the gas-phase test methods specified in **Appendix E** of this regulation. The control device destruction or removal efficiency shall be calculated using the following equation:

$$E = \frac{\sum_{i=1}^n Q_i C_i - \sum_{j=1}^m Q_j C_j}{\sum_{i=1}^n Q_i C_i} \quad \text{(D-6)}$$

where:

E = VOC destruction efficiency of the control device.

Q_i = Volumetric flow rate of the effluent gas flowing through stack i entering the control device, dry standard cubic meters per hour (dscm/hr).

C_i = Concentration of VOC (as carbon) in the effluent gas flowing through stack i entering the control device, parts per million by volume (ppmv).

Q_j = Volumetric flow rate of the effluent gas flowing through stack j leaving the control device, dscmh.

C_j = Concentration of VOC (as carbon) in the effluent gas flowing through stack j leaving the control device, ppmv.

n = The number of vents to the control device.

m = The number of vents after the control device.

2.1.2 ~~ii~~—A source using a PTE (or a BE as a PTE) shall demonstrate that this enclosure meets the requirements given in Method 30 of this **Appendix D** ~~appendix~~ for a PTE during any testing of a control device.

2.1.3 ~~iii~~—A source using a TTE (or a BE as a TTE) shall demonstrate that this enclosure meets the requirements given in Method 30 of this **Appendix D** ~~appendix~~ for a TTE during testing of a control device. The source shall also provide documentation that the quality assurance criteria for a TTE have been achieved.

2.2 ~~2~~—Monitoring.

2.2.1 ~~i~~—Any owner or operator who uses an incinerator or regenerative carbon adsorber to comply with any part of this regulation shall install, calibrate, certify to the Department, operate, and maintain continuous

monitoring equipment. The continuous monitoring equipment shall monitor the following parameters:

2.2.1.1 A.—Combustion chamber temperature of each thermal incinerator or afterburner.

2.2.1.2 B.—Temperature rise immediately before the catalyst bed and across each catalytic incinerator bed.

2.2.1.3 C.—The VOC concentration of the outlet from each carbon adsorption bed.

2.2.2 ii.—The continuous temperature monitoring equipment must be equipped with a continuous recorder and have an accuracy of $\pm 1\%$ percent of the combustion temperature being measured expressed in degrees Celsius ($^{\circ}\text{C}$) or $\pm 0.5^{\circ}\text{C}$, whichever is greater.

2.2.3 iii.—The owner or operator shall ensure that the quality assurance measures in 10.0 of Appendix G (j) of this regulation and the quality control procedures in **Appendix H** of this regulation are met.

3.0 e.—Determining the overall emission reduction efficiency. The overall emission reduction efficiency of the emission control system shall be determined each day as the product of the capture efficiency, as determined using the capture efficiency test method in this **Appendix D** appendix, and the control device destruction or removal efficiency; or for each solvent recovery system, by the test protocol described in ~~paragraph (a)(2)(iii)(A)~~ 1.2.3.1 of this Section appendix for comparing liquid input to liquid VOC recovery. The results of the capture efficiency test and control device destruction or removal efficiency test remain valid for each day until a subsequent test is performed. The results of any valid test may be used for each day until superseded by the results of a valid test subsequently performed.

METHOD 30 - CRITERIA FOR AND VERIFICATION OF A PERMANENT OR TEMPORARY TOTAL ENCLOSURE

1.0 ~~4-~~Introduction.

1.1 Applicability. This procedure is used to determine whether a permanent or temporary enclosure meets the criteria for a total enclosure.

1.2 Principle. An enclosure is evaluated against a set of criteria. If the criteria are met and if all the exhaust gases from the enclosure are ducted to a control device, then the VOC CE is assumed to be 100% percent, and CE need not be measured. However, if part of the exhaust gas stream is not ducted to a control device, CE must be determined.

1.3 Note. An evaluation of the proposed building materials is recommended to minimize any potential hazards.

2.0 ~~2-~~Definitions.

2.1 Natural Draft Opening (NDO). Any permanent opening in the enclosure that remains open during operation of the facility and is not connected to a duct in which a fan is installed.

2.2 Permanent Total Enclosure (PTE). A permanently installed enclosure that completely surrounds a source of emissions such that all VOC emissions are captured and contained for discharge to a control device.

2.3 Temporary Total Enclosure (TTE). A temporarily installed enclosure that completely surrounds a source of emissions such that all fugitive VOC emissions are captured and contained for discharge through ducts that allow for the accurate measurement of fugitive VOC emissions.

3.0 ~~3-~~Criteria for Temporary Total Enclosure

3.1 Any NDO shall be at least four equivalent opening diameters from each VOC emitting point unless otherwise specified by the Department.

3.2 Any exhaust point from the enclosure shall be at least four equivalent duct or hood diameters from each NDO.

3.3 The total area of all NDO's shall not exceed 5% percent of the surface area of the enclosure's four walls, floor, and ceiling.

3.4 The average facial velocity (FV) of air through all NDO's shall be at least 3,600 m/hr (200 fpm). The direction of air flow through all NDO's shall be into the enclosure.

3.5 All access doors and windows whose areas are not included in ~~Section 3.3~~ Section 3.3 of this method and are not included in the calculation in ~~Section 3.4~~ Section 3.4 of this method shall be closed during routine operation of the process.

4.0 ~~4-~~Criteria for a Permanent Total Enclosure

4.1 Same as ~~Sections 3.1 and 3.3 through 3.5~~ of this method.

4.2 All VOC emissions must be captured and contained for discharge through a control device.

5.0 ~~5-~~Procedure.

5.1 Determine the equivalent diameters of the NDO's and determine the distances from each VOC emitting point to all NDO's. Determine the equivalent diameter of each exhaust duct or hood and its distance to all NDO's. Calculate the distances in terms of equivalent diameters. The number of equivalent diameters shall be at least four.

5.2 Measure the total area (A_T) of the enclosure and the total area (A_N) of all NDO's in the enclosure. Calculate the NDO to enclosure area ratio (NEAR) as follows:

$$\text{NEAR} = \frac{A_N}{A_T} \quad \text{Eq. } (\underline{\text{D-30-1}})$$

The NEAR must be ≤ 0.05 .

5.3 Measure the volumetric flow rate, corrected to standard conditions, of each gas stream exiting the enclosure through an exhaust duct or hood using EPA Method 2. In some cases (e.g., when the building is the enclosure), it may be necessary to measure the volumetric flow rate, corrected to standard conditions, of each gas stream entering the enclosure through a forced makeup air duct using Method 2. Calculate FV using the following equation:

$$\text{FV} = \frac{Q_O - Q_I}{A_N} \quad \text{Eq. } (\underline{\text{D-30-2}})$$

where:

Q_O = the sum of the volumetric flow from all gas streams exiting the enclosure through an exhaust duct or hood.

Q_I = the sum of the volumetric flow from all gas streams into the enclosure through a forced makeup air duct; zero, if there is no forced makeup air into the enclosure.

A_N = total area of all NDO's in enclosure.

The FV shall be at least 3,600 m/hr (200 fpm). Alternatively, measure the pressure differential across the enclosure. A pressure drop of 0.0075 mm Hg (0.004 in. H_2O) corresponds to an FV of 3,600 m/hr (200 fpm).

5.4 Verify that the direction of air flow through all NDO's is inward. Streamers, smoke tubes, or tracer gases may be used. Strips of plastic wrapping

film have also been found to be effective. Monitor the direction of air flow for at least 4 one hour, with checks made no more than 10 minutes apart.

6.0 ~~6~~-Quality Assurance.

6.1 The success of this method lies in designing the TTE to simulate the conditions that exist without the TTE (i.e., the effect of the TTE on the normal flow patterns around the affected facility or the amount of fugitive VOC emissions should be minimal). The TTE must enclose the application stations, coating reservoirs, and all areas from the application station to the oven. The oven does not have to be enclosed if it is under negative pressure. The NDO's of the temporary enclosure and a fugitive exhaust fan must be properly sized and placed.

6.2 Estimate the ventilation rate of the TTE that best simulates the conditions that exist without the TTE (i.e., the effect of the TTE on the normal flow patterns around the affected facility or the amount of fugitive VOC emissions should be minimal). Measure the concentration (CG) and flow rate (QG) of the captured gas stream, specify a safe concentration (CF) for the fugitive gas stream, estimate the CE, and then use a plot available from the Department to determine the volumetric flow rate of the fugitive gas stream (QF). A fugitive VOC emission exhaust fan that has a variable flow control is desirable.

6.3 Monitor the concentration of VOC into the capture device without the TTE. To minimize the effect of temporal variation on the captured emissions, the baseline measurement should be made over as long a time period as practical. However, the process conditions must be the same for the measurement in ~~Section 6.5~~ of this appendix as they are for this baseline measurement. This may require short measuring times for this quality control check before and after the construction of the TTE.

6.4 After the TTE is constructed, monitor the VOC concentration inside the TTE. This concentration shall not continue to increase, and must not exceed the safe level according to Occupational Safety and Health Administration requirements for permissible exposure limits. An increase in VOC concentration indicates poor TTE design or poor capture efficiency.

6.5 Monitor the concentration of VOC into the capture device with the TTE. To limit the effect of the TTE on the process, the VOC measurement with and without the TTE must be within $\pm 10\%$ ~~percent~~. If the measurements do not agree, adjust the ventilation rate from the TTE until they agree within 10% ~~percent~~.

METHOD 30A - VOLATILE ORGANIC COMPOUNDS CONTENT IN LIQUID INPUT STREAM

1.0 ~~4-~~Introduction

1.1 Applicability. This procedure is applicable for determining the input of VOC. It is intended to be used in the development of liquid/gas protocols for determining VOC CE for surface coating and printing operations.

1.2 Principle. The amount of VOC introduced to the process (L) is the sum of the products of the weight (W) of each VOC containing liquid (ink, paint, solvent, etc.) used and its VOC content (V). A sample of each VOC containing liquid is analyzed with a flame ionization analyzer (FIA) to determine V.

1.3 Estimated Measurement Uncertainty. The measurement uncertainties are estimated for each VOC containing liquid as follows: $W = \pm 2.0\%$ ~~percent~~ and $V = \pm 12.0\%$ ~~percent~~. Based on these numbers, the probable uncertainty for L is estimated at about $\pm 12.2\%$ ~~percent~~ for each VOC containing liquid.

1.4 Sampling Requirements. A CE test shall consist of at least three sampling runs. Each run shall cover at least one complete production cycle, but shall be at least ~~3~~ three hours long. The sampling time for each run need not exceed ~~8~~ eight hours, even if the production cycle has not been completed. Alternative sampling times may be used with the approval of the Department.

1.5 Notes. Because this procedure is often applied in highly explosive areas, caution and care should be exercised in choosing, installing, and using the appropriate equipment. Mention of trade names or company products does not constitute endorsement. All gas concentrations (percent, ppm) are by volume, unless otherwise noted.

2.0 ~~2-~~Apparatus and Reagents

2.1 Liquid Weight.

2.1.1 Balances/Digital Scales. To weigh drums of VOC containing liquids to within 0.2 lb.

2.1.2 Volume Measurement Apparatus (Alternative). Volume meters, flow meters, density measurement equipment, etc., as needed to achieve the same accuracy as direct weight measurements.

2.2 VOC Content (FIA Technique). The following equipment is required:

2.2.1 Sample Collection Can. An appropriately-sized metal can to be used to collect VOC containing materials. The can must be constructed in such a way that it can be grounded to the coating container.

2.2.2 Needle Valves. To control gas flow.

- 2.2.3 Regulators. For carrier gas and calibration gas cylinders.
- 2.2.4 Tubing. Teflon or stainless steel tubing with diameters and lengths determined by connection requirements of equipment. The tubing between the sample oven outlet and the FIA shall be heated to maintain a temperature of $120 \pm 5^{\circ}\text{C}$.
- 2.2.5 Atmospheric Vent. A tee and 0- to 0.5-liter/min rotameter placed in the sampling line between the carrier gas cylinder and the VOC sample vessel to release the excess carrier gas. A toggle valve placed between the tee and the rotameter facilitates leak tests of the analysis system.
- 2.2.6 Thermometer. Capable of measuring the temperature of the hot water bath to within 1°C .
- 2.2.7 Sample Oven. Heated enclosure, containing calibration gas coil heaters, critical orifice, aspirator, and other liquid sample analysis components, capable of maintaining a temperature of $120 \pm 5^{\circ}\text{C}$.
- 2.2.8 Gas Coil Heaters. Sufficient lengths of stainless steel or Teflon tubing to allow zero and calibration gases to be heated to the sample oven temperature before entering the critical orifice or aspirator.
- 2.2.9 Water Bath. Capable of heating and maintaining a sample vessel temperature of $100 \pm 5^{\circ}\text{C}$.
- 2.2.10 Analytical Balance. To measure ± 0.001 g.
- 2.2.11 Disposable Syringes. 2-cc or 5-cc.
- 2.2.12 Sample Vessel. Glass, 40-ml septum vial. A separate vessel is needed for each sample.
- 2.2.13 Rubber Stopper. Two-hole stopper to accommodate 3.2-mm (1/8-in.) Teflon tubing, appropriately sized to fit the opening of the sample vessel. The rubber stopper should be wrapped in Teflon tape to provide a tighter seal and to prevent any reaction of the sample with the rubber stopper. Alternatively, any leak-free closure fabricated of nonreactive materials and accommodating the necessary tubing fittings may be used.
- 2.2.14 Critical Orifices. Calibrated critical orifices capable of providing constant flow rates from 50 to 250 ml/min at known pressure drops. Sapphire orifice assemblies (available from O'Keefe Controls Company) and glass capillary tubing have been found to be adequate for this application.
- 2.2.15 Vacuum Gauge. Zero to 760-mm (0 to 30-in.) Hg U-Tube manometer or vacuum gauge.

2.2.16 Pressure Gauge. Bourdon gauge capable of measuring the maximum air pressure at the aspirator inlet (e.g., 100 psig, 690 kilo-Pascals).

2.2.17 Aspirator. A device capable of generating sufficient vacuum at the sample vessel to create critical flow through the calibrated orifice when sufficient air pressure is present at the aspirator inlet. The aspirator must also provide sufficient sample pressure to operate the FIA. The sample is also mixed with the dilution gas within the aspirator.

2.2.18 Soap Bubble Meter. Of an appropriate size to calibrate the critical orifices in the system.

2.2.19 Organic Concentration Analyzer. An FIA with a span value of 1.5 times the expected concentration as propane; however, other span values may be used if it can be demonstrated that they would provide more accurate measurements. The FIA instrument should be the same instrument used in the gaseous analyses adjusted with the same fuel, combustion air, and sample back-pressure (flow rate) settings. The system shall be capable of meeting or exceeding the following specifications:

2.2.19.1 Zero Drift. Less than $\pm 3.0\%$ ~~percent~~ of the span value.

2.2.19.2 Calibration Drift. Less than $\pm 3.0\%$ ~~percent~~ of the span value.

2.2.19.3 Calibration Error. Less than $\pm 5.0\%$ ~~percent~~ of the calibration gas value.

2.2.20 Integrator/Data Acquisition System. An analog or digital device or computerized data acquisition system used to integrate the FIA response or compute the average response and record measurement data. The minimum data sampling frequency for computing average or integrated values is one measurement value every 5 seconds. The device shall be capable of recording average values at least once per minute.

2.2.21 Chart Recorder (Optional). A chart recorder or similar device is recommended to provide a continuous analog display of the measurement results during the liquid sample analysis.

2.2.22 Calibration and Other Gases. Gases used for calibration, fuel, and combustion air (if required) are contained in compressed gas cylinders. All calibration gases shall be traceable to National Institute of Standards and Technology standards and shall be certified by the manufacturer to $\pm 1\%$ ~~percent~~ of the tag value. Additionally, the manufacturer of the cylinder should provide a recommended shelf life for each calibration gas cylinder over which the concentration does not change more than $\pm 2\%$ ~~percent~~ from the certified value. For calibration gas values not generally available, alternative methods for preparing calibration gas mixtures, such as dilution systems, may be used with the approval of the Department.

2.2.22.1 Fuel. A 40% ~~percent~~ H₂/60% ~~percent~~ He or 40% ~~percent~~ H₂/60% ~~percent~~ N₂ gas mixture is recommended to avoid an oxygen synergism effect that reportedly occurs when oxygen concentration varies significantly from a mean value.

2.2.22.2 Carrier Gas. High purity air with less than 4 one ppm of organic material (as propane) or less than 0.1% ~~percent~~ of the span value, whichever is greater.

2.2.22.3 FIA Linearity Calibration Gases. Low-, mid-and high-range gas mixture standards with nominal propane concentrations of 20-30, 45-55, and 70-80% ~~percent~~ of the span value in air, respectively. Other calibration values and other span values may be used if it can be shown to the Department's satisfaction that more accurate measurements would be achieved.

2.2.22.4 System Calibration Gas. Gas mixture standard containing propane in air, approximating the undiluted VOC concentration expected for the liquid samples.

3.0 ~~3~~-Determination of Liquid Input Weight

3.1 Weight Difference. Determine the amount of material introduced to the process as the weight difference of the feed material before and after each sampling run. In determining the total VOC containing liquid usage, account for:

- (a) The initial (beginning) VOC containing liquid mixture.
- (b) Any solvent added during the test run.
- (c) Any coating added during the test run.
- (d) Any residual VOC containing liquid mixture remaining at the end of the sample run.

3.1.1 Identify all points where VOC containing liquids are introduced to the process. To obtain an accurate measurement of VOC containing liquids, start with an empty fountain (if applicable). After completing the run, drain the liquid in the fountain back into the liquid drum (if possible) and weigh the drum again. Weigh the VOC containing liquids to $\pm 0.5\%$ ~~percent~~ of the total weight (full) or $\pm 0.1\%$ ~~percent~~ of the total weight of VOC containing liquid used during the sample run, whichever is less. If the residual liquid cannot be returned to the drum, drain the fountain into a pre-weighed empty drum to determine the final weight of the liquid.

3.1.2 If it is not possible to measure a single representative mixture, then weigh the various components separately (e.g., if solvent is added during the sampling run, weigh the solvent before it is added to the mixture). If a fresh drum of VOC containing liquid is needed during the run, then weigh both the empty drum and fresh drum.

3.2 Volume Measurement (Alternative). If direct weight measurements are not feasible, the tester may use volume meters and flow rate meters (and density

measurements) to determine the weight of liquids used if it can be demonstrated that the technique produces results equivalent to the direct weight measurements. If a single representative mixture cannot be measured, measure the components separately.

4.0 4-Determination of VOC Content in Input Liquids

4.1 Collection of Liquid Samples.

4.1.1 Collect a 100-ml or larger sample of the VOC containing liquid mixture at each application location at the beginning and end of each test run. A separate sample should be taken of each VOC containing liquid added to the application mixture during the test run. If a fresh drum is needed during the sampling run, then obtain a sample from the fresh drum.

4.1.2 When collecting the sample, ground the sample container to the coating drum. Fill the sample container as close to the rim as possible to minimize the amount of headspace.

4.1.3 After the sample is collected, seal the container so the sample cannot leak out or evaporate.

4.1.4 Label the container to clearly identify the contents.

4.2 Liquid Sample VOC Content.

4.2.1 Assemble the liquid VOC content analysis system.

4.2.2 Permanently identify all of the critical orifices that may be used. Calibrate each critical orifice under the expected operating conditions (i.e., sample vacuum and temperature) against a volume meter as described in Section 5.3 of this method.

4.2.3 Label and tare the sample vessels (including the stoppers and caps) and the syringes.

4.2.4 Install an empty sample vessel and perform a leak test of the system. Close the carrier gas valve and atmospheric vent and evacuate the sample vessel to 250 mm (10 in.) Hg absolute or less using the aspirator. Close the toggle valve at the inlet to the aspirator and observe the vacuum for at least 1 minute. If there is any change in the sample pressure, release the vacuum, adjust or repair the apparatus as necessary, and repeat the leak test.

4.2.5 Perform the analyzer calibration and linearity checks according to the procedure in Section 5.1 of this method. Record the responses to each of the calibration gases and the back-pressure setting of the FIA.

4.2.6 Establish the appropriate dilution ratio by adjusting the aspirator air supply or substituting critical orifices. Operate the aspirator at a vacuum of

at least 25 mm (4 one inch) Hg greater than the vacuum necessary to achieve critical flow. Select the dilution ratio so that the maximum response of the FIA to the sample does not exceed the high-range calibration gas.

4.2.7 Perform system calibration checks at two levels by introducing compressed gases at the inlet to the sample vessel while the aspirator and dilution devices are operating. Perform these checks using the carrier gas (zero concentration) and the system calibration gas. If the response to the carrier gas exceeds $\pm 0.5\%$ ~~percent~~ of span, clean or repair the apparatus and repeat the check. Adjust the dilution ratio as necessary to achieve the correct response to the upscale check, but do not adjust the analyzer calibration. Record the identification of the orifice, aspirator air supply pressure, FIA back-pressure, and the responses of the FIA to the carrier and system calibration gases.

4.2.8 After completing the above checks, inject the system calibration gas for approximately 10 minutes. Time the exact duration of the gas injection using a stopwatch. Determine the area under the FIA response curve and calculate the system response factor based on the sample gas flow rate, gas concentration, and the duration of the injection as compared to the integrated response using Equations 30A-2 and 30A-3 of this method.

4.2.9 Verify that the sample oven and sample line temperatures are $120 \pm 5^\circ\text{C}$ and that the water bath temperature is $100 \pm 5^\circ\text{C}$.

4.2.10 Fill a tared syringe with approximately 1 g of the VOC containing liquid and weigh it. Transfer the liquid to a tared sample vessel. Plug the sample vessel to minimize sample loss. Weigh the sample vessel containing the liquid to determine the amount of sample actually received. Also, as a quality control check, weigh the empty syringe to determine the amount of material delivered. The two coating sample weights should agree within 0.02 g. If not, repeat the procedure until an acceptable sample is obtained.

4.2.11 Connect the vessel to the analysis system. Adjust the aspirator supply pressure to the correct value. Open the valve on the carrier gas supply to the sample vessel and adjust it to provide a slight excess flow to the atmospheric vent. As soon as the initial response of the FIA begins to decrease, immerse the sample vessel in the water bath. (Applying heat to the sample vessel too soon may cause the FIA response to exceed the calibrated range of the instrument and, thus, invalidate the analysis.)

4.2.12 Continuously measure and record the response of the FIA until all of the volatile material has been evaporated from the sample and the instrument response has returned to the baseline (i.e., response less than 0.5% ~~percent~~ of the span value). Observe the aspirator supply pressure, FIA back-pressure, atmospheric vent, and other system operating parameters during the run; repeat the analysis procedure if any of these parameters deviate from the values established during the system calibration checks in Section 4.2.7 of this method. After each sample,

perform the drift check described in ~~Section 5.2 of this method~~. If the drift check results are acceptable, calculate the VOC content of the sample using the equations in ~~Section 7.0 of this method~~. Integrate the area under the FIA response curve, or determine the average concentration response and the duration of sample analysis.

5.0 ~~5~~-Calibration and Quality Assurance

5.1 FIA Calibration and Linearity Check. Make necessary adjustments to the air and fuel supplies for the FIA and ignite the burner. Allow the FIA to warm up for the period recommended by the manufacturer. Inject a calibration gas into the measurement system and adjust the back-pressure regulator to the value required to achieve the flow rates specified by the manufacturer. Inject the zero- and the high-range calibration gases and adjust the analyzer calibration to provide the proper responses. Inject the low- and mid-range gases and record the responses of the measurement system. The calibration and linearity of the system are acceptable if the responses for all four gases are within ~~5% percent~~ of the respective gas values. If the performance of the system is not acceptable, repair or adjust the system and repeat the linearity check. Conduct a calibration and linearity check after assembling the analysis system and after a major change is made to the system.

5.2 Systems Drift Checks. After each sample, repeat the system calibration checks in ~~Section 4.2.7 of this method~~ before any adjustments to the FIA or measurement system are made. If the zero or calibration drift exceeds ~~±3% percent~~ of the span value, discard the result and repeat the analysis.

5.3 Critical Orifice Calibration.

5.3.1 Each critical orifice must be calibrated at the specific operating conditions under which it will be used. Therefore, assemble all components of the liquid sample analysis system as they are to be used. A stopwatch is also required.

5.3.2 Turn on the sample oven, sample line, and water bath heaters, and allow the system to reach the proper operating temperature. Adjust the aspirator to a vacuum of 380 mm (15 in.) Hg vacuum. Measure the time required for one soap bubble to move a known distance and record barometric pressure.

5.3.3 Repeat the calibration procedure at a vacuum of 406 mm (16 in.) Hg and at 25-mm (1-in.) Hg intervals until three consecutive determinations provide the same flow rate. Calculate the critical flow rate for the orifice in ml/min at standard conditions. Record the vacuum necessary to achieve critical flow.

6.0 ~~6~~-Nomenclature

A_L = area under the response curve of the liquid sample, area count.

A_S = area under the response curve of the calibration gas, area count.

C_S = actual concentration of system calibration gas, ppm propane.
 $K = 1.830 \times 10^{-9}$ g/(ml-ppm).
 L = total VOC content of liquid input, kg.
 M_L = mass of liquid sample delivered to the sample vessel, g.
 q = flow rate through critical orifice, ml/min.
 RF = liquid analysis system response factor, g/area count.
 θ_S = total gas injection time for system calibration gas during integrator calibration, min.
 V_{Fj} = final VOC fraction of VOC containing liquid j.
 V_{ij} = initial VOC fraction of VOC containing liquid j.
 V_{Aj} = VOC fraction of VOC containing liquid j added during the run.
 V = VOC fraction of liquid sample.
 W_{Fj} = weight of VOC containing liquid j remaining at end of the run, kg.
 W_{ij} = weight of VOC containing liquid j at beginning of the run, kg.
 W_{Aj} = weight of VOC containing liquid j added during the run, kg.

7.0 ~~7.~~ Calculations

7.1 Total VOC Content of the Input VOC Containing Liquid.

$$L = \sum_{j=1}^n V_{ij} W_{ij} - \sum_{j=1}^n V_{Fj} W_{Fj} + \sum_{j=1}^n V_{Aj} W_{Aj} \quad \text{Eq. (D-30A-1)}$$

7.2 Liquid Sample Analysis System Response Factor for Systems Using Integrators, Grams/Area Count.

$$RF = \frac{C_s q \theta_s K}{A_s} \quad \text{Eq. (D-30A-2)}$$

7.3 VOC Content of the Liquid Sample.

$$V = \frac{A_L RF}{M_L} \quad \text{Eq. (D-30A-3)}$$

METHOD 30B - VOLATILE ORGANIC COMPOUNDS EMISSIONS IN CAPTURED STREAM

1.0 ~~4-~~Introduction

1.1 Applicability. This procedure is applicable for determining the VOC content of captured gas streams. It is intended to be used in the development of liquid/gas or gas/gas protocols for determining VOC CE for surface coating and printing operations. The procedure may not be acceptable in certain site-specific situations [e.g., when: (1) direct-fired heaters or other circumstances affect the quantity of VOC at the control device inlet; and (2) particulate organic aerosols are formed in the process and are present in the captured emissions].

1.2 Principle. The amount of VOC captured (G) is calculated as the sum of the products of the VOC content (C_{Gj}), the flow rate (Q_{Gj}), and the sample time (θ_c) from each captured emissions point.

1.3 Estimated Measurement Uncertainty. The measurement uncertainties are estimated for each captured or fugitive emissions point as follows: $Q_{Gj} = \pm 5.5\%$ ~~percent~~ and $C_{Gj} = \pm 5.0\%$ ~~percent~~. Based on these numbers, the probable uncertainty for G is estimated at about $\pm 7.4\%$ ~~percent~~.

1.4 Sampling Requirements. A CE test shall consist of at least three sampling runs. Each run shall cover at least one complete production cycle, but shall be at least ~~3~~ three hours long. The sampling time for each run need not exceed ~~8~~ eight hours, even if the production cycle has not been completed. Alternative sampling times may be used with the approval of the Department.

1.5 Notes. Because this procedure is often applied in highly explosive areas, caution and care should be exercised in choosing, installing, and using the appropriate equipment. Mention of trade names or company products does not constitute endorsement. All gas concentrations (percent, ppm) are by volume, unless otherwise noted.

2.0 ~~2-~~Apparatus and Reagents

2.1 Gas VOC Concentration. The main components are as follows:

2.1.1 Sample Probe. Stainless steel or equivalent. The probe shall be heated to prevent VOC condensation.

2.1.2 Calibration Valve Assembly. Three-way valve assembly at the outlet of the sample probe to direct the zero and calibration gases to the analyzer. Other methods, such as quick-connect lines, to route calibration gases to the outlet of the sample probe are acceptable.

2.1.3 Sample Line. Stainless steel or Teflon tubing to transport the sample gas to the analyzer. The sample line must be heated to prevent condensation.

2.1.4 Sample Pump. A leak-free pump, to pull the sample gas through the system at a flow rate sufficient to minimize the response time of the measurement system. The components of the pump that contact the gas stream shall be constructed of stainless steel or Teflon. The sample pump must be heated to prevent condensation.

2.1.5 Sample Flow Rate Control. A sample flow rate control valve and rotameter, or equivalent, to maintain a constant sampling rate within 10% percent. The flow rate control valve and rotameter must be heated to prevent condensation. A control valve may also be located on the sample pump bypass loop to assist in controlling the sample pressure and flow rate.

2.1.6 Sample Gas Manifold. Capable of diverting a portion of the sample gas stream to the FIA, and the remainder to the bypass discharge vent. The manifold components shall be constructed of stainless steel or Teflon. If captured or fugitive emissions are to be measured at multiple locations, the measurement system shall be designed to use separate sampling probes, lines, and pumps for each measurement location and a common sample gas manifold and FIA. The sample gas manifold and connecting lines to the FIA must be heated to prevent condensation.

2.1.7 Organic Concentration Analyzer. An FIA with a span value of 1.5 times the expected concentration as propane; however, other span values may be used if it can be demonstrated to the Department's satisfaction that they would provide more accurate measurements. The system shall be capable of meeting or exceeding the following specifications:

2.1.7.1 Zero Drift. Less than ±3.0% percent of the span value.

2.1.7.2 Calibration Drift. Less than ±3.0% percent of the span value.

2.1.7.3 Calibration Error. Less than ±5.0% percent of the calibration gas value.

2.1.7.4 Response Time. Less than 30 seconds.

2.1.8 Integrator/Data Acquisition System. An analog or digital device, or computerized data acquisition system used to integrate the FIA response or compute the average response and record measurement data. The minimum data sampling frequency for computing average or integrated values is one measurement value every 5 five seconds. The device shall be capable of recording average values at least once per minute.

2.1.9 Calibration and Other Gases. Gases used for calibration, fuel, and combustion air (if required) are contained in compressed gas cylinders. All calibration gases shall be traceable to National Institute of Standards and Technology standards and shall be certified by the manufacturer to ±1% percent of the tag value. Additionally, the manufacturer of the cylinder should provide a recommended shelf life for each calibration gas cylinder

over which the concentration does not change more than $\pm 2\%$ percent from the certified value. For calibration gas values not generally available, alternative methods for preparing calibration gas mixtures, such as dilution systems, may be used with the approval of the Department.

2.1.9.1 Fuel. A 40% percent $H_2/60\%$ percent He or 40% percent $H_2/60\%$ percent N_2 gas mixture is recommended to avoid an oxygen synergism effect that reportedly occurs when oxygen concentration varies significantly from a mean value.

2.1.9.2 Carrier Gas. High purity air with less than 1 ppm of organic material (as propane or carbon equivalent) or less than 0.1% percent of the span value, whichever is greater.

2.1.9.3 FIA Linearity Calibration Gases. Low-, mid-, and high-range gas mixture standards with nominal propane concentrations of 20-30, 45-55, and $70-80\%$ percent of the span value in air, respectively. Other calibration values and other span values may be used if it can be shown to the Department's satisfaction that more accurate measurements would be achieved.

2.1.9.4 Dilution Check Gas. Gas mixture standard containing propane in air, approximately half the span value after dilution.

2.1.10 Particulate Filter. An in-stack or an out-of-stack glass fiber filter is recommended if exhaust gas particulate loading is significant. An out-of-stack filter must be heated to prevent any condensation unless it can be demonstrated that no condensation occurs.

2.2 Captured Emissions Volumetric Flow Rate.

2.2.1 Method 2 or 2A Apparatus. For determining volumetric flow rate.

2.2.2 Method 3 Apparatus and Reagents. For determining molecular weight of the gas stream. An estimate of the molecular weight of the gas stream may be used if approved by the Department.

2.2.3 Method 4 Apparatus and Reagents. For determining moisture content, if necessary.

3.0 ~~3~~-Determination of Volumetric Flow Rate of Captured Emissions

3.1 Locate all points where emissions are captured from the affected facility. Using Method 1, determine the sampling points. Be sure to check each site for cyclonic or swirling flow.

3.2 Measure the velocity at each sampling site at least once every hour during each sampling run using Method 2 or 2A.

4.0 ~~4~~-Determination of VOC Content of Captured Emissions

4.1 Analysis Duration. Measure the VOC responses at each captured emissions point during the entire test run or, if applicable, while the process is operating. If there are multiple captured emission locations, design a sampling system to allow a single FIA to be used to determine the VOC responses at all sampling locations.

4.2 Gas VOC Concentration.

4.2.1 Assemble the sample train. Calibrate the FIA according to the procedure in ~~Section 5.1~~ of this method.

4.2.2 Conduct a system check according to the procedure in ~~Section 5.3~~ of this method.

4.2.3 Install the sample probe so that the probe is centrally located in the stack, pipe, or duct, and is sealed tightly at the stack port connection.

4.2.4 Inject zero gas at the calibration valve assembly. Allow the measurement system response to reach zero. Measure the system response time as the time required for the system to reach the effluent concentration after the calibration valve has been returned to the effluent sampling position.

4.2.5 Conduct a system check before, and a system drift check after, each sampling run according to the procedures in ~~Sections 5.2 and 5.3~~ of this method. If the drift check following a run indicates unacceptable performance (see ~~Section 5.3~~ of this method), the run is not valid. The tester may elect to perform system drift checks during the run not to exceed one drift check per hour.

4.2.6 Verify that the sample lines, filter, and pump temperatures are $120 \pm 5^{\circ}\text{C}$.

4.2.7 Begin sampling at the start of the test period and continue to sample during the entire run. Record the starting and ending times and any required process information as appropriate. If multiple captured emission locations are sampled using a single FIA, sample at each location for the same amount of time (e.g., 2 two minutes) and continue to switch from one location to another for the entire test run. Be sure that total sampling time at each location is the same at the end of the test run. Collect at least four separate measurements from each sample point during each hour of testing. Disregard the measurements at each sampling location until two times the response time of the measurement system has elapsed. Continue sampling for at least 4 one minute and record the concentration measurements.

4.3 Background Concentration. NOTE: Not applicable when the building is used as the TTE.

4.3.1 Locate all NDO's of the TTE. A sampling point shall be at the center of each NDO, unless otherwise specified by the Department. If there are more than six NDO's, choose six sampling points evenly spaced among the NDO's.

4.3.2 Assemble the sample train. Calibrate the FIA and conduct a system check according to the procedures in ~~Sections 5.1 and 5.3 of this method.~~ NOTE: This sample train shall be separate from the sample train used to measure the captured emissions.

4.3.3 Position the probe at the sampling location.

4.3.4 Determine the response time, conduct the system check, and sample according to the procedures described in ~~Sections 4.2.4 through 4.2.7 of this method.~~

4.4 Alternative Procedure. The direct interface sampling and analysis procedure described in Section 7.2 of Method 18 may be used to determine the gas VOC concentration (see 1.1 of **Appendix E** of this regulation). The system must be designed to collect and analyze at least one sample every 10 minutes.

5.0 ~~5~~-Calibration and Quality Assurance

5.1 FIA Calibration and Linearity Check. Make necessary adjustments to the air and fuel supplies for the FIA and ignite the burner. Allow the FIA to warm up for the period recommended by the manufacturer. Inject a calibration gas into the measurement system and adjust the back-pressure regulator to the value required to achieve the flow rates specified by the manufacturer. Inject the zero- and the high-range calibration gases and adjust the analyzer calibration to provide the proper responses. Inject the low- and mid-range gases and record the responses of the measurement system. The calibration and linearity of the system are acceptable if the responses for all four gases are within 5% percent of the respective gas values. If the performance of the system is not acceptable, repair or adjust the system and repeat the linearity check. Conduct a calibration and linearity check after assembling the analysis system and after a major change is made to the system.

5.2 Systems Drift Checks. Select the calibration gas that most closely approximates the concentration of the captured emissions for conducting the drift checks. Introduce the zero and calibration gases at the calibration valve assembly and verify that the appropriate gas flow rate and pressure are present at the FIA. Record the measurement system responses to the zero and calibration gases. The performance of the system is acceptable if the difference between the drift check measurement and the value obtained in ~~Section 5.1 of this method~~ is less than 3% percent of the span value. Conduct the system drift checks at the end of each run.

5.3 System Check. Inject the high-range calibration gas at the inlet of the sampling probe and record the response. The performance of the system is acceptable if the measurement system response is within 5% percent of the value

obtained in ~~Section 5.1~~ of this method for the high-range calibration gas. Conduct a system check before and after each test run.

5.4 Analysis Audit Procedure. Immediately before each test, analyze an audit cylinder as described in ~~Section 5.2~~ of this method. The analysis audit must agree with the audit cylinder concentration within 10% percent.

6.0 ~~6-~~Nomenclature

A_i = area of NDO i , ft^2 .

A_N = total area of all NDO's in the enclosure, ft^2 .

C_{Bi} = corrected average VOC concentration of background emissions at point i , ppm propane.

C_B = average background concentration, ppm propane.

C_{Gj} = corrected average VOC concentration of captured emissions at point j , ppm propane.

C_{DH} = average measured concentration for the drift check calibration gas, ppm propane.

C_{D0} = average system drift check concentration for zero concentration gas, ppm propane.

C_H = actual concentration of the drift check calibration gas, ppm propane.

C_i = uncorrected average background VOC concentration measured at point i , ppm propane.

C_j = uncorrected average VOC concentration measured at point j , ppm propane.

G = total VOC content of captured emissions, kg.

$K_1 = 1.830 \times 10^{-6} \text{ kg}/(\text{m}^3\text{-ppm})$.

n = number of measurement points.

Q_{Gj} = average effluent volumetric flow rate corrected to standard conditions at captured emissions point j , m^3/min .

θ_C = total duration of captured emissions.

7.0 ~~7-~~Calculations

7.1 Total VOC Captured Emissions.

$$G = \sum_{j=1}^n (C_{Gj} - C_B) Q_{Gj} \theta_C K_1 \quad \text{Eq. (D-30B-1)}$$

7.2 VOC Concentration of the Captured Emissions at Point j .

$$C_{Gj} = (C_j - C_{D0}) \frac{C_H}{C_{DH} - C_{D0}} \quad \text{Eq. (D-30B-2)}$$

7.3 Background VOC Concentration at Point i .

$$C_{Bi} = (C_i - C_{D0}) \frac{C_H}{C_{DH} - C_{D0}} \quad \text{Eq. (D-30B-3)}$$

7.4 Average Background Concentration.

$$C_B = \frac{\sum_{i=1}^n C_{Bi} A_i}{A_N} \quad \text{Eq. (D-30B-4)}$$

NOTE: If the concentration at each point is within 20% percent of the average concentration of all points, then use the arithmetic average.

METHOD 30C - VOLATILE ORGANIC COMPOUNDS EMISSIONS IN CAPTURED STREAM (DILUTION TECHNIQUE)

1.0 ~~4-~~Introduction

1.1 Applicability. This procedure is applicable for determining the VOC content of captured gas streams. It is intended to be used in the development of a gas/gas protocol in which fugitive emissions are measured for determining VOC CE for surface coating and printing operations. A dilution system is used to reduce the VOC concentration of the captured emissions to about the same concentration as the fugitive emissions. The procedure may not be acceptable in certain site-specific situations [e.g., when: (1) direct-fired heaters or other circumstances affect the quantity of VOC at the control device inlet; and (2) particulate organic aerosols are formed in the process and are present in the captured emissions].

1.2 Principle. The amount of VOC captured (G) is calculated as the sum of the products of the VOC content (C_{Gj}), the flow rate (Q_{Gj}), and the sampling time ($2G \theta_C$) from each captured emissions point.

1.3 Estimated Measurement Uncertainty. The measurement uncertainties are estimated for each captured or fugitive emissions point as follows: $Q_{Gj} = \pm 5.5\%$ percent and $C_{Gj} = \pm 5\%$ percent. Based on these numbers, the probable uncertainty for G is estimated at about $\pm 7.4\%$ percent.

1.4 Sampling Requirements. A CE test shall consist of at least three sampling runs. Each run shall cover at least one complete production cycle, but shall be at least ~~3~~ three hours long. The sampling time for each run need not exceed ~~8~~ eight hours, even if the production cycle has not been completed. Alternative sampling times may be used with the approval of the Department.

1.5 Notes. Because this procedure is often applied in highly explosive areas, caution and care should be exercised in choosing, installing, and using the appropriate equipment. Mention of trade names or company products does not constitute endorsement. All gas concentrations (percent, ppm) are by volume, unless otherwise noted.

2.0 ~~2-~~Apparatus and Reagents

2.1 Gas VOC Concentration. The main components are as follows:

2.1.1 Dilution System. A Kipp in-stack dilution probe and controller or similar device may be used. The dilution rate may be changed by substituting different critical orifices or adjustments of the aspirator supply pressure. The dilution system shall be heated to prevent VOC condensation. Note: An out-of-stack dilution device may be used.

2.1.2 Calibration Valve Assembly. Three-way valve assembly at the outlet of the sample probe to direct the zero and calibration gases to the

analyzer. Other methods, such as quick connect lines, to route calibration gases to the outlet of the sample probe are acceptable.

2.1.3 Sample Line. Stainless steel or Teflon tubing to transport the sample gas to the analyzer. The sample line must be heated to prevent condensation.

2.1.4 Sample Pump. A leak-free pump, to pull the sample gas through the system at a flow rate sufficient to minimize the response time of the measurement system. The components of the pump that contact the gas stream shall be constructed of stainless steel or Teflon. The sample pump must be heated to prevent condensation.

2.1.5 Sample Flow Rate Control. A sample flow rate control valve and rotameter, or equivalent, to maintain a constant sampling rate within 10% percent. The flow control valve and rotameter must be heated to prevent condensation. A control valve may also be located on the sample pump bypass loop to assist in controlling the sample pressure and flow rate.

2.1.6 Sample Gas Manifold. Capable of diverting a portion of the sample gas stream to the FIA, and the remainder to the bypass discharge vent. The manifold components shall be constructed of stainless steel or Teflon. If captured or fugitive emissions are to be measured at multiple locations, the measurement system shall be designed to use separate sampling probes, lines, and pumps for each measurement location and a common sample gas manifold and FIA. The sample gas manifold and connecting lines to the FIA must be heated to prevent condensation.

2.1.7 Organic Concentration Analyzer. An FIA with a span value of 1.5 times the expected concentration as propane; however, other span values may be used if it can be demonstrated to the Department's satisfaction that they would provide more accurate measurements. The system shall be capable of meeting or exceeding the following specifications:

2.1.7.1 Zero Drift. Less than ±3.0% percent of the span value.

2.1.7.2 Calibration Drift. Less than ±3.0% percent of the span value.

2.1.7.3 Calibration Error. Less than ±5.0% percent of the calibration gas value.

2.1.7.4 Response Time. Less than 30 seconds.

2.1.8 Integrator/Data Acquisition System. An analog or digital device or computerized data acquisition system used to integrate the FIA response or compute the average response and record measurement data. The minimum data sampling frequency for computing average or integrated values is one measurement value every 5 five seconds. The device shall be capable of recording average values at least once per minute.

2.1.9 Calibration and Other Gases. Gases used for calibration, fuel, and combustion air (if required) are contained in compressed gas cylinders. All calibration gases shall be traceable to National Institute of Standards and Technology standards and shall be certified by the manufacturer to $\pm 1\%$ percent of the tag value. Additionally, the manufacturer of the cylinder should provide a recommended shelf life for each calibration gas cylinder over which the concentration does not change more than $\pm 2\%$ percent from the certified value. For calibration gas values not generally available, alternative methods for preparing calibration gas mixtures, such as dilution systems, may be used with the approval of the Department.

2.1.9.1 Fuel. A 40% percent $H_2/60\%$ percent He or 40% percent $H_2/60\%$ percent N_2 gas mixture is recommended to avoid an oxygen synergism effect that reportedly occurs when oxygen concentration varies significantly from a mean value.

2.1.9.2 Carrier Gas and Dilution Air Supply. High purity air with less than 1 ppm of organic material (as propane or carbon equivalent), or less than 0.1% percent of the span value, whichever is greater.

2.1.9.3 FIA Linearity Calibration Gases. Low-, mid-, and high-range gas mixture standards with nominal propane concentrations of 20-30, 45-55, and $70-80\%$ percent of the span value in air, respectively. Other calibration values and other span values may be used if it can be shown to the Department's satisfaction that more accurate measurements would be achieved.

2.1.9.4 Dilution Check Gas. Gas mixture standard containing propane in air, approximately half the span value after dilution.

2.1.10 Particulate Filter. An in-stack or an out-of-stack glass fiber filter is recommended if exhaust gas particulate loading is significant. An out-of-stack filter must be heated to prevent any condensation unless it can be demonstrated that no condensation occurs.

2.2 Captured Emissions Volumetric Flow Rate.

2.2.1 Method 2 or 2A Apparatus. For determining volumetric flow rate.

2.2.2 Method 3 Apparatus and Reagents. For determining molecular weight of the gas stream. An estimate of the molecular weight of the gas stream may be used if approved by the Department.

2.2.3 Method 4 Apparatus and Reagents. For determining moisture content, if necessary.

3.0 ~~3~~-Determination of Volumetric Flow Rate of Captured Emissions

3.1 Locate all points where emissions are captured from the affected facility. Using Method 1, determine the sampling points. Be sure to check each site for cyclonic or swirling flow.

3.2 Measure the velocity at each sampling site at least once every hour during each sampling run using Method 2 or 2A.

4.0 ~~4.~~Determination of VOC Content of Captured Emissions

4.1 Analysis Duration. Measure the VOC responses at each captured emissions point during the entire test run or, if applicable, while the process is operating. If there are multiple captured emissions locations, design a sampling system to allow a single FIA to be used to determine the VOC responses at all sampling locations.

4.2 Gas VOC Concentration.

4.2.1 Assemble the sample train. Calibrate the FIA according to the procedure in ~~Section 5.1~~ of this method.

4.2.2 Set the dilution ratio and determine the dilution factor according to the procedure in ~~Section 5.3~~ of this method.

4.2.3 Conduct a system check according to the procedure in ~~Section 5.4~~ of this method.

4.2.4 Install the sample probe so that the probe is centrally located in the stack, pipe, or duct, and is sealed tightly at the stack port connection.

4.2.5 Inject zero gas at the calibration valve assembly. Measure the system response time as the time required for the system to reach the effluent concentration after the calibration valve has been returned to the effluent sampling position.

4.2.6 Conduct a system check before, and a system drift check after, each sampling run according to the procedures in ~~Sections 5.2 and 5.4~~ of this method. If the drift check following a run indicates unacceptable performance (see ~~Section 5.4~~ of this method), the run is not valid. The tester may elect to perform system drift checks during the run not to exceed one drift check per hour.

4.2.7 Verify that the sample lines, filter, and pump temperatures are $120 \pm 5^{\circ}\text{C}$.

4.2.8 Begin sampling at the start of the test period and continue to sample during the entire run. Record the starting and ending times and any required process information as appropriate. If multiple captured emission locations are sampled using a single FIA, sample at each location for the same amount of time (e.g., 2 two min.) and continue to switch from one location to another for the entire test run. Be sure that total sampling time at

each location is the same at the end of the test run. Collect at least four separate measurements from each sample point during each hour of testing. Disregard the measurements at each sampling location until two times the response time of the measurement system has elapsed. Continue sampling for at least 4 one minute and record the concentration measurements.

4.3 Background Concentration. NOTE: Not applicable when the building is used as the TTE.

4.3.1 Locate all NDO's of the TTE. A sampling point shall be at the center of each NDO, unless otherwise approved by the Department. If there are more than six NDO's, choose six sampling points evenly spaced among the NDO's.

4.3.2 Assemble the sample train. Calibrate the FIA and conduct a system check according to the procedures in ~~Sections~~ 5.1 and 5.4 of this method.

4.3.3 Position the probe at the sampling location.

4.3.4 Determine the response time, conduct the system check, and sample according to the procedures described in ~~Sections~~ 4.2.4 through 4.2.8 of this method.

4.4 Alternative Procedure. The direct interface sampling and analysis procedure described in Section 7.2 of Method 18 may be used to determine the gas VOC concentration (see 1.1 of Appendix E of this regulation). The system must be designed to collect and analyze at least one sample every 10 minutes.

5.0 ~~5-~~Calibration and Quality Assurance

5.1 FIA Calibration and Linearity Check. Make necessary adjustments to the air and fuel supplies for the FIA and ignite the burner. Allow the FIA to warm up for the period recommended by the manufacturer. Inject a calibration gas into the measurement system after the dilution system and adjust the back-pressure regulator to the value required to achieve the flow rates specified by the manufacturer. Inject the zero- and the high-range calibration gases and adjust the analyzer calibration to provide the proper responses. Inject the low- and mid-range gases and record the responses of the measurement system. The calibration and linearity of the system are acceptable if the responses for all four gases are within ~~5% percent~~ 5% of the respective gas values. If the performance of the system is not acceptable, repair or adjust the system and repeat the linearity check. Conduct a calibration and linearity check after assembling the analysis system and after a major change is made to the system.

5.2 Systems Drift Checks. Select the calibration gas that most closely approximates the concentration of the diluted captured emissions for conducting the drift checks. Introduce the zero and calibration gases at the calibration valve assembly, and verify that the appropriate gas flow rate and pressure are present at the FIA. Record the measurement system responses to the zero and calibration

gases. The performance of the system is acceptable if the difference between the drift check measurement and the value obtained in Section 5.1 of this method is less than 3% percent of the span value. Conduct the system drift check at the end of each run.

5.3 Determination of Dilution Factor. Inject the dilution check gas into the measurement system before the dilution system and record the response. Calculate the dilution factor using Equation D-30C-3.

5.4 System Check. Inject the high-range calibration gas at the inlet to the sampling probe while the dilution air is turned off. Record the response. The performance of the system is acceptable if the measurement system response is within 5% percent of the value obtained in Section 5.1 of this method for the high-range calibration gas. Conduct a system check before and after each test run.

5.5 Analysis Audit Procedure. Immediately before each test, analyze an audit cylinder as described in Section 5.2 of this method. The analysis audit must agree with the audit cylinder concentration within 10% percent.

6.0 ~~6~~-Nomenclature

A_i = area of NDO i , ft^2 .

A_N = total area of all NDO's in the enclosure, ft^2 .

C_A = actual concentration of the dilution check gas, ppm propane.

C_{Bi} = corrected average VOC concentration of background emissions at point i , ppm propane.

C_B = average background concentration, ppm propane.

C_{DH} = average measured concentration for the drift check calibration gas, ppm propane.

C_{D0} = average system drift check concentration for zero concentration gas, ppm propane.

C_H = actual concentration of the drift check calibration gas, ppm propane.

C_i = uncorrected average background VOC concentration measured at point i , ppm propane.

C_j = uncorrected average VOC concentration measured at point j , ppm propane.

C_M = measured concentration of the dilution check gas, ppm propane.

D_F = dilution factor.

G = total VOC content of captured emissions, kg.

$K_1 = 1.830 \times 10^{-6} \text{ kg}/(\text{m}^3\text{-ppm})$.

n = number of measurement points.

Q_{Gj} = average effluent volumetric flow rate corrected to standard conditions at captured emissions point j , m^3/min .

θ_C = total duration of CE sampling run, min.

7.0 ~~7~~-Calculations

7.1 Total VOC Captured Emissions.

$$G = \sum_{j=1}^n (C_{Gj} - C_B) Q_{Gj} \theta_C K_1 \quad \text{Eq. (D-30C-1)}$$

7.2 VOC Concentration of the Captured Emissions at Point j.

$$C_{Gj} = DF(C_j - C_{D0}) \frac{C_H}{C_{DH} - C_{D0}} \quad \text{Eq. (D-30C-2)}$$

7.3 Dilution Factor.

$$DF = \frac{C_A}{C_M} \quad \text{Eq. (D-30C-3)}$$

7.4 Background VOC Concentration at Point i.

$$C_{Bi} = (C_i - C_{D0}) \frac{C_H}{C_{DH} - C_{D0}} \quad \text{Eq. (D-30C-4)}$$

7.5 Average Background Concentration.

$$C_B = \frac{\sum_{i=1}^n C_{Bi} A_i}{A_N} \quad \text{Eq. (D-30C-5)}$$

NOTE: If the concentration at each point is within 20% percent of the average concentration of all points, then use the arithmetic average.

METHOD 30D - VOLATILE ORGANIC COMPOUNDS EMISSIONS IN FUGITIVE STREAM FROM TEMPORARY TOTAL ENCLOSURE

1.0 ~~4-~~Introduction

1.1 Applicability. This procedure is applicable for determining the fugitive VOC emissions from a TTE. It is intended to be used as a segment in the development of liquid/gas or gas/gas protocols for determining VOC CE for surface coating and printing operations.

1.2 Principle. The amount of fugitive VOC emissions (F) from the TTE is calculated as the sum of the products of the VOC content (C_{Fj}), the flow rate (Q_{Fj}), and the sampling time ($2F \theta_F$) from each fugitive emissions point.

1.3 Estimated Measurement Uncertainty. The measurement uncertainties are estimated for each fugitive emission point as follows:

$Q_{Fj} = \pm 5.5\%$ ~~percent~~ and $C_{Fj} = \pm 5.0\%$ ~~percent~~. Based on these numbers, the probable uncertainty for F is estimated at about $\pm 7.4\%$ ~~percent~~.

1.4 Sampling Requirements. A CE test shall consist of at least three sampling runs. Each run shall cover at least one complete production cycle, but shall be at least ~~3~~ three hours long. The sampling time for each run need not exceed ~~8~~ eight hours, even if the production cycle has not been completed. Alternative sampling times may be used with the approval of the Department.

1.5 Notes. Because this procedure is often applied in highly explosive areas, caution and care should be exercised in choosing, installing, and using the appropriate equipment. Mention of trade names or company products does not constitute endorsement. All gas concentrations (percent, ppm) are by volume, unless otherwise noted.

2.0 ~~2-~~Apparatus and Reagents

2.1 Gas VOC Concentration. The main components are as follows:

2.1.1 Sample Probe. Stainless steel or equivalent. The probe shall be heated to prevent VOC condensation.

2.1.2 Calibration Valve Assembly. Three-way valve assembly at the outlet of the sample probe to direct the zero and calibration gases to the analyzer. Other methods, such as quick-connect lines, to route calibration gases to the outlet of the sample probe are acceptable.

2.1.3 Sample Line. Stainless steel or Teflon tubing to transport the sample gas to the analyzer. The sample line must be heated to prevent condensation.

2.1.4 Sample Pump. A leak-free pump, to pull the sample gas through the system at a flow rate sufficient to minimize the response time of the

measurement system. The components of the pump that contact the gas stream shall be constructed of stainless steel or Teflon. The sample pump must be heated to prevent condensation.

2.1.5 Sample Flow Rate Control. A sample flow rate control valve and rotameter, or equivalent, to maintain a constant sampling rate within 10% percent. The flow control valve and rotameter must be heated to prevent condensation. A control valve may also be located on the sample pump bypass loop to assist in controlling the sample pressure and flow rate.

2.1.6 Sample Gas Manifold. Capable of diverting a portion of the sample gas stream to the FIA, and the remainder to the bypass discharge vent. The manifold components shall be constructed of stainless steel or Teflon. If emissions are to be measured at multiple locations, the measurement system shall be designed to use separate sampling probes, lines, and pumps for each measurement location and a common sample gas manifold and FIA. The sample gas manifold and connecting lines to the FIA must be heated to prevent condensation.

2.1.7 Organic Concentration Analyzer. An FIA with a span value of 1.5 times the expected concentration as propane; however, other span values may be used if it can be demonstrated to the Department's satisfaction that they would provide more accurate measurements. The system shall be capable of meeting or exceeding the following specifications:

2.1.7.1 Zero Drift. Less than ±3.0% percent of the span value.

2.1.7.2 Calibration Drift. Less than ±3.0% percent of the span value.

2.1.7.3 Calibration Error. Less than ±5.0% percent of the calibration gas value.

2.1.7.4 Response Time. Less than 30 seconds.

2.1.8 Integrator/Data Acquisition System. An analog or digital device or computerized data acquisition system used to integrate the FIA response or compute the average response and record measurement data. The minimum data sampling frequency for computing average or integrated values is one measurement value every 5 five seconds. The device shall be capable of recording average values at least once per minute.

2.1.9 Calibration and Other Gases. Gases used for calibration, fuel, and combustion air (if required) are contained in compressed gas cylinders. All calibration gases shall be traceable to National Institute of Standards and Technology standards and shall be certified by the manufacturer to ±1% percent of the tag value. Additionally, the manufacturer of the cylinder should provide a recommended shelf life for each calibration gas cylinder over which the concentration does not change more than ±2% percent from the certified value. For calibration gas values not generally available,

alternative methods for preparing calibration gas mixtures, such as dilution systems, may be used with the approval of the Department.

2.1.9.1 Fuel. A 40% ~~percent~~ H₂/60% ~~percent~~ He or 40% ~~percent~~ H₂/60% ~~percent~~ N₂ gas mixture is recommended to avoid an oxygen synergism effect that reportedly occurs when oxygen concentration varies significantly from a mean value.

2.1.9.2 Carrier Gas. High purity air with less than 4 one ppm of organic material (as propane or carbon equivalent) or less than 0.1% ~~percent~~ of the span value, whichever is greater.

2.1.9.3 FIA Linearity Calibration Gases. Low-, mid-, and high-range gas, mixture standards with nominal propane concentrations of 20-30, 45-55, and 70-80% ~~percent~~ of the span value in air, respectively. Other calibration values and other span values may be used if it can be shown to the Department's satisfaction that more accurate measurements would be achieved.

2.1.10 Particulate Filter. An in-stack or an out-of-stack glass fiber filter is recommended if exhaust gas particulate loading is significant. An out-of-stack filter must be heated to prevent any condensation unless it can be demonstrated that no condensation occurs.

2.2 Fugitive Emissions Volumetric Flow Rate.

2.2.1 Method 2 or 2A Apparatus. For determining volumetric flow rate.

2.2.2 Method 3 Apparatus and Reagents. For determining molecular weight of the gas stream. An estimate of the molecular weight of the gas stream may be used if approved by the Department.

2.2.3 Method 4 Apparatus and Reagents. For determining moisture content, if necessary.

2.3 Temporary Total Enclosure. The criteria for designing an acceptable TTE are specified in Method 30.

3.0 ~~3.~~ Determination of Volumetric Flow Rate of Fugitive Emissions

3.1 Locate all points where emissions are exhausted from the TTE. Using Method 1, determine the sampling points. Be sure to check each site for cyclonic or swirling flow.

3.2 Measure the velocity at each sampling site at least once every hour during each sampling run using Method 2 or 2A.

4.0 ~~4.~~ Determination of VOC Content of Fugitive Emissions

4.1 Analysis Duration. Measure the VOC responses at each fugitive emission point during the entire test run or, if applicable, while the process is operating. If there are multiple emission locations, design a sampling system to allow a single FIA to be used to determine the VOC responses at all sampling locations.

4.2 Gas VOC Concentration.

4.2.1 Assemble the sample train. Calibrate the FIA and conduct a system check according to the procedures in ~~Sections 5.1 and 5.3~~ of this method, respectively.

4.2.2 Install the sample probe so that the probe is centrally located in the stack, pipe, or duct, and is sealed tightly at the stack port connection.

4.2.3 Inject zero gas at the calibration valve assembly. Allow the measurement system response to reach zero. Measure the system response time as the time required for the system to reach the effluent concentration after the calibration valve has been returned to the effluent sampling position.

4.2.4 Conduct a system check before, and a system drift check after, each sampling run according to the procedures in ~~Sections 5.2 and 5.3~~ of this method. If the drift check following a run indicates unacceptable performance (see ~~Section 5.3~~ of this method), the run is not valid. The tester may elect to perform system drift checks during the run not to exceed one drift check per hour.

4.2.5 Verify that the sample lines, filter, and pump temperatures are $120 \pm 5^{\circ}\text{C}$.

4.2.6 Begin sampling at the start of the test period and continue to sample during the entire run. Record the starting and ending times and any required process information, as appropriate. If multiple emission locations are sampled using a single FIA, sample at each location for the same amount of time (e.g., 2 two min.) and continue to switch from one location to another for the entire test run. Be sure that total sampling time at each location is the same at the end of the test run. Collect at least four separate measurements from each sample point during each hour of testing. Disregard the response measurements at each sampling location until 2 two times the response time of the measurement system has elapsed. Continue sampling for at least 4 one minute and record the concentration measurements.

4.3 Background Concentration.

4.3.1 Locate all NDO's of the TTE. A sampling point shall be at the center of each NDO, unless otherwise approved by the Department. If there are more than six NDO's, choose six sampling points evenly spaced among the NDO's.

4.3.2 Assemble the sample train. Calibrate the FIA and conduct a system check according to the procedures in ~~Sections 5.1 and 5.3~~ of this method.

4.3.3 Position the probe at the sampling location.

4.3.4 Determine the response time, conduct the system check, and sample according to the procedures described in ~~Sections 4.2.3 through 4.2.6~~ of this method.

4.4 Alternative Procedure. The direct interface sampling and analysis procedure described in Section 7.2 of Method 18 may be used to determine the gas VOC concentration (see 1.1 of **Appendix E** of this regulation). The system must be designed to collect and analyze at least one sample every 10 minutes.

5.0 ~~5-~~Calibration and Quality Assurance

5.1 FIA Calibration and Linearity Check. Make necessary adjustments to the air and fuel supplies for the FIA and ignite the burner. Allow the FIA to warm up for the period recommended by the manufacturer. Inject a calibration gas into the measurement system and adjust the back-pressure regulator to the value required to achieve the flow rates specified by the manufacturer. Inject the zero- and the high-range calibration gases and adjust the analyzer calibration to provide the proper responses. Inject the low- and mid-range gases and record the responses of the measurement system. The calibration and linearity of the system are acceptable if the responses for all four gases are within 5% percent of the respective gas values. If the performance of the system is not acceptable, repair or adjust the system and repeat the linearity check. Conduct a calibration and linearity check after assembling the analysis system and after a major change is made to the system.

5.2 Systems Drift Checks. Select the calibration gas concentration that most closely approximates that of the fugitive gas emissions to conduct the drift checks. Introduce the zero and calibration gases at the calibration valve assembly and verify that the appropriate gas flow rate and pressure are present at the FIA. Record the measurement system responses to the zero and calibration gases. The performance of the system is acceptable if the difference between the drift check measurement and the value obtained in ~~Section 5.1~~ of this method is less than 3% percent of the span value. Conduct a system drift check at the end of each run.

5.3 System Check. Inject the high-range calibration gas at the inlet of the sampling probe and record the response. The performance of the system is acceptable if the measurement system response is within 5% percent of the value obtained in ~~Section 5.1~~ of this method for the high-range calibration gas. Conduct a system check before each test run.

5.4 Analysis Audit. Immediately before each test, analyze an audit cylinder as described in ~~Section 5.2~~ of this method. The analysis audit must agree with the audit cylinder concentration within 10% percent.

6.0 6--Nomenclature

A_i = area of NDO i , ft^2 .

A_N = total area of all NDO's in the enclosure, ft^2 .

C_{Bi} = corrected average VOC concentration of background emissions at point i , ppm propane.

C_B = average background concentration, ppm propane.

C_{DH} = average measured concentration for the drift check calibration gas, ppm propane.

C_{D0} = average system drift check concentration for zero concentration gas, ppm propane.

C_{Fj} = corrected average VOC concentration of fugitive emissions at point j , ppm propane.

C_H = actual concentration of the drift check calibration gas, ppm propane.

C_i = uncorrected average background VOC concentration at point i , ppm propane.

C_j = uncorrected average VOC concentration measured at point j , ppm propane.

F = total VOC content of fugitive emissions, kg.

$K_1 = 1.830 \times 10^{-6} \text{ kg}/(\text{m}^3\text{-ppm})$.

n = number of measurement points.

Q_{Fj} = average effluent volumetric flow rate corrected to standard conditions at fugitive emissions point j , m^3/min .

θ_F = total duration of fugitive emissions sampling run, min.

7.0 7. Calculations

7.1 Total VOC Fugitive Emissions.

$$F = \sum_{j=1}^n (C_{Fj} - C_B) Q_{Fj} \theta_F K_1 \quad \text{Eq. (D-30D-1)}$$

7.2 VOC Concentration of the Fugitive Emissions at Point j .

$$C_{Fj} = (C_j - C_{D0}) \frac{C_H}{C_{DH} - C_{D0}} \quad \text{Eq. (D-30D-2)}$$

7.3 Background VOC Concentration at Point i .

$$C_{Bi} = (C_i - C_{D0}) \frac{C_H}{C_{DH} - C_{D0}} \quad \text{Eq. (D-30D-3)}$$

7.4 Average Background Concentration.

$$C_B = \frac{\sum_{i=1}^n C_{Bi} A_i}{A_N} \quad \text{Eq. (D-30D-4)}$$

NOTE: If the concentration at each point is within 20% percent of the average concentration of all points, use the arithmetic average.

METHOD 30E - VOLATILE ORGANIC COMPOUNDS EMISSIONS IN FUGITIVE STREAM FROM BUILDING ENCLOSURE

1.0 ~~4-~~Introduction

1.1 Applicability. This procedure is applicable for determining the fugitive VOC emissions from a BE. It is intended to be used in the development of liquid/gas or gas/gas protocols for determining VOC CE for surface coating and printing operations.

1.2 Principle. The total amount of fugitive VOC emissions (F_B) from the BE is calculated as the sum of the products of the VOC content (C_{Fj}) of each fugitive emissions point, the flow rate (Q_{Fj}) at each fugitive emissions point, and time (θ_F).

1.3 Measurement Uncertainty. The measurement uncertainties are estimated for each fugitive emissions point as follows: $Q_{Fj} = \pm 10.0\%$ ~~percent~~ and $C_{Fj} = \pm 5.0\%$ ~~percent~~. Based on these numbers, the probable uncertainty for F_B is estimated at about $\pm 11.2\%$ ~~percent~~.

1.4 Sampling Requirements. A CE test shall consist of at least three sampling runs. Each run shall cover at least one complete production cycle, but shall be at least ~~3~~ three hours long. The sampling time for each run need not exceed ~~8~~ eight hours, even if the production cycle has not been completed. Alternative sampling times may be used with the approval of the Department.

1.5 Notes. Because this procedure is often applied in highly explosive areas, caution and care should be exercised in choosing, installing, and using the appropriate equipment. Mention of trade names or company products does not constitute endorsement. All gas concentrations (percent, ppm) are by volume, unless otherwise noted.

2.0 ~~2-~~Apparatus and Reagents

2.1 Gas VOC Concentration. The main components are as follows:

2.1.1 Sample Probe. Stainless steel or equivalent. The probe shall be heated to prevent VOC condensation.

2.1.2 Calibration Valve Assembly. Three-way valve assembly at the outlet of the sample probe to direct the zero and calibration gases to the analyzer. Other methods, such as quick-connect lines, to route calibration gases to the outlet of the sample probe are acceptable.

2.1.3 Sample Line. Stainless steel or Teflon tubing to transport the sample gas to the analyzer. The sample line must be heated to prevent condensation.

2.1.4 Sample Pump. A leak-free pump, to pull the sample gas through the system at a flow rate sufficient to minimize the response time of the

measurement system. The components of the pump that contact the gas stream shall be constructed of stainless steel or Teflon. The sample pump must be heated to prevent condensation.

2.1.5 Sample Flow Rate Control. A sample flow rate control valve and rotameter, or equivalent, to maintain a constant sampling rate within 10% percent. The flow rate control valve and rotameter must be heated to prevent condensation. A control valve may also be located on the sample pump bypass loop to assist in controlling the sample pressure and flow rate.

2.1.6 Sample Gas Manifold. Capable of diverting a portion of the sample gas stream to the FIA, and the remainder to the bypass discharge vent. The manifold components shall be constructed of stainless steel or Teflon. If emissions are to be measured at multiple locations, the measurement system shall be designed to use separate sampling probes, lines, and pumps for each measurement location, and a common sample gas manifold and FIA. The sample gas manifold must be heated to prevent condensation.

2.1.7 Organic Concentration Analyzer. An FIA with a span value of 1.5 times the expected concentration as propane; however, other span values may be used if it can be demonstrated to the Department's satisfaction that they would provide more accurate measurements. The system shall be capable of meeting or exceeding the following specifications:

2.1.7.1 Zero Drift. Less than ±3.0% percent of the span value.

2.1.7.2 Calibration Drift. Less than ±3.0% percent of the span value.

2.1.7.3 Calibration Error. Less than ±5.0% percent of the calibration gas value.

2.1.7.4 Response Time. Less than 30 seconds.

2.1.8 Integrator/Data Acquisition System. An analog or digital device or computerized data acquisition system used to integrate the FIA response or compute the average response and record measurement data. The minimum data sampling frequency for computing average or integrated values is one measurement value every 5 seconds. The device shall be capable of recording average values at least once per minute.

2.1.9 Calibration and Other Gases. Gases used for calibration, fuel, and combustion air (if required) are contained in compressed gas cylinders. All calibration gases shall be traceable to National Institute of Standards and Technology standards and shall be certified by the manufacturer to ±1% percent of the tag value. Additionally, the manufacturer of the cylinder should provide a recommended shelf life for each calibration gas cylinder over which the concentration does not change more than ±2% percent from the certified value. For calibration gas values not generally available,

alternative methods for preparing calibration gas mixtures, such as dilution systems, may be used with the approval of the Department.

2.1.9.1 Fuel. A ~~40% percent~~ H₂/~~60% percent~~ He or ~~40% percent~~ H₂/~~60% percent~~ N₂ gas mixture is recommended to avoid an oxygen synergism effect that reportedly occurs when oxygen concentration varies significantly from a mean value.

2.1.9.2 Carrier Gas. High purity air with less than 4 one ppm of organic material (propane or carbon equivalent) or less than 0.1% ~~percent~~ of the span value, whichever is greater.

2.1.9.3 FIA Linearity Calibration Gases. Low-, mid-, and high-range gas mixture standards with nominal propane concentrations of 20-30, 45-55, and 70-80% ~~percent~~ of the span value in air, respectively. Other calibration values and other span values may be used if it can be shown to the Department's satisfaction that more accurate measurements would be achieved.

2.1.10 Particulate Filter. An in-stack or an out-of-stack glass fiber filter is recommended if exhaust gas particulate loading is significant. An out-of-stack filter must be heated to prevent any condensation unless it can be demonstrated that no condensation occurs.

2.2 Fugitive Emissions Volumetric Flow Rate.

2.2.1 Flow Direction Indicators. Any means of indicating inward or outward flow, such as light plastic film or paper streamers, smoke tubes, filaments, and sensory perception.

2.2.2 Method 2 or 2A Apparatus. For determining volumetric flow rate. Anemometers or similar devices calibrated according to the manufacturer's instructions may be used when low velocities are present. Vane anemometers (Young-maximum response propeller), specialized pitots with electronic manometers (e.g., Shortridge Instruments Inc., Airdata Multimeter 860) are commercially available with measurement thresholds of 15 and 8 eight mpm (50 and 25 fpm), respectively.

2.2.3 Method 3 Apparatus and Reagents. For determining molecular weight of the gas stream. An estimate of the molecular weight of the gas stream may be used if approved by the Department.

2.2.4 Method 4 Apparatus and Reagents. For determining moisture content, if necessary.

2.3 Total Temporary Enclosure. The criteria for an acceptable TTE are specified in Method 30.

3.0 ~~3.~~ Determination of Volumetric Flow Rate of Fugitive Emissions

3.1 Preliminary Determinations. To determine which exhaust points should be measured for volumetric flow rates and VOC concentrations, the following procedure shall be used:

3.1.1 Forced Draft Openings. Identify all forced draft openings. Determine the volumetric flow rate according to Method 2.

3.1.2 The NDO's Exhaust Points. The NDO's in the roof of a facility are considered to be exhaust points. Determine volumetric flow rate from these NDO's. Divide the cross-sectional area according to Method 1 using 12 equal areas. Use the appropriate velocity measurement devices (e.g., propeller anemometers).

3.1.3 Other NDO's.

3.1.3.1 This step is optional. Determine the exhaust flow rate, including that of the control device, from the enclosure and the intake air flow rate. If the exhaust flow rate divided by the intake air flow rate is greater than 1.1, then all other NDO's are not considered to be significant exhaust points. It is not necessary to measure the volumetric flow rate and VOC concentration from these insignificant exhaust points during the CE test.

3.1.3.2 If the option above is not taken, identify all other NDO's and other potential points through which fugitive emissions may escape the enclosure; then use the following criteria to determine whether flow rates and VOC concentrations need to be measured.

3.1.3.2.1 Using the appropriate flow direction indicator, determine the flow direction. An NDO with zero or inward flow is not an exhaust point.

3.1.3.2.2 Measure the outward volumetric flow rate from the remainder of the NDO's. If the collective flow rate is 2% percent or less of the flow rate from ~~Sections 3.1.1 and 3.1.2 of this method~~, then these NDO's, except those within two equivalent diameters (based on NDO opening) from VOC sources, may be considered to be non-exhaust points.

3.1.3.2.3 If the percentage calculated in ~~Section 3.1.3.2.2 of this method~~ is greater than 2% percent, those NDO's (except those within two equivalent diameters from VOC sources) whose volumetric flow rates total 2% percent of the flow rate from ~~Sections 3.1.1 and 3.1.2 of this method~~ may be considered as non-exhaust points. All remaining NDO's shall be measured for volumetric flow rate and VOC concentrations during the CE test.

3.1.3.2.4 The tester may choose to measure VOC concentrations at the forced exhaust points and the NDO's. If

the total VOC emissions from the non-roof NDO's are less than ~~2% percent~~ of the emissions from the forced draft and roof NDO's, then it is not necessary to measure the VOC concentration at the non-roof NDO's during the CE test.

3.2 Determination of Flow Rates.

3.2.1 Measure the volumetric flow rate at all locations identified as exhaust points in ~~Section 3.1~~ in this method. Divide each exhaust opening into nine equal areas for rectangular openings and into eight equal areas for circular openings.

3.2.2 Measure the velocity at each site at least once every hour during each sampling run using Method 2 or 2A, if applicable, or using the low velocity instruments in ~~Section 2.2.2~~ in this method.

4.0 ~~4.~~ Determination of VOC Content of Fugitive Emissions

4.1 Analysis Duration. Measure the VOC responses at each fugitive emissions point during the entire test run or, if applicable, while the process is operating. If there are multiple emissions locations, design a sampling system to allow a single FIA to be used to determine the VOC responses at all sampling locations.

4.2 Gas VOC Concentration.

4.2.1 Assemble the sample train. Calibrate the FIA and conduct a system check according to the procedures in ~~Sections 5.1 and 5.3~~ in this method, respectively.

4.2.2 Install the sample probe so that the probe is centrally located in the stack, pipe, or duct, and is sealed tightly at the stack port connection.

4.2.3 Inject zero gas at the calibration valve assembly. Allow the measurement system response to reach zero. Measure the system response time as the time required for the system to reach the effluent concentration after the calibration valve has been returned to the effluent sampling position.

4.2.4 Conduct a system check before, and a system drift check after, each sampling run according to the procedures in ~~Sections 5.2 and 5.3~~ of this method. If the drift check following a run indicates unacceptable performance (see ~~Section 5.3~~ of this method), the run is not valid. The tester may elect to perform drift checks during the run, not to exceed one drift check per hour.

4.2.5 Verify that the sample lines, filter, and pump temperatures are $120 \pm 5^{\circ}\text{C}$.

4.2.6 Begin sampling at the start of the test period and continue to sample during the entire run. Record the starting and ending times, and any required process information, as appropriate. If multiple emission locations are sampled using a single FIA, sample at each location for the same amount of time (e.g., 2 two minutes) and continue to switch from one location to another for the entire test run. Be sure that total sampling time at each location is the same at the end of the test run. Collect at least four separate measurements from each sample point during each hour of testing. Disregard the response measurements at each sampling location until 2 two times the response time of the measurement system has elapsed. Continue sampling for at least 4 one minute, and record the concentration measurements.

4.3 Alternative Procedure. The direct interface sampling and analysis procedure described in Section 7.2 of Method 18 may be used to determine the gas VOC concentration (see 1.1 of **Appendix E** of this regulation). The system must be designed to collect and analyze at least one sample every 10 minutes.

5.0 ~~5~~-Calibration and Quality Assurance

5.1 FIA Calibration and Linearity Check. Make necessary adjustments to the air and fuel supplies for the FIA and ignite the burner. Allow the FIA to warm up for the period recommended by the manufacturer. Inject a calibration gas into the measurement system and adjust the back-pressure regulator to the value required to achieve the flow rates specified by the manufacturer. Inject the zero- and the high-range calibration gases, and adjust the analyzer calibration to provide the proper responses. Inject the low- and mid-range gases and record the responses of the measurement system. The calibration and linearity of the system are acceptable if the responses for all four gases are within 5% ~~percent~~ of the respective gas values. If the performance of the system is not acceptable, repair or adjust the system and repeat the linearity check. Conduct a calibration and linearity check after assembling the analysis system and after a major change is made to the system.

5.2 Systems Drift Checks. Select the calibration gas that most closely approximates the concentration of the captured emissions for conducting the drift checks. Introduce the zero and calibration gases at the calibration valve assembly and verify that the appropriate gas flow rate and pressure are present at the FIA. Record the measurement system responses to the zero and calibration gases. The performance of the system is acceptable if the difference between the drift check measurement and the value obtained in ~~Section 5.1~~ of this method is less than 3% ~~percent~~ of the span value. Conduct a system drift check at the end of each run.

5.3 System Check. Inject the high-range calibration gas at the inlet of the sampling probe and record the response. The performance of the system is acceptable if the measurement system response is within 5% ~~percent~~ of the value obtained in ~~Section 5.1~~ of this method for the high-range calibration gas. Conduct a system check before each test run.

5.4 Analysis Audit. Immediately before each test, analyze an audit cylinder as described in ~~Section 5.2 of this method~~. The analysis audit must agree with the audit cylinder concentration within 10% percent.

6.0 ~~6-~~Nomenclature

- C_{DH} = average measured concentration for the drift check calibration gas, ppm propane.
- C_{D0} = average system drift check concentration for zero concentration gas, ppm propane.
- C_{Fj} = corrected average VOC concentration of fugitive emissions at point j, ppm propane.
- C_H = actual concentration of the drift check calibration gas, ppm propane.
- C_j = uncorrected average VOC concentration measured at point j, ppm propane.
- F_B = total VOC content of fugitive emissions from the building, kg.
- $K_1 = 1.830 \times 10^{-6}$ kg/(m³-ppm).
- n = number of measurement points.
- Q_{Fj} = average effluent volumetric flow rate corrected to standard conditions at fugitive emissions point j, m³/min.
- θ_F = total duration of CE sampling run, min.

7.0 ~~7-~~Calculations

7.1 Total VOC Fugitive Emissions from the Building.

$$F_B = \sum_{j=1}^n C_{Fj} Q_{Fj} \theta_F K_1 \quad \text{Eq. (D-30E-1)}$$

7.2 VOC Concentration of the Fugitive Emissions at Point j.

$$C_{Fj} = (C_j - C_{D0}) \frac{C_H}{C_{DH} - C_{D0}} \quad \text{Eq. (D-30E-2)}$$

APPENDIX E

Test Methods and Compliance Procedures: Determining the Destruction or Removal Efficiency of a Control Device.

1.0 a—Depending upon the conditions at a test site, one of the following test methods from 40 CFR Part 60, Appendix A (July 1, 1992), must be used to determine volatile organic compound (VOC) concentrations of a gas stream at the inlet and outlet of a control device:

1.1 ~~4~~—Method 18.

1.2 ~~2~~—Method 25.

1.3 ~~3~~—Method 25A.

2.0 b—The method selected shall be based on consideration of the diversity of organic species present and their total concentration and on consideration of the potential presence of interfering gases. Because of the different response factors for the many organic compounds formed during the combustion process, only Method 25, which measures VOC as carbon, shall be used for determining destruction efficiency of incinerators or catalytic incinerators, except in cases where the allowable outlet VOC concentration of the control device is less than 50 ppm as carbon, or the product of CO₂ in percent and H₂O in percent exceeds 100, in which case Method 25A shall be used.

3.0 e—Except as indicated in paragraphs ~~(c)(1) and (2)~~ 3.1 and 3.2 of this Section appendix, a test shall consist of three separate runs, each lasting a minimum of 60 minutes (min), unless the Department determines that process variables dictate shorter sampling times.

3.1 ~~4~~—When the method is to be used to determine the efficiency of a fixed-bed carbon adsorption system with a common exhaust stack for all of the individual adsorber vessels, the test shall consist of three separate runs, each coinciding with one or more complete sequences through the adsorption cycles of all the individual adsorber vessels.

3.2 ~~2~~—When the method is to be used to determine the efficiency of a fixed-bed carbon adsorption system with individual exhaust stacks for each adsorber vessel, each adsorber vessel shall be tested individually. The test for each adsorber vessel shall consist of three separate runs. Each run shall coincide with one or more complete adsorption cycles.

4.0 ~~d~~—Method 1 or 1A of 40 CFR Part 60, Appendix A (July 1, 1992), shall be used for velocity traverses.

5.0 e—Method 2, 2A, 2C, or 2D of 40 CFR Part 60, Appendix A (July 1, 1992), shall be used for velocity and volumetric flow rates.

6.0 ~~f.~~ Method 3 or 3A of 40 CFR Part 60, Appendix A (July 1, 1992), shall be used for O₂ and CO₂ analysis.

7.0 ~~g.~~ Method 4 of 40 CFR Part 60, Appendix A (July 1, 1992), shall be used for stack gas moisture.

8.0 ~~h.~~ Methods 2, 2A, 2C, 2D, 3, 3A and 4 of 40 CFR Part 60, Appendix A (July 1, 1992), shall be performed, as applicable, at least twice during each test run.

9.0 ~~i.~~ Use of adaptations to test methods. Use of an adaptation to any of the analytical methods specified in ~~paragraphs (a) and (d) through (h)~~ 1.0 and 4.0 through 8.0 of this ~~Section~~ appendix shall be approved by the Department on a case-by-case basis. An owner or operator shall submit sufficient documentation for the Department to find that the analytical methods specified in ~~paragraphs (a) and (d) through (h)~~ 1.0 and 4.0 through 8.0 of this appendix will yield inaccurate results and that the proposed adaptation is appropriate.

APPENDIX F

Test Methods and Compliance Procedures: Leak Detection Methods for Volatile Organic Compounds (VOCs).

1.0 a—Owners or operators required to carry out a leak detection monitoring program shall comply with the following requirements:

1.1 4—Monitoring shall be performed in accordance with Method 21 of 40 CFR, Part 60, Appendix A (July 1, 1992).

1.2 2—The detection instrument shall meet the performance criteria of Method 21.

1.3 3—The detection instrument shall be calibrated before and after use on each day of its use by the methods specified in Method 21. Failure to achieve a post-use calibration precision of less than 10% percent shall constitute grounds for rejecting all tests performed since the last pre-use calibration. In such cases, required leak tests must be reperformed.

1.4 4—Calibration gases shall be:

1.4.1 i—Zero air (less than 10 parts per million [ppm] of hydrocarbon in air).

1.4.2 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.

1.5 5—The detection instrument probe shall be traversed around all potential leak interfaces as close to the interface as possible as described in Method 21.

2.0 b—When equipment is tested for compliance with the requirement that there be no detectable emissions, the test shall comply with the following:

2.1 4—The requirements of paragraphs ~~(a)(1) through (a)(5)~~ 1.1 through 1.5 of this ~~Section~~ appendix shall apply and shall be met, and

2.2 2—The background level shall be determined as set forth in Method 21.

3.0 e—Leak detection tests shall be performed consistent with:

3.1 4—"APTI Course SI 417-Controlling Volatile Organic Compound Emissions from Leaking Process Equipment", EPA-450/2-82-015.

3.2 2—"Portable Instrument User's Manual for Monitoring VOC Sources," EPA-340/1-86-015.

3.3 3—"Protocols for Generating Unit--Specific Emission Estimates for Equipment Leaks of VOC and VHAP," EPA-450/3-88-010.

3.4 4. "Petroleum Refinery Enforcement Manual", EPA-340/1-80-008.

4.0 d. Use of adaptations to test methods. Use of an adaptation to any of the analytical methods specified in ~~paragraphs (a), (b), and (c) 1.0, 2.0, and 3.0~~ of this ~~Section~~ appendix shall be approved by the Department on a case-by-case basis. An owner or operator shall submit sufficient documentation for the Department to find that the analytical methods specified in ~~paragraphs (a), (b), and (c) 1.0, 2.0, and 3.0~~ of this appendix will yield inaccurate results and that the proposed adaptation is appropriate.

APPENDIX G

Performance Specifications for: Continuous Emissions Monitoring of Total Hydrocarbons.

1.0 ~~a~~–Applicability.

1.1 ~~4~~–This method applies to the measurement of total hydrocarbons as a surrogate measure for the total gaseous organic concentration of the VOC control device outlet. The concentration is expressed in terms of propane.

1.2 ~~2~~–The Department may approve the use of gas conditioning, including cooling to between 4.4 and 18°C (40° and 64°F), and condensate traps to reduce the moisture content of the sample gas if the owner/operator:

1.2.1 ~~i~~–Successfully demonstrates to the Department that the use of such system is necessary for the specific application.

1.2.2 ~~ii~~–Includes in the demonstration a quantification of the total hydrocarbon concentration (THC) lost to the gas conditioning system.

2.0 ~~b~~–Principal. A gas sample is extracted from the source through a heated sample line and heated glass fiber filter to a flame ionization detector (FID), or other detector as approved by the Department. Results are reported as volume concentration equivalents of the propane.

3.0 ~~e~~–Definitions. As used in this ~~Section~~ appendix, all terms not defined herein shall have the meaning given them in the November 15, 1990 Clean Air Act Amendments (CAAA), or in ~~Section 2~~ 2.0 of this regulation.

“**Calibration drift**” means the difference in the measurement system response to a mid-level calibration gas before and after a stated period of operation during which no unscheduled maintenance, repair, or adjustment took place.

“**Calibration error**” means the difference between the gas concentration indicated by the measurement system and the known concentration of the calibration system.

“**Calibration gas**” means a known concentration of a gas in an appropriate diluent gas.

“**Measurement system**” means the total equipment required for the determination of the inlet and outlet gas concentrations, percent capture efficiency, and gas outlet emission rate. The system consists of the following major subsystems:

1. Sample interface--the portion of the system that is used for one or more of the following:

- i. Sample acquisition.
 - ii. Sample transportation.
 - iii. Sample conditioning.
 - iv. Protection of the analyzer from the effects of the stack effluent.
2. Organic analyzer--the portion of the system that senses organic concentration and generates an output proportional to the gas concentration.
 3. Data recorder--the portion of the system that records a permanent record of the measurement values.
 4. Flow rate system
 - i. A gas volume meter meeting the requirements of Method 2A, Section 2.1 (40 CFR Part 60, Appendix A, July 1, 1992), or,
 - ii. A system approved by the Department.

“Response time” means the time interval from a step change in pollutant concentration at the inlet to the emission measurement system to the time at which 95% percent of the corresponding final value is reached as displayed on the recorder.

“Span value” means for most incinerators, a 50 parts per million (ppm) propane span. Different span values may be allowed with prior Department approval.

“Zero drift” means the difference in the measurement system response to a zero level calibration gas before and after a stated period of operation during which no unscheduled maintenance, repair, or adjustment took place.

4.0 ~~4.~~ Apparatus. [Note: this method is often applied in highly explosive areas. Caution should be exercised in choice of equipment and installation.] An acceptable measurement system includes a sample interface system, a calibration valve, gas filter and a pump preceding the analyzer. THC measurement systems are designated HOT or COLD systems based on the operating temperatures of the system. In HOT systems, all components in contact with the sample gas (probe, calibration valve, filter, and sample lines) as well as all parts of the flame ionization analyzer between the sample inlet and the detector must be maintained between 150° to 175°C. This includes the sample pump if it is located on the inlet side of the FID. A condensate trap may be installed, if necessary, to prevent any condensate entering the detector. The essential components of the measurement system are as follows:

4.1 ~~4.~~ Organic concentration analyzer. A Department-approved detector capable of meeting or exceeding the specifications in this method.

4.2 ~~2~~—Sample probe. Use either ~~paragraph (d)(2)(i) or (ii)~~ 4.2.1 or 4.2.2 of this Section appendix.

4.2.1 ~~i~~—Stainless steel, or equivalent, three-hole rake type. Sample holes shall be 4 four millimeters (mm) (0.2 inches [in.] in diameter or smaller and located at 16.7, 50, and 83.3% ~~percent~~ of the equivalent stack diameter.

4.2.2 ~~ii~~—A single opening probe so that a gas sample is collected from the centrally located 10% ~~percent~~ area of the stack cross-section, and is representative of the emission.

4.3 ~~3~~—Sample line. Stainless steel or Teflon¹ tubing to transport the sample gas to the analyzer. The sample line from the heated probe shall be heated to between 150 and 175°C (302 and 347°F).

4.4 ~~4~~—Calibration valve assembly. Use either ~~paragraph (d)(4)(i) or (ii)~~ 4.4.1 or 4.4.2 of this Section appendix.

4.4.1 ~~i~~—A heated three-way valve assembly to direct the zero and calibration gases to the analyzers.

4.4.2 ~~ii~~—Other methods, such as quick-connect lines, to route calibration gas to the analyzers.

4.5 ~~5~~—Particulate filter. An in-stack or an out-of-stack glass fiber filter if exhaust gas particulate loading is significant. An out-of-stack filter must be heated.

4.6 ~~6~~—Recorder. A strip-chart recorder, analog computer, or digital recorder for recording measurement data. The minimum data recording shall be one measurement value per minute. Full scale of the data recorder shall be selected so that the emission limit is between 30% ~~percent~~ and 50% ~~percent~~.

5.0 ~~e~~—Calibration gases and other gases.

5.1 ~~1~~—Gases used for calibration, fuel, and combustion air shall be contained in compressed gas cylinders.

5.2 ~~2~~—Preparation of calibration gases shall be done according to the procedure in Protocol No. 1, listed in the reference in ~~paragraph (f)(2)~~ 12.2 of this Section appendix.

5.3 ~~3~~—The recommended shelf life for each calibration gas cylinder over which the concentration does not change more than $\pm 2\%$ ~~percent~~ from the certified value shall be obtained from the cylinder manufacturer.

¹ Mention of trade names or specific products does not constitute endorsement by the Department or the U.S. EPA.

5.4 4. The following calibration and other gases shall be used:

5.4.1 i. Fuel. A 40% ~~percent~~ hydrogen and 60% ~~percent~~ helium or 40% ~~percent~~ hydrogen and 60% ~~percent~~ nitrogen gas mixture to avoid an oxygen synergism effect that reportedly occurs when oxygen concentration varies significantly from a mean value.

5.4.2 ii. Zero gas. High purity air with less than 0.1 parts per million by volume (ppmv) of organic material methane or carbon equivalent or less than 0.1% ~~percent~~ of the span value, whichever is greater.

5.4.3 iii. Low-level calibration gas. Propane calibration gas (in air or nitrogen) with a concentration equivalent to 20 to 30% ~~percent~~ of the applicable span value.

5.4.4 iv. Mid-level calibration gas. Propane calibration gas with a concentration equivalent to 45 to 55% ~~percent~~ of the applicable span value.

5.4.5 v. High-level calibration gas. Propane calibration gas with a concentration equivalent to 80 to 90% ~~percent~~ of the applicable span value.

6.0 f. Measurement system performance specifications.

6.1 4. Zero drift shall be less than $\pm 3\%$ ~~percent~~ of the span value.

6.2 2. Calibration drift shall be less than $\pm 3\%$ ~~percent~~ of the span value.

6.3 3. Calibration error shall be less than $\pm 5\%$ ~~percent~~ of the calibration gas value.

7.0 g. Pretest preparations.

7.1 4. Selection of sampling site.

7.1.1 i. The location of the sampling site shall be determined from the applicable ~~Section~~ provisions of this regulation or purpose of the test (i.e., exhaust stack, inlet line, etc).

7.1.2 ii. The sample port shall be located at least 1.5 meters (4.9 feet) or 2 two equivalent diameters upstream of the gas discharge to the atmosphere.

7.2 2. Location of sample probe. The sample probe must be installed so that the probe is centrally located in the stack, pipe or duct and is sealed tightly at the stack port connection.

7.3 3. Measurement systems preparation. Prior to the emission test, the measurement system must be assembled following the manufacturer's written instructions in preparing the sample interface and the organic analyzer. The system must be operable.

7.4 ~~4~~–Calibration error test.

7.4.1 ~~i~~–Immediately prior to the test series (within ~~2~~ two hours of the start of the test), zero gas and high-level calibration gas shall be introduced at the calibration valve assembly.

7.4.2 ~~ii~~–The analyzer output shall be adjusted to the appropriate levels, if necessary.

7.4.3 ~~iii~~–The predicted response for the low-level and mid-level gases shall be calculated based on a linear response line between the zero and high-level responses.

7.4.4 ~~iv~~–Low-level and mid-level calibration gases shall be introduced successively to the measurement system.

7.4.5 ~~v~~–The analyzer responses for low-level and mid-level calibration gases shall be recorded, and the differences between the measurement system responses and the predicted responses shall be determined. These differences must be less than ~~±5% percent~~ ±5% of the respective calibration gas value. If not, the measurement system shall be deemed not acceptable and must be replaced or repaired prior to testing. No adjustments to the measurement system shall be conducted after the calibration and before the drift determination found in ~~paragraph (h)(2)~~ 8.2 of this ~~Section~~ appendix.

7.4.6 ~~vi~~–If adjustments are necessary before the completion of the test series, the drift checks shall be performed prior to the required adjustments, and the calibration following the adjustments shall be repeated.

7.4.7 ~~vii~~–If multiple electronic ranges are to be used, each additional range must be checked with a mid-level calibration gas to verify the multiplication factor.

7.5 ~~5~~–Sampling System Bias Check

7.5.1 ~~i~~–Perform the sampling system bias check by introducing calibration gases at the calibration valve installed at the outlet of the sampling probe. A zero gas and either the mid-range or high-range gas, whichever most closely approximates the effluent concentrations, shall be used for this check, as follows:

7.5.2 ~~ii~~–Introduce the upscale calibration gas and record the gas concentration displayed by the analyzer on a form approved by the Department. Then introduce zero gas, and record the gas concentration displayed by the analyzer. During the sampling system bias check, operate the system at the normal sampling rate, and make no adjustments to the measurement system other than those necessary to achieve proper calibration gas flow rates at the analyzer. Alternately introduce the zero and

upscale gases until a stable response is achieved. The tester shall determine the measurement system response time by observing the times required to achieve a stable response for both the zero and upscale gases. Note the longer of the two times as the response time.

7.5.3 ~~iii~~—The sampling system bias check shall be considered invalid if the difference between the gas concentrations displayed by the measurement system for the analyzer calibration error check exceeds ±5% ~~percent~~ of the span for either the zero or upscale calibration gas. If an invalid calibration is exhibited, take corrective action, and repeat the sampling system bias check until acceptable performance is achieved. If adjustment to the analyzer is required, first repeat the analyzer calibration error check, then repeat the sampling system bias check.

7.6 ~~6~~—Response time test.

7.6.1 ~~i~~—Zero gas shall be introduced into the measurement system at the calibration valve assembly.

7.6.2 ~~ii~~—When the system output has stabilized, the owner or operator shall switch quickly to the high-level calibration gas.

7.6.3 ~~iii~~—The time shall be recorded from the concentration change to the measurement system response equivalent to 95% ~~percent~~ of the step change.

7.6.4 ~~iv~~—The test shall be repeated three times and the results averaged.

8.0 ~~h~~—Emission measurement test procedure.

8.1 ~~4~~—Organic measurement.

8.1.1 ~~i~~—Sampling shall begin at the start of the test period.

8.1.2 ~~ii~~—Time and any required process information shall be recorded, as appropriate.

8.1.3 ~~iii~~—Periods of process interruption or cyclic operation shall be noted on the recording chart.

8.2 ~~2~~—Drift determination.

8.2.1 ~~i~~—Immediately following the completion of the test period and hourly during the test period, the zero and mid-level calibration gases shall be introduced, one at a time, to the measurement system at the calibration valve assembly. No adjustments to the measurement system shall be made until after both the zero and calibration drift checks are made.

8.2.2 ~~ii~~—The analyzer response shall be recorded.

8.2.3 ~~iii~~—If the drift values exceed the specified limits, the test results shall be invalidated preceding the check, and the test shall be repeated following corrections to the measurement system.

8.2.4 ~~iv~~—Alternatively, the test measurement system may be recalibrated as in ~~paragraph (g)(4)~~ 7.4 of this Section appendix and the results reported using both sets of calibration data (i.e., data determined prior to the test period and data determined following the test period).

9.0 ~~i~~—Organic concentration calculations. The average organic concentration shall be determined in terms of ppmv propane by the integration of the output recording over the period specified in the applicable ~~Section~~ provisions of this regulation.

10.0 ~~j~~—Quality assurance.

10.1 ~~4~~—The owner or operator shall assure proper calibration, maintenance, and operation of the continuous emissions monitoring system on a continual basis.

10.2 ~~2~~—The owner or operator shall establish a quality assurance program to evaluate and monitor performance on a continual basis. The following checks shall be done routinely:

10.2.1 ~~i~~—A daily calibration check for each monitor. The calibration shall be adjusted if the check indicates the instrument's calibration drift exceeds the specification established in ~~paragraph (f)~~ 6.0 of this Section appendix.

10.2.2 ~~ii~~—A daily system audit that includes the following:

10.2.2.1 ~~A~~—A review of the calibration check data.

10.2.2.2 ~~B~~—An inspection of the recording system.

10.2.2.3 ~~C~~—An inspection of the control panel warning lights.

10.2.2.4 ~~D~~—An inspection of the sample transport/interface system (e.g., flowmeters, filters), as appropriate.

10.2.3 ~~iii~~—A quarterly calibration error test at the span midpoint.

10.2.4 ~~iv~~—The entire performance specification test repeated every second year.

11.0 ~~k~~—Reporting of total hydrocarbon levels.

11.1 ~~4~~—The total hydrocarbon concentration (THC) levels from the initial compliance certification test shall be reported as ppm propane for inlet and outlet concentrations and as a percent reduction across the control device.

11.2 2.—THC levels shall be expressed in milligrams per second (mg/sec) (pounds per second [lb/sec]).

11.3 3.—This conversion shall be accomplished using the following equation:

$$\text{THC, mg/sec} = (\text{THC ppm propane}) \times (\text{stack gas flow}) \times 5.2 \times 10^{-2} \quad (\text{G-1})$$

where:

THC ppm propane = The total hydrocarbon concentration as actually measured by this method in ppm propane at the inlet or outlet;

Stack gas flow = Measured in dry standard cubic feet per second as determined by the flowmeter system or Methods 2 and 4;

5.2×10^{-2} = Constant to account for the conversion of units.

12.0 1.—References.

12.1 4.—Measurement of Volatile Organic Compounds--Guideline Series. U. S. Environmental Protection Agency, Research Triangle Park, North Carolina. Publication No. EPA-450/2-78-041. June 1978. p. 46-54.

12.2 2.—Traceability Protocol for Establishing True Concentrations of Gases Used for Calibration and Audits of Continuous Source Emission Monitors (Protocol No. 1). U. S. Environmental Protection Agency, Environmental Monitoring and Support Laboratory. Research Triangle Park, North Carolina. June 1973.

12.3 3.—Gasoline Vapor Emission Laboratory Evaluation--Part 2. U. S. Environmental Protection Agency. Office of Air Quality Planning and Standards. Research Triangle Park, North Carolina. EMB Report No. 75-GAS-6. August 1975.

12.4 4.—Appendix D: Performance Specifications for Continuous Emissions Monitoring of Total Hydrocarbons in Hazardous Waste Incinerators, Boilers and Industrial Furnaces. Federal Register. 54:206 pp. 43743-43745. October 26, 1989.

Footnote

1. Mention of trade names or specific products does not constitute endorsement by the Department or the U.S. EPA.

APPENDIX H

Quality Control Procedures for: Continuous Emission Monitoring Systems (CEMS).

1.0 a. CEMS quality control (QC) program. Each owner or operator of a CEMS shall develop and implement a CEMS QC program. At a minimum, each QC program shall include written procedures that describe in detail step-by-step procedures and operations for each of the following:

1.1 4. Initial and routine periodic calibration of the CEMS.

1.2 2. Calibration drift (CD) determination and adjustment of the CEMS.

1.3 3. Preventative maintenance of the CEMS (including spare parts inventory).

1.4 4. Data recording, calculations, and reporting.

1.5 5. Accuracy audit procedures including sampling and analysis methods.

1.6 6. Program of corrective action for malfunctioning CEMS.

2.0 b. Determining out-of-control condition for the CEMS.

2.1 4. If either the zero (or low-level) or high-level CD exceeds ~~ten (10)~~ 10% percent for five consecutive daily periods, the CEMS is out-of-control.

2.2 2. If either the zero (or low-level) or high-level CD exceeds ~~twenty (20)~~ 20% percent, the CEMS is out-of-control.

2.3 3. If the CEMS fails a performance audit (PA) performed consistent with the requirements of 40 CFR, Part 60, Appendix F (July 1, 1992), the CEMS is out-of-control, and the owner or operator shall take necessary corrective action to eliminate the problem. Following the corrective action, the source owner or operator shall reconduct the appropriate failed portion of the audit and other applicable portions to determine whether the monitoring system is operating properly and within specifications. Monitoring data obtained during any out-of-control period may not be used for compliance determination or meet any data capture requirements; however, the data can be used for identifying periods when there has been a failure to meet quality assurance/quality control criteria.

3.0 e. Determining the out-of-control time period for the CEMS.

3.1 4. The beginning of the out-of-control period is either of the following:

3.1.1 i. The time corresponding to the completion of the fifth consecutive daily CD check with CD in excess of two times the allowable limit.

3.1.2 ii.—The time corresponding to completion of the daily CD check preceding the daily CD check that results in a CD in excess of four times the allowable limit.

3.2 2.—The end of the out-of-control period is the time corresponding to the completion of the CD check following corrective action that results in the CD's at both the zero (or low-level) and high-level measurement points being within the corresponding allowable CD limit (i.e., either two times or four times the allowable limit in 40 CFR, Part 60, Appendix B, July 1, 1992).

3.3 3.—If the CEMS failed a PA, the beginning of the out-of-control period is the time corresponding to the completion of the failed audit test. The end of the out-of-control period is the time corresponding to a successful retest of the PA sample.

4.0 d.—Recordkeeping. The owner or operator shall keep the QC procedure described in ~~paragraph (a) 1.0~~ of this Section appendix in a readily accessible location for at least ~~5~~ five years and shall make the procedure available to the Department upon verbal or written request.

5.0 e.—Reporting. Upon verbal or written request, the owner or operator shall submit to the Department a copy of all information and records documenting out-of-control periods including beginning and end dates and descriptions of corrective actions taken.

APPENDIX I

11/29/1994

Method to Determine Length of Rolling Period for Liquid/Liquid Material Balance

1.0 a.—Applicability. This method determines the length of the rolling material balance period used in the liquid-liquid material balance test method to measure the overall performance of volatile organic compound (VOC) emission control systems employing carbon adsorbers for solvent recovery as the control device. The rolling balance period obtained from this method is source-specific, taking into account the particular configuration and operating parameters of the emission source (process) and its emission control system. Although the use of the rolling material balance approach may be applied to other types of solvent recovery control devices such as refrigeration, the method herein for determining the appropriate rolling balance period is limited to carbon adsorber-type solvent recovery control devices.

2.0 b.—Summary of Method. Physical properties and usage are determined for the solvent(s) or solvents used in the process, and configuration and operating parameters are identified for the emission source and its emission control system. This information is used to calculate the concentration of VOC in the outlet air of the capture unit, amount of VOC adsorbed on the carbon, maximum VOC loading on the carbon, unmeasured solvent holding capacity of the solvent recovery system, and unmeasured solvent holding capacity of the process unit. These values are then used to calculate the rolling material balance period.

3.0 c.—Definitions. As used in this ~~Section~~ appendix, all terms not defined herein shall have the meaning given them in the November 15, 1990 Clean Air Act Amendments (CAAA), or in ~~Section 2 of Regulation 24~~ 2.0 of this regulation.

“Maximum carbon adsorber holding capacity for solvent, VA,” means the quantity of solvent (expressed as volume of liquid solvent) adsorbed on the carbon in all the adsorbent beds of the solvent recovery system that is in adsorption equilibrium with the capture unit outlet air stream under the process operating condition of maximum solvent usage.

“Rolling balance period (RBP)” or **“rolling material balance period (RMBP)”** means the number of consecutive operating 24-hour material balances, NMBP, used to determine the quantities of solvent usage and recovery for computation of the recovery efficiency for the emission control system, ER.

“Unmeasured process holding capacity for solvent, VP,” means the aggregate volume contained within the emission source (process) such as reservoirs, surge tanks, and transfer piping where the volumetric quantity of solvent-bearing liquid varies during process operation and where the quantity of solvent in this volume cannot be reasonably measured or determined as part of the daily solvent material balance around the process and emission control system. For the purpose of this method, the portion of the solvent that remains

continuously filled with liquid under all process operating conditions is not considered part of the unmeasured process holding capacity for solvent.

“Unmeasured solvent recovery system holding capacity for solvent, VR,” means the sum of the maximum carbon adsorber holding capacity, VA, and the unmeasured solvent recovery system support equipment holding capacity, VS.

4.0 d. Procedure. Follow the procedure below and complete the worksheets using configuration and operating data specific to the process unit(s) or units and VOC emission control system for which the rolling balance period determination is being made.

4.1 4. Solvent Properties. The purpose of this step is to determine representative values for the molecular weight and liquid density of the solvent(s) or solvents used in the process.

4.1.1 i. Single Component Solvent. If a single component solvent (not a mixture) is used exclusively for the process unit(s) or units served by the emission control system, then record the chemical name of the solvent, its molecular weight, and liquid density in lines 1a, 2, and 3, respectively, of Worksheet A of this appendix and proceed to 4.2 of this appendix.

4.1.2 ii. Multiple Solvent or Solvent Mixtures. If multiple solvents or solvent mixtures are used, complete Worksheet A of this appendix. List the chemical names of the individual organic compounds, including the major components of the solvent mixtures, in block 1 of Worksheet A of this appendix. The organic constituents listed should account for at least 90% percent of the total solvent. Use equation (4) (I-1) of this appendix to calculate the weighted average molecular weight, M_L , and liquid density, d_L , of the solvents used in the process unit(s) or units. Record these values on lines 2 and 3, respectively, of Worksheet A of this appendix.

$$Y = \sum_{i=1}^n (X_i Y_i) \quad (4) \quad (I-1)$$

where

Y = Weighted average molecular weight (M_L) or liquid density (d_L).

Y_i = Molecular weight (M_i) or liquid density (d_i) for VOC i.

X_i = Fraction of total solvent for VOC i.

n = Number of VOC species in the solvent(s) or solvents.

WORKSHEET A SOLVENT DESCRIPTION				
Solvent Composition	Annual Usage (gal/yr)	(100• x_i) Percent of Total Solvents Listed	(M_i) Molecular Weight (lb/lb _{mole})	(d_i) Liquid Density (lb/gal)
1a				
1b				

1c				
1d				
1e				
1f				
1g				
1h				
Total				
2. Solvent Molecular Weight (weighted average), (M _i)			lb/lb _{mole}	
3. Solvent Liquid Density (weighted average), (d _i)			lb/lb _{mole}	

4.2 ~~2~~—Emission Source and Control System Description. In this step, the site-specific system design and operation information needed to determine the appropriate rolling balance period is developed and compiled in Worksheet B of this appendix. Complete Worksheet B of this appendix by providing the indicated information specific to the emission source process unit(s) or units and emission control system for which this rolling balance period determination is being made. Unless otherwise specified, the information requested refers to the aggregate of all the process units of the emission source linked to and served by the emission control system containing the carbon solvent recovery control device.

4.2.1 ~~i~~—Number of Process Units. Record the total number of process units (e.g., dip tanks, spray booths) connected to the capture system and manifolded to the solvent recovery control system on line 1 of Worksheet B of this appendix.

4.2.2 ~~ii~~—Solvent Usage. The maximum daily solvent usage reported on line 2 of Worksheet B of this appendix is the maximum total solvent throughput of the process unit(s) or units that would be used in a day under peak production. The average daily solvent usage requested in line 3 of Worksheet B of this appendix is the annual total solvent throughput of the process unit(s) or units divided by the number of days in the year the process unit(s) or units was in operation.

4.2.3 ~~iii~~—Unmeasured Process Holding Capacity for Solvent. Estimate (+10 gallons) the unmeasured solvent holding capacity of each process unit served by the capture and solvent recovery systems in this analysis. Compute the aggregate total unmeasured volume of these process units, and then compare this total to 10% ~~percent~~ of the value listed in Worksheet B, line 3 (0.1xQ'_{SP}), of this appendix for the average daily solvent usage. Enter on line 4 the smaller of the values of the estimated aggregate total unmeasured process holding capacity and 10% ~~percent~~ of the average daily solvent usage reported on line 3 of Worksheet B of this appendix.

4.2.4 ~~iv~~—Capture System Air Flow Rate. Report on line 5 of Worksheet B of this appendix the total volumetric air flow rate (adjusted to the standard conditions of 70°F and 1.0 atm) output from the capture system to the solvent recovery system.

WORKSHEET B	
EMISSION SOURCE AND CONTROL SYSTEM DESCRIPTION	
Emission Source - Process Units	
1. Number of Process Units	
2. Maximum Daily Solvent Usage, Q_{SP}	gal/day
3. Average Daily Solvent Usage, Q'_{SP}	gal/day
4. Unmeasured Solvent Holding Capacity In Process, V_P	gal ^a
Emission Control System - Capture Unit	
5. Average Air Flow Rate, G_{CU}	scfm ^b
6. Maximum VOC Concentration In Outlet Air, C_O	ppmv
Emission Control System - Solvent Recovery Control Unit	
7. Number of Carbon Beds	
8. Total Carbon in Solvent Recovery Unit, W_C	lb
9. Maximum Solvent Loading On Carbon, V_A	gal
10. Unmeasured Capacity In Support Equipment, V_S	gal
11. Total Unmeasured Capacity, $V_R = V_A + V_S$	gal

^a Maximum value limited to 10% percent of the value in line 3, (Q'_{SP}).

^b Standard conditions: 70°F and 1.0 atm.

4.2.5 ~~v.~~ Maximum VOC Concentration in Capture System Outlet. Use equation (2) (I-2) of this appendix to estimate the maximum concentration of VOC in the outlet air stream of the capture unit (inlet (2)(3) air stream to the carbon adsorber beds of the solvent recovery control unit). If actual VOC concentrations (measured on the same capture unit under the current operating conditions within the past 2 two years using an EPA approved test method) are available and their average exceeds the concentration calculated in equation (2) (I-2) of this appendix, then record the average of the measured concentrations on Worksheet B, line 6 of Worksheet B of this appendix; otherwise record the concentration from equation (2) (I-2) of this appendix on line 6 of Worksheet B of this appendix.

$$C_O = 2.69 \times 10^5 \left(\frac{Q_{SP} D_L}{M_L G_{CU}} \right) \quad (2) \quad (I-2)$$

where

C_O = Concentration of VOC in outlet air of capture unit, ppmv.

Q_{SP} = Maximum daily solvent throughput to the process units, gal/day
(Worksheet B, line 2, of this appendix).

d_L = Solvent liquid density, lb/gal (Worksheet A, line 3, of this appendix).

M_L = Solvent molecular weight, lb/lb_{mole} (Worksheet A, line 2, of this appendix).

G_{CU} = Capture unit outlet air flow rate, scfm (Worksheet B, line 5, of this appendix).

4.2.6 ~~vi.~~ Quantity of Carbon in Solvent Recovery System. Report the number of carbon adsorber beds (both online and offline for regeneration) in the solvent recovery system on line 7 of Worksheet B of this appendix.

Determine the total mass of carbon in the solvent recovery system by summing the masses in each of the carbon adsorber beds, and enter the total on line 8 of Worksheet B of this appendix.

4.2.7 ~~vii.~~—Maximum Solvent Loading on the Carbon. To estimate the maximum solvent loading (i.e., solvent holding capacity) for the total carbon in the solvent recovery control unit, use equations ~~(3) and (4)~~ (1-3) and (1-4) of this appendix. Record the value calculated for VA in equation ~~(4)~~ (1-4) on line 9 of Worksheet B of this appendix.

$$W_A = \exp(Y) \quad \text{(3)} \quad \text{(1-3)}$$

where,

$$Y = \sum_{j=1}^n (b_j X_j)$$

$$X = \ln(C_O)$$

$$b_0 = -3.047598$$

$$b_1 = 0.275410$$

$$b_2 = -0.003271$$

$$b_3 = -0.000486$$

C_O = Maximum VOC concentration in capture unit outlet air, ppmv
(Worksheet B, line 6, of this appendix).

W_A = Amount of VOC adsorbed on the carbon, lb VOC/lb carbon.

$$V_A = \frac{W_A W_C}{d_L} \quad \text{(4)} \quad \text{(1-4)}$$

where

V_A = Maximum solvent loading on the carbon in the solvent recovery unit,
gal.

W_A = Amount of VOC adsorbed on the carbon (equation ~~(3)~~ (1-3) of this
appendix).

W_C = Total quantity of carbon in the solvent recovery unit, lb carbon
(Worksheet B, line 3, of this appendix).

d_L = Solvent liquid density, lb/gal (Worksheet A, line 3, of this appendix).

4.2.8 ~~viii.~~—Unmeasured Solvent Capacity in Support Equipment. In addition to the solvent adsorbed on the carbon, the solvent recovery system may contain time-varying quantities of solvent in its support equipment such as condensate tanks, decanters, and surge/collection tanks, which are not measured as part of the daily material balance. Estimate that portion of the volume in the support equipment over which the unmeasured quantity of solvent it contains may vary between material balances. Do not include the capacity where the solvent inventory remains essentially constant over time. Compare this estimated value of the unmeasured solvent holding capacity in the support equipment with the value corresponding to 10% percent of the average daily solvent usage

(Worksheet B, line 3, of this appendix), and record the smaller of these two values as VS on line 10 of Worksheet B of this appendix.

4.2.9 ~~ix.~~ Unmeasured Solvent Capacity for Solvent Recovery System. The unmeasured solvent holding capacity of the solvent recovery system is the sum of the maximum solvent loading on the carbon and the unmeasured holding capacity of the support equipment. On Worksheet B of this appendix, sum the values on lines 9 and 10 and record this sum on line 11.

5.0 e.—Data Analysis and Calculations. Rolling Material Balance Period Determination. Use equation (5) (I-5) of this appendix and the values of the indicated variables from Worksheet B of this appendix to compute the appropriate rolling balance period (number of consecutive 24-hour operating period material balances) for this specific emission source and emission control system.

$$\text{NRBP} = \text{integer}[\exp(D)], \left\{ \begin{array}{l} = 1, \text{ if } \exp(D) < 1; \\ \text{if } 1 < \exp(D) < 30; \\ = 30, \text{ if } \exp(D) > 30. \end{array} \right\} \quad (5) \quad \text{(I-5)}$$

where

$$D = b_0 + \sum_{j=1}^n (b_j X_j)$$

$b_0 = 2.36877 \times 100$	
$b_1 = -9.47906 \times 10^{-2}$	$X_1 = (0.001 \times Q_{SP})$
$b_2 = -7.22840 \times 10^{-3}$	$X_2 = (X_1)^2$
$b_3 = 2.22034 \times 10^{-4}$	$X_3 = (X_1)^3$
$b_4 = 1.22762 \times 10^{-1}$	$X_4 = (0.001 \times V_R)$
$b_5 = 1.48939 \times 10^{-2}$	$X_5 = (X_4)^2$
$b_6 = -1.77705 \times 10^{-3}$	$X_6 = (X_4)^3$
$b_7 = 1.43241 \times 100$	$X_7 = (0.001 \times V_P)$
$b_8 = -3.77860 \times 10^{-1}$	$X_8 = (X_7)^2$
$b_9 = 7.89384 \times 10^{-4}$	$X_9 = (X_1 \times X_4)$
$b_{10} = 3.76158 \times 10^{-2}$	$X_{10} = (X_1 \times X_7)$
$b_{11} = -1.05375 \times 10^{-1}$	$X_{11} = (X_4 \times X_7)$
$b_{12} = 8.57476 \times 10^{-4}$	$X_{12} = (X_1 \times X_4 \times X_7)$

NRBP = Rolling balance period, days.

Q_{SP} = Maximum daily solvent throughput to the process units, gal/day
(Worksheet B, line 2, of this appendix).

V_R = Unmeasured solvent holding capacity of the solvent recovery system, gal
(Worksheet B, line 11, of this appendix).

V_P = Unmeasured solvent holding capacity of the process units, gal
(Worksheet B, line 4, of this appendix).

[TO BE ADDED]

APPENDIX J [RESERVED]

APPENDIX K

11/29/1994

Emission Estimation Methodologies²¹

The methodologies presented in this attachment are based on the Ideal Gas Law and on fundamental vapor/liquid equilibrium relationships such as Henry's and Raoult's Law, unless otherwise specified. The equations are intended for use in estimating and characterizing uncontrolled emission streams from batch processes. Example calculations are presented for several unit operations. Significant errors may result in using the examples for situations that do not meet the conditions and/or assumptions that are clearly stated in the presentation of the methodologies.

1.0 a. Process Vent Emissions

Process vent emissions may result from a number of different events. Common process vents in batch processing result from drying, tank and reactor inert gas purging, vapor displacement losses from material transfer, tank and reactor heating, gas evolution, gas sparging, batch pressure filtration, and vacuum generation. The discussion below presents the principles and methodologies for estimating emissions during these events.

1.1 4. Drying

Two types of drying operations commonly occur in batch processing. These are conductive drying, in which heat is transmitted to the material to be dried by contact with heated surfaces, and convective drying, in which heat is transmitted by hot gases which are in contact with the material. Conductive drying may occur under vacuum conditions or at atmospheric pressure and in several types of dryers, including tray dryers, tumble (double-cone) dryers, pan dryers, and rotary dryers. Convective drying occurs at atmospheric pressure. Convective dryers include rotary dryers, fluid bed dryers, and spray dryers.

The methodology for calculating emissions from the types of dryers described above is essentially the same. In general, the rate of drying of the material depends on many factors associated with the specific drying situation (i.e., moisture or solvent content of material to be dried, heat and mass transfer parameters, drying period, etc.), but generally decreases with time so that a large percentage of the total liquid will be removed during the beginning of the drying cycle.

Studies on the theory of solids drying usually relate drying rate to moisture content of the solid. Three distinct periods of drying can be observed: the constant-rate period when surface moisture is evaporated; the funicular state when capillarity of the liquid in the pores influences the drying rate; and the pendular state when

²¹ Material in this Appendix has been derived from guidance in Chapter 3 and Appendix C of EPA's draft CTG for Batch Processes (EPA-453/R-93-017).

capillary action ceases and the liquid must diffuse through the pores of the solid. Each of these three drying periods has successively lower rates of drying; the final drying rate, when the moisture content is zero, is of course also zero (see 5.1 of this appendix).⁴

Dryer designers often generate drying curves expressing the rate of drying as a function of residence time. Laboratory or pilot-scale experiments are often needed to establish the correct dryer size, operating temperature, gas flow rate, and cycle time. Once a dryer is installed and operating, readily available data include the cycle time, gas flow rates, and moisture content of the solid at the start and finish of the cycle. If very dry solids are produced (i.e., zero moisture content), the drying rate at the end of the cycle will be asymptotic to zero. This end point condition, and a knowledge of the total solvent removed, can be used to estimate the emission characteristics of an existing, installed dryer.

In industrial practice, the filter cakes and centrifuged solids to be dried often appear dry and free-flowing and may contain up to 50% percent solvent by weight. At the end of the drying cycle, the solvent content is reduced to a level required by the process. From a mass balance, the total amount of solvent emitted can be calculated.

To properly size emission control equipment for dryers, however, one must know the exhaust stream VOC content throughout the cycle. Although the precise VOC content can only be determined from extensive laboratory testing, a reasonable estimate can be obtained by assuming that the rate at which the drying rate decreases is linear over the length of the drying cycle starting from the initial, highest value and declining to zero at the end of the cycle. From the material balance on solvent removed, the average drying rate can be calculated knowing the length of the cycle. With a straight line relationship and a final value of zero, the initial drying rate must be two times the average. Therefore, the drying rate, and hence the emission rate, can be estimated for any point in the drying cycle.

1.1.1 ~~i~~-Vacuum Dryers. Tray dryers, double-cone dryers, pan dryers, and rotary dryers may be operated under vacuum conditions. Such vacuum dryers will have an inward leakage rate of air that will aid in transporting the VOC's and air toxics that have evaporated from the dryer's product. Vacuums in the range of 15 to 25 inches mercury are typical. Articles have been published which provide methods of estimating leakage rates for vacuum systems (see 5.2 of this appendix).² One such methodology is contained in ~~Section 8~~ 1.8 of this appendix. For a single dryer, the air leakage may range from 10 to 30 scfm depending on system design and vacuum level desired. An example calculation of vacuum dryer emissions follows:

Example: Consider the following example of a double-cone dryer operating at 15 inches of mercury, with an air-leakage rate of 15 scfm. The temperature inside the dryer is 60°F. Three hundred pounds of product cake, initially containing 25% percent by weight acetone are dried to less

than 1-wt% by weight solvent over the course of 8 eight hours. Calculate the maximum VOC emission rate.

Solution: The total amount of acetone dried from the product cake is:

$$300 \text{ lb cake} \times \frac{0.25 \text{ lb acetone}}{\text{lb cake}} = 75 \text{ lb acetone}$$

$$\therefore 300 - 75 = 225 \text{ lb product in cake}$$

The amount of acetone remaining at the end of the cycle is:

$$\frac{x}{225 + x} = 0.01$$

$$x = 0.01(225 + x)$$

$$x = 2.25 + 0.01x$$

$$0.99x = 2.25$$

$$x = 2.3 \text{ lb acetone (at end of cycle)}$$

Therefore, the total amount of acetone removed from the drying cycle is:

$$75 - 2.3 = 72.7 \approx 73 \text{ lb}$$

Average emission rate over the drying cycle is:

$$(73 \text{ lb}/8 \text{ hr})(1 \text{ hr}/60 \text{ min}) = 0.15 \text{ lb}/\text{min}$$

The initial drying rate is two times the average rate, assuming a straight-line decline.

Maximum (initial drying rate)

$$\text{MW acetone} = 58 \text{ lb}/\text{lb-mol}$$

Therefore, the molar flow of acetone is:

$$(0.30 \text{ lb}/\text{min})(1 \text{ lb-mol}/58 \text{ lb})(60 \text{ min}/\text{hr}) = 0.31 \text{ lb-mol}/\text{hr}$$

The airflow (leakage) is given as 15 scfm where 359 scf (at 0°C and 1 atm) is 1 mole. Therefore, the molar flow rate is:

$$(15 \text{ scf}/\text{min})(\text{lb-mol}/359 \text{ scf})(60 \text{ min}/\text{hr}) = 2.51 \text{ lb-mol}/\text{hr}$$

Therefore, the uncontrolled emission stream properties at the start of the drying cycle are estimated to be:

Component	lb-mol/hr	mole fraction
Acetone	0.31	0.110
Air	2.51	0.890
TOTAL	2.82	1.000

The 0.31 lb-mol/hr rate represents the maximum VOC emission rate during the cycle.

1.1.2 ii. Atmospheric Dryers. Convective dryers, such as tray and fluid bed dryers, operate at or above atmospheric pressure. The four types of conductive dryers discussed previously, tray dryers, double-cone dryers, pan dryers and rotary dryers may also be operated at atmospheric conditions. A stream of air or inert gas is used to move the volatilized material from the dryer vessel in conductive drying. The gas stream serves as the heating mechanism in convective drying. In both of these situations, the calculation of total VOC content emitted during the drying cycle is identical to the vacuum drying method (i.e., a mass balance from initial cake concentration to final cake concentration). The estimation of the maximum dryer emission rate, which is used for sizing of equipment, is analogous to the method presented for vacuum drying, with the flow rate of gas through the system equal to the dryer exhaust gas rate. An example calculation of atmospheric dryer emissions follows:

Example: A tray dryer uses 6,000 acfm of heated air (65°C) over a period of 6 six hours to remove isopropyl alcohol (IPA) from a batch of solids. Each batch consists of 1,000 pounds of material containing 40% percent (by weight) solvent. The final product contains less than 0.6% percent solvent. Calculate the total uncontrolled VOC emissions per drying cycle and the maximum VOC emissions rate.

Solution: Mass balance over the drying cycle:

$$(1,000 \text{ lb cake})(0.40 \text{ IPA/lb cake}) = 400 \text{ lb IPA initially}$$

$$\text{Quantity of bone-dry solids} = 1,000 - 400 = 600 \text{ lb}$$

Amount of IPA remaining:

$$\frac{x}{600 + x} = 0.006$$

$$\therefore x = 3.6 \text{ lb IPA}$$

Amount of IPA removed is:

$$400 - 3.6 = 396 \text{ lb (MW = 60.09)}$$

$$\text{Average emission rate} = 396 \text{ lb}/6 \text{ hr} = 66 \text{ lb/hr}$$

Assume initial rate = 2 x average rate

$$(2)(66) = 132 \text{ lb/hr}$$

$$(132 \text{ lb/hr})(\text{lb-mole}/60.09 \text{ lb}) = 2.20 \text{ lb-mol/hr}$$

Calculate composition of uncontrolled emission stream at start of drying cycle:

Airflow:

$$(6,000 \text{ acf/min}) (60 \text{ min/h}) (\text{lb-mol}/359 \text{ scf}) (273/273+65)\text{scf}/\text{acf} = 810 \text{ lb-mol/hr}$$

Component	lb-mol/hr	mole fraction
IPA	2.20	0.0027
Air	810	0.9973
TOTAL	812.2	1.0000

Knowledge of, or an estimate of (as above), the uncontrolled outlet stream composition is necessary to select an appropriate control technology. One should note that the mole fraction of the VOC is considerably lower (approximately two orders of magnitude) in the convective oven exhaust than in the vacuum oven (previous example).

1.2 2--Tank and Reactor Purging

In batch processing a gas stream is frequently used to purge VOC vapors from either an empty tank or reactor vessel, or from the vapor space of a partially filled tank or reactor. Typical reasons for purging are to maintain product quality (e.g., by using a dry sweep gas to minimize water vapor in a system) or to dilute flammable vapor concentrations below safety limits.

1.2.1 i--Empty Tank Purging. Empty vessels may be purged intermittently (e.g., at startup and shutdown, or between batches) using a displacement purge to remove accumulated vapors. The estimation of VOC emissions in this case is fairly straightforward. Before the purge, the initial VOC concentration of an empty vessel's vapor space is assumed to be equivalent to vapor in equilibrium with the removed liquid. The final concentration is a function of the number of purge gas volumes used. This relation can be expressed as a power law:

$$\frac{C_f}{C_i} = x^n \quad (4) \quad \underline{(K-1)}$$

where:

n = the number of purge gas volumes used;
 x = the fractional dilution per volume change;
 C_f = final concentration in vessel; and
 C_i = initial concentration in vessel.

The fractional dilution per volume change assuming perfect mixing has been shown to be 37% percent. Thus, equation (1) (K-1) of this appendix becomes:

$$\frac{C_f}{C_i} = (0.37)^n \quad (2) \quad (K-2)$$

This equation does not account for evaporation of any residual liquid in the vessel, and no free liquid. The equation was derived via the following steps:

$$\frac{d(VC_a)}{dt} = -qC_a \quad (3) \quad (K-3)$$

where:
 V = vessel volume
 C_a = concentration of VOC species
 q = volumetric purge rate
 t = time

if q = 1 ft³/min and V = 1 ft³, then equation (3) (K-3) reduces to:

$$\frac{dC_a}{C_a} = -dt \quad (4) \quad (K-4)$$

By integrating and setting the following boundary limits:

$$t = 0, \quad C_a = C_i,$$

$$t = 1, \quad C_a = C_f,$$

Then, equation (4) reduces to

$$\ln\left(\frac{C_f}{C_i}\right) = -1 \quad (5) \quad (K-5)$$

Therefore, C_f = 0.37C_i

Emissions are calculated by multiplying the vessel volume by the difference between final and initial concentrations, (C_f-C_i).

1.2.2 ii.—Filled Vessels. Filled or partially filled vessels are often "blanketed" with inert gas (or even air in the case of nonflammable solvents) using either "balanced pressure" or "trickle" control schemes (see 5.3 of

this appendix)³. With balanced pressure blanketing, there is no flow of gas unless the tank liquid level changes (during filling or emptying) or the pressure rises or falls due to thermal effects. The calculation of emissions from this type of blanketing is analogous to "working and breathing" losses. For trickle blanketing, a constant flow of gas is maintained through headspace. The flow rate may be quite low for a storage tank, but may be much higher for a reactor where removal of water vapor or excess solvent vapor is required. The higher flows are referred to as purges or sweeps.

The volatile organic content of a purge gas stream may be calculated by assuming that the gas is saturated with the vapors of the liquid over which it is flowing. This assumption is generally conservative in that the VOC content of a gas cannot possibly be greater than saturation concentrations (as long as there are no entrained droplets). To calculate a maximum expected uncontrolled emissions rate, this approach is acceptable. However, the actual VOC concentration of the exiting purge gas may be substantially below saturation. Calculations show that the percent saturation of an inert gas purge stream over a quiescent pool of liquid is expected to be no more than 10% percent. The purging of equipment with a turbulent liquid surface leads to higher saturation fractions, approaching 100% percent saturation at lower flow rates. Since most vessels are typically agitated, the conservative assumption of complete VOC saturation is recommended at low to moderate purge gas flow rates. However, if the purge flow is greater than 100 scfm, a saturation factor of 25% percent is recommended.

Most operations are run at conditions, such as atmospheric pressure and relatively low temperatures, which allow the application of the ideal gas law. The VOC emission rate from purging may be estimated by first calculating the volumetric flow rate of the gas leaving the vessel, consisting of noncondensibles as well as the volatilized VOCs. The total rate of gas exiting a vessel is therefore:

$$V_{r2} = V_{r1} \left[\frac{P_T}{P_T - \sum (P_i X_i)} \right] \quad (6) \quad \text{(K-6)}$$

where:

V_{r2} = rate of gas displaced from the vessel (VOC and noncondensibles), scfm;

V_{r1} = rate of purge gas (noncondensibles), scfm;

P_T = vessel pressure, mmHg;

$\sum (P_i X_i)$ = the sum of the products of the vapor pressures and mole fractions for each VOC, mmHg.

The emission rate of VOCs in this exit gas is then calculated using the following equation:

$$E_R = \frac{(Y_i)(V_r)(P_T)(MW)}{(R)(T)} \quad (7) \quad \text{(K-7)}$$

where:

E_R = mass emission rate;

Y_i = mole fraction in vapor phase, calculated in Equations (9) and (10) (K-9) and (K-10) to follow in this appendix.

V_r = volumetric gas displacement rate (equal to the total rate of gas exiting a vessel, V_{r2})

R = ideal gas law constant;

T = absolute temperature of the vessel vapor space, ($^{\circ}$ K or $^{\circ}$ R);

P_T = pressure of the vessel vapor space; and

MW = molecular weight of the VOC or air toxic.

1.3 ~~3~~. Vapor Displacement Losses--Transfer of Material to Vessels.

Emissions occur as a result of vapor displacement in many batch operations. The transfer of liquids from one vessel to another vessel causes a certain volume of gas to be displaced in the receiving vessel. The VOC's that may be contained in this volume also are displaced. In many cases, the displaced gas is vented directly to the atmosphere. The amount of VOC's emitted during such an event is limited by the partial pressure of the components in the gas stream and the vessel pressure. Usually, vessel vapor spaces are filled with air (i.e., 21% percent oxygen, 79% percent nitrogen) or an inert gas, such as nitrogen.

The degree of vent gas saturation with the VOCs must be assumed or known before any calculations are performed. When permit levels are established, a conservative assumption is typically made to prevent a low estimate of emissions. In most vapor displacement calculations one may conservatively consider the gas being displaced to be 100% saturated with the volatile compounds that are entering the vessel. The following steps are involved in calculating emissions from vapor displacement events:

Step 1. Define the conditions of the displaced gas:

1. Temperature;
2. Pressure; and
3. Volumetric rate of displacement.

The rate of displacement of a gas from a vapor space is equal to the rate of vessel filling with liquid. An example of this displacement is the transfer of liquid material from one process vessel to another, such as the charging of a reactor with material from a weigh tank, and the subsequent emission reactor gas that is saturated with the vaporized liquid.

Step 2. Calculate the mole fraction of components in displaced gas:

The vapor pressure of the compound of interest (for one specific component, such as an air toxic) or of the entire volatile component of the liquid (for total VOC emissions) must first be determined. For one component, this can be done by consulting vapor pressure tables at the appropriate temperature or by using Antoine's equation, a form of which is presented below:

$$\ln P_i^* = A - \left[\frac{B}{(T+C)} \right] \quad (8) \quad \underline{(K-8)}$$

where:

P_i^* = vapor pressure of component i (mmHg);

A, B, C = compound-specific constants; and

T = absolute temperature of the liquid (K).

There are several forms of vapor pressure estimation equations and the reader should be certain that the constants correspond to the appropriate form and that the units are consistent. Most physical property handbooks contain the Antoine equation and the appropriate constants.

If more than one compound is present in the liquid, the vapor pressure of all compounds in the mixture must be determined. After the vapor pressures have been determined, the partial pressure that the VOC vapor fraction exerts in the vessel vapor space may be determined by using Raoult's Law, which is a simple expression that describes equilibrium between an ideal vapor and an ideal liquid. The general equation for Raoult's Law is presented below:

$$Y_i = \frac{P_i}{P_T} = \frac{X_i P_i^*}{P_T} \quad (9) \quad \underline{(K-9)}$$

where:

Y_i = mole fraction of i in the vapor

P_i = partial pressure of component i;

X_i = mole fraction of component i in the liquid;

P_i^* = vapor pressure of component i at temperature T; and

P_T = the total pressure in the vessel vapor space.

Raoult's Law may be used for multicomponent systems, assuming the compounds are completely miscible in one another. If the compounds are not miscible, or are only partially miscible, then they are considered "nonideal" and Raoult's Law does not apply. At or above the solubility limit, each compound exerts a partial pressure in the vapor space which is equal to the vapor pressure at that temperature. Below the solubility limit, especially for dilute solutions comprised of water and trace amounts of air toxics or VOC's, Henry's Law is used to describe the relationship between the mole fraction of the compound in the liquid and the vapor phase mole fraction. Henry's Law is presented below:

$$Y_i = \frac{P_i}{P_T} = \frac{X_i H_i}{P_T} \quad (10) \quad \underline{(K-10)}$$

where:

X_i = mole fraction of component i in the liquid;

H_i = Henry's Law constant for i (at temperature T);

Y_i =mole fraction of component i in vapor; and
 P_T =the total pressure in the vessel vapor space.

This relationship is especially important in calculating evaporative losses from process wastewater.

Step 3. Calculate the emission rate:

Once Y_i , the mole fraction of component i in the vessel vapor space, is known, the VOC or air toxic emission rate may be easily calculated by multiplying Y_i by the vessel fill rate (which equals the gas displacement rate) and converting this volumetric rate to a mass emission using equation (7) (K-7) of this appendix.

1.4 4.-Vessel Heating

When a process vessel partially filled with a VOC or a material containing a VOC is heated, the gas and vapors in the headspace expand and are discharged from the vent. An estimate of the emissions in the uncontrolled vent stream from such an event can be calculated based on application of the Ideal Gas Law and on vapor-liquid equilibrium principles.

The basis of the calculation is that the moles of gas displaced from a vessel are a result of the expansion of the noncondensable gas upon heating, and an increase in the VOC vapor pressure. The assumptions made for the calculations which follow are (1) atmospheric pressure of 760 mmHg; and, (2) the displaced gas is always saturated with VOC vapor in equilibrium with the liquid mixture.

The initial pressure of the gas (noncondensable) in the vessel is given by:

$$P_{a1} = 760 - \sum (P_i)_{T1} \quad (14) \quad \text{(K-11)}$$

where:

P_{a1} = initial partial pressure of gas in vessel headspace, mmHg, and
 $(P_i)_{T1}$ = initial partial pressure of each VOC in vessel headspace, mmHg, at the initial temperature (T_1).

The choice of formula to calculate P_i depends on which vapor-liquid equilibrium assumption is chosen (as discussed in ~~Section 3~~ 1.3 of this Appendix). If the VOC species behaves "ideally" in the system under consideration, then Raoult's Law holds and

$$(P_i)_{T1} = (P_i^*)_{T1} X_i \quad (12) \quad \text{(K-12)}$$

where:

$(P_i^*)_{T1}$ = vapor pressure of each compound at specified temperature, T_1 ,
and
 X_i = mole fraction of each compound in the liquid mixture.

If the VOC in question is present in very dilute concentrations in the liquid, then Henry's Law gives a reasonable estimate of the compound partial pressure if the empirically determined constant is available:

$$(P_i)_{T_1} = (H_i)_{T_1} X_i \quad (13) \quad \text{(K-13)}$$

where:

H_i = Henry's Law Constant at T_1 in consistent units (atm/mole fractions);

and

X_i = Mole fraction of each compound in the liquid mixture.

Note: If neither Raoult's Law nor Henry's Law is considered to be valid for the compound mixture being considered, a more complex procedure, beyond the scope of this document, must be used. Commercial computer programs are available to simplify the task of calculating vapor-liquid equilibria for nonideal mixtures.

The calculation of P_i is repeated at the final temperature conditions, T_2 ; and the final partial pressure of the gas in the vessel is calculated:

$$P_{a1} = 760 - \sum (P_i)_{T_1} \quad (14) \quad \text{(K-14)}$$

By application of the Ideal Gas Law, the moles of gas displaced is represented by:

$$\Delta \eta = \frac{V}{R} \left[\left(\frac{P_{a1}}{T_1} \right) - \left(\frac{P_{a2}}{T_2} \right) \right] \quad (15) \quad \text{(K-15)}$$

where:

$\Delta \eta$ = number of lb-moles of gas displaced;

V = volume of free space in the vessel, ft^3 ;

R = Gas Law constant, $998.9 \text{ mmHg ft}^3/\text{lb-moles } ^\circ\text{K}$;

P_{a1} = initial gas pressure in the vessel, mmHg;

P_{a2} = final gas pressure, mmHg;

T_1 = initial temperature of vessel, $^\circ\text{K}$; and

T_2 = final temperature of vessel, $^\circ\text{K}$.

The concentration of the VOC in the gas displaced at the beginning of the event is calculated assuming equilibrium at the initial vessel temperature. The final concentration of the VOC in the final amount of air displaced is calculated assuming equilibrium at the final vessel temperature. The VOC concentration in the displaced gas may be approximated by assuming it is equal to the average of the initial and final values. The number of moles of VOC displaced is equal to the moles of gas displaced times the average VOC mole fraction, as follows:

$$\eta_s = \frac{\frac{\sum (P_i)_{T_1}}{760 - \sum (P_i)_{T_1}} + \frac{\sum (P_i)_{T_2}}{760 - \sum (P_i)_{T_2}}}{2} \times \Delta \eta \quad (16) \quad \text{(K-16)}$$

where:

η_s = lb-moles of VOC vapor displaced from the vessel being heated up.

The mass of VOC vented can be calculated by multiplying the number of moles by the molecular weight. The reader should note that, at the boiling point of the VOC, this equation goes to infinity. In a physical sense, the vessel vapor space is filled entirely with VOC during boiling; the rate of release of VOC is therefore equal to the total flow of VOC out of the kettle. Therefore, this equation is not valid at the boiling point of the VOC.

1.5 ~~5~~-Gas Evolution

When a gas is generated as the result of a chemical reaction, emissions may be calculated by assuming that the gas is saturated with any VOCs that are in contact with it at the exit temperature. Emission calculations are analogous to the filled vessel purging calculations and are calculated using the following formula to first calculate the rate of gas displaced:

$$V_2 = V_1 \left[\frac{P_T}{P_T - \sum (P_i X_i)} \right] \quad (17) \quad \text{(K-17)}$$

where:

V_1 = initial volumetric rate of noncondensable gas evolution

P_T = vessel pressure

$\sum (P_i X_i)$ = sum of the products of the vapor pressure and the mole fraction of each VOC at the exit temperature

Once V_2 is known, it can be substituted into Equation (7) (K-7) of this appendix to calculate the emission rate.

1.6 ~~6~~-Sparging

Sparging is the subsurface introduction of a gas (typically nitrogen or other inert gas) intended to remove by selective volatilization (stripping) a more volatile minor component from a liquid mixture of predominantly less volatile material. Common applications of sparging are the removal of trace quantities of water or volatile organic solvent from a low volatility (high boiling point) resin. The removal of low concentrations of organic solvents from wastewater also may be achieved using air sparging.

Sparging is a semi-batch operation. The sparge tank is filled or discharged on a batch basis, while the gas is fed continuously at a steady flow rate for the duration of the sparge cycle. The subsurface sparger is designed to develop a mass of small diameter bubbles. The tank may be agitated as well in order to produce fine bubbles and increase the bubble residence time. These design features are intended to increase contact efficiency.

Utilizing fundamental chemical engineering principles and empirical correlations published in the literature it is possible to calculate the mass transfer coefficients encountered in sparging applications. The transfer rate of the component being stripped out is a function of temperature, composition, liquid diffusivity, gas rate and agitator power (which determine bubble size), and tank geometry (which, along with agitation power, determines residence time).

For the calculation of equilibrium concentration of VOC in the exiting sparge gas the earlier discussion of Raoult's Law and Henry's Law applies. For simple sparging (low viscosity fluids; no solids) vapor concentration may approach 100% ~~percent~~ of the calculated equilibrium value. For complex sparging, an empirically determined lower value may need to be used.

Unlike continuous flow vapor-liquid separation processes, with batch-wise sparging it is not possible to write a series of simple analytical equations which define the outlet gas concentration as a function of inlet concentration and thermodynamic properties of the compounds. This is because the liquid flow rate is zero and the composition changes with time. The problem of estimating the gas composition (hence, VOC emission rate) at any time during the sparge cycle, or of determining the amount of sparge gas and sparge item required to achieve a certain concentration reduction, can, however, be solved using simple numerical integration. One chooses a small time increment, one minute, for example, over which to calculate the gas flow and composition, making the simplifying assumption that the liquid composition does not change. From the inlet gas concentration (most likely zero) and the saturated exit gas concentration, the amount of volatile removed from the bulk liquid can be calculated, and a new estimate made for the liquid composition. The calculation of the vapor composition for the next item "slice" will be made based on this new liquid composition value. The cumulative quantity of volatile removed is used for subsequent estimates of the liquid composition.

A graphical representation of the vapor or liquid composition as a function of sparge time has a characteristic hyperbolic shape where the composition is asymptotic to zero. The initial composition is high, as is the stripping rate, because the mass transfer is a function of the composition driving force. The final composition is low, but a long stripping time is required to achieve a small decrease in composition because the driving force is also very low. An example sparging volatilization calculation follows:

Example: A 1,000-gal tank of wastewater containing a 0.025 wt% toluene is to be air sparged to remove the toluene to a concentration level of less than 20 ppb (by weight) to permit discharge to a municipal sewer system. Ambient air is to be used; the design temperature is 20°C. Toluene-water vapor-liquid equilibrium at 20°C can be approximated using a Henry's Law constant of 370 atm.

Solution: Use 4 one minute time slices, assume a sparge rate, calculate time required to achieve concentration objective, adjust sparge rate until reasonable cycle time is calculated. Because of standard geometry of 1,000-gal tank, and modest gas rates, 100% ~~percent~~ of equilibrium

concentration can be assumed. Table 4 K-1 summarizes the results of the calculations made using a personal computer spreadsheet program. With 75 acfm of sparge gas, the desired concentration of 20 ppb toluene is achieved in 55 minutes of sparging. The table clearly shows that the bulk of the VOC is removed during the early part of the cycle: one-half of the total toluene is removed in the first 3 three minutes, and 90% percent is removed after 13 minutes.

Table 4 K-1
Sparging Volatilization

	x-bulk	y-exit	# mols out	cum out	new x-b	wt fr	Percent Removal
0	0.000048	0.018090	0.003521	0.003521	0.000041	2.11E-04	15.580%
1	0.000041	0.015271	0.002972	0.006494	0.000034	1.78E-04	28.733%
2	0.000034	0.012892	0.002509	0.009003	0.000029	1.50E-04	39.837%
3	0.000029	0.010883	0.002118	0.011122	0.000024	1.27E-04	49.210%
4	0.000024	0.009188	0.001788	0.012910	0.000020	1.07E-04	57.123%
5	0.000020	0.007756	0.001509	0.014420	0.000017	9.05E-05	63.804%
6	0.000017	0.006548	0.001274	0.015695	0.000014	7.64E-05	69.443%
7	0.000014	0.005527	0.001076	0.016771	0.000012	6.45E-05	74.204%
8	0.000012	0.004666	0.000908	0.017679	0.000010	5.44E-05	78.223%
9	0.000010	0.003939	0.000766	0.018446	0.000008	4.60E-05	81.616%
10	0.000008	0.003325	0.000647	0.019093	0.000007	3.88E-05	84.480%
11	0.000007	0.002807	0.000546	0.019640	0.000006	3.28E-05	86.898%
12	0.000006	0.002370	0.000461	0.020101	0.000005	2.77E-05	88.939%
13	0.000005	0.002000	0.000389	0.020491	0.000004	2.33E-05	90.663%
14	0.000004	0.001689	0.000328	0.020819	0.000003	1.97E-05	92.118%
15	0.000003	0.001425	0.000277	0.021097	0.000003	1.66E-05	93.346%
16	0.000003	0.001203	0.000234	0.021331	0.000002	1.40E-05	94.382%
17	0.000002	0.001016	0.000197	0.021529	0.000002	1.19E-05	95.250%
18	0.000002	0.000857	0.000166	0.021696	0.000001	1.00E-05	95.996%
19	0.000001	0.000724	0.000140	0.021837	0.000001	8.45E-06	96.620%
20	0.000001	0.000611	0.000119	0.021956	0.000001	7.13E-06	97.147%
21	0.000001	0.000516	0.000100	0.022057	0.000001	6.02E-06	97.591%
22	0.000001	0.000435	0.000084	0.022141	9.94E-07	5.08E-06	97.967%
23	9.94E-07	0.000367	0.000071	0.022213	8.39E-07	4.29E-06	98.283%
24	8.39E-07	0.000310	0.000060	0.022273	7.09E-07	3.62E-06	98.551%
25	7.09E-07	0.000262	0.000051	0.022324	5.98E-07	3.06E-06	98.777%
26	5.98E-07	0.000221	0.000043	0.022368	5.05E-07	2.58E-06	98.967%
27	5.05E-07	0.000186	0.000036	0.022404	4.26E-07	2.18E-06	99.128%
28	4.26E-07	0.000157	0.000030	0.022435	3.60E-07	1.84E-06	99.264%
29	3.60E-07	0.000133	0.000025	0.022461	3.04E-07	1.55E-06	99.379%
30	3.04E-07	0.000112	0.000021	0.022482	2.56E-07	1.31E-06	99.475%
31	2.56E-07	0.000094	0.000018	0.022501	2.17E-07	1.11E-06	99.557%
32	2.17E-07	0.000080	0.000015	0.022516	1.83E-07	9.35E-07	99.626%
33	1.83E-07	0.000067	0.000013	0.022530	1.54E-07	7.89E-07	99.684%
34	1.54E-07	0.000057	0.000011	0.022541	1.30E-07	6.66E-07	99.734%
35	1.30E-07	0.000048	0.000009	0.022550	1.10E-07	5.62E-07	99.775%
36	1.10E-07	0.000040	0.000007	0.022558	9.28E-08	4.75E-07	99.810%
37	9.28E-08	0.000034	0.000006	0.022565	7.84E-08	4.01E-07	99.840%
38	7.84E-08	0.000028	0.000005	0.022570	6.62E-08	3.38E-07	99.865%
39	6.62E-08	0.000024	0.000004	0.022575	5.58E-08	2.86E-07	99.886%
40	5.58E-08	0.000020	0.000004	0.022579	4.71E-08	2.41E-07	99.904%
41	4.71E-08	0.000017	0.000003	0.022583	3.98E-08	2.04E-07	99.919%
42	3.98E-08	0.000014	0.000002	0.022585	3.36E-08	1.72E-07	99.931%
43	3.36E-08	0.000012	0.000002	0.022588	2.84E-08	1.45E-07	99.942%
44	2.84E-08	0.000010	0.000002	0.022590	2.39E-08	1.22E-07	99.951%

45	2.39E-08	0.000008	0.000001	0.022592	2.02E-08	1.03E-07	99.959%
46	2.02E-08	0.000007	0.000001	0.022593	1.71E-08	8.73E-08	99.965%
47	1.71E-08	0.000006	0.000001	0.022594	1.44E-08	7.37E-08	99.971%
48	1.44E-08	0.000005	0.000001	0.022595	1.22E-08	6.22E-08	99.975%
49	1.22E-08	0.000004	0.000000	0.022596	1.03E-08	5.25E-08	99.979%
50	1.03E-08	0.000003	0.000000	0.022597	8.67E-09	4.43E-08	99.982%
51	8.67E-09	0.000003	0.000000	0.022598	7.32E-09	3.74E-08	99.985%
52	7.32E-09	0.000002	0.000000	0.022598	6.18E-09	3.16E-08	99.987%
53	6.18E-09	0.000002	0.000000	0.022599	5.21E-09	2.67E-08	99.989%
54	5.21E-09	0.000001	0.000000	0.022599	4.40E-09	2.25E-08	99.991%
55	4.40E-09	0.000001	0.000000	0.022599	3.72E-09	1.90E-08	99.992%
56	3.72E-09	0.000001	0.000000	0.022600	3.14E-09	1.60E-08	99.994%
57	3.14E-09	0.000001	0.000000	0.022600	2.65E-09	1.35E-08	99.995%
58	2.65E-09	0.000000	0.000000	0.022600	2.24E-09	1.14E-08	99.995%
59	2.24E-09	0.000000	0.000000	0.022600	1.89E-09	9.65E-09	99.996%
60	1.89E-09	0.000000	0.000000	0.022600	1.59E-09	8.15E-09	99.997%
61	1.59E-09	0.000000	0.000000	0.022600	1.35E-09	6.88E-09	99.997%
62	1.35E-09	0.000000	0.000000	0.022600	1.14E-09	5.81E-09	99.998%
63	1.14E-09	0.000000	0.000000	0.022601	9.59E-10	4.90E-09	99.998%
64	9.59E-10	0.000000	0.000000	0.022601	8.09E-10	4.14E-09	99.998%
65	8.09E-10	0.000000	0.000000	0.022601	6.83E-10	3.49E-09	99.999%
66	6.83E-10	0.000000	0.000000	0.022601	5.77E-10	2.95E-09	99.999%
67	5.77E-10	0.000000	0.000000	0.022601	4.87E-10	2.49E-09	99.999%
68	4.87E-10	0.000000	0.000000	0.022601	4.11E-10	2.10E-09	99.999%
69	4.11E-10	0.000000	0.000000	0.022601	3.47E-10	1.77E-09	99.999%
70	3.47E-10	0.000000	0.000000	0.022601	2.93E-10	1.50E-09	99.999%

1.7 ~~7~~-Batch Pressure Filtration

Pressure filtration of non-aqueous, volatile, flammable, or hazardous slurries is typically conducted in a closed vessel. Generally, VOCs are not emitted during the filtration step, as there is no venting from the process vessel. However, during the gas blowing (cake-drying) step of the cycle, or during pressure release prior to cake discharge, venting occurs and there is potential for VOC emissions.

The gas blowing step is intended to accomplish some preliminary cake drying by evaporating some of the liquid filtrate present in the filter cake. This operation is roughly equivalent to the constant drying-rate period of a dryer's operation except that heated gas is not used (except in the case of some special purpose equipment where heated gas is, in fact, used). The blowing gas follows the same flow path as the filtrate, so that it could be vented through the receiving tank.

1.7.1 ~~i~~-Filter Cake Purging. The emission rate in the vented purge/blowing gas can be calculated if the cake conditions at the start and end of this portion of the cycle are known. The filtrate will be evaporated at approximately a constant rate. Assuming that the filtrate is 100% VOC, the emissions rate is simply:

$$ER = \frac{W(X_i - X_f)}{t} \quad (18) \quad \text{(K-18)}$$

where:

W = the dry weight of a batch of filter cake;
X_i = the weight fraction of filtrate at the start of the gas-blowing step;
X_f = the weight fraction of filtrate at the end of the gas-blowing step;
t = elapsed time of gas blowing; and
ER = emission rate in weight per unit time.

However, one key piece of data required for the above calculations, namely the filtrate content of the cake before the gas blowing, is not usually available. Therefore, this methodology is of only limited utility.

Since the blowing gas causes the VOCs in the filtrate to evaporate, the gas stream is partially saturated with vapor, and approaches vapor-liquid equilibrium as a limit. An assumption of the attained percent saturation enables the calculation of an emission rate.

1.7.2 ~~ii~~—Depressurization. Prior to opening a batch pressure filter for solids discharges, the pressure must be relieved. In the case of a filter design utilizing a closed vessel, there is some compressed gas in the vapor space which will have some degree of vapor saturation of VOC from the filtrate. Upon depressurization, a fraction of the noncondensable gas along with the VOC vapor will be vented. The estimation of the emission rate from a depressurization event is a straightforward application of the Ideal Gas Law if certain simplifying assumptions are made. If the vessel has been under pressure for some time during the filter cycle, and no additional noncondensable gas has been added, then it is reasonable to assume that the gas is saturated with the VOC vapor at the vessel temperature. To simplify the calculations, one assumes that the pressure decreases linearly with time once depressurization has begun, and that the composition of the gas/vapor mixture is always saturated with VOC vapor through the end of the depressurization. The estimation of the emission rate proceeds according to the following steps:

1.7.2.1 ~~4~~—Calculate the mole fraction of each VOC vapor species initially present in the vessel at the end of the depressurization.

$$Y_i = \frac{X_i P_i}{P_1} \quad (19) \quad (K-19)$$

where:

P_i = vapor pressure of each VOC component i;

P₁ = initial pressure of the process vessel in units consistent with P_i calculations;

X_i = mole fraction of component i in liquid; and

Y_i = mole fraction of component i initially in the vapor.

1.7.2.2 ~~2~~—The moles of VOC initially in the vessel are then calculated using the Ideal Gas Law as follows:

$$n_{\text{VOC}} = \frac{(Y_{\text{VOC}})(V)(P_1)}{RT} \quad (20) \quad \underline{\text{(K-20)}}$$

where:

Y_{VOC} = mole fraction of VOC (the sum of the individual VOC fractions, ΣY_i);

V = free volume in the vessel being depressurized;

P_1 = initial vessel pressure;

R = ideal gas constant; and

T = vessel temperature, absolute units.

1.7.2.3 3.—The moles of noncondensable gas present initially in the vessel are calculated as follows:

$$n_1 = \frac{VP_{\text{NC1}}}{RT} \quad (21) \quad \underline{\text{(K-21)}}$$

where:

V = free volume in the vessel being depressurized;

P_{NC1} = initial partial pressure of the noncondensable gas, $P_1 - \Sigma P_i$;

R = gas law constant; and

T = temperature, absolute units.

1.7.2.4 4.—At the beginning of the depressurization, there are more moles of noncondensable gas in the vessel relative to the moles of VOC in the vessel than at the end of depressurization. At the beginning of the depressurization, there are: $\frac{n_{\text{VOC}}}{n_1}$ moles of VOC to noncondensables.

1.7.2.5 5.—At the end of depressurization, there are: $\frac{n_{\text{VOC}}}{n_2}$ moles of

VOC to noncondensables, where:

$$n_2 = \frac{VP_{\text{NC2}}}{RT} \quad (22) \quad \underline{\text{(K-22)}}$$

where:

V = free volume in the vessel being depressurized;

P_{NC2} = final partial pressure of the noncondensable gas, $P_2 - \Sigma X_i P_i$;

R = gas law constant; and

T = temperature, absolute.

1.7.2.6 6.—The moles of VOC for the duration of the depressurization may be calculated by taking an approximation of the average ratio of moles of VOC to moles of noncondensibles and multiplying by the total moles of noncondensibles released during the depressurization, or:

$$\frac{\left(\frac{N_{\text{VOC}}}{n_1} + \frac{N_{\text{VOC}}}{n_2} \right)}{2} [n_2 - n_1] = N_{\text{VOC}} \quad (23) \quad \underline{\text{(K-23)}}$$

where:

N_{VOC} = moles of VOC emitted.

1.7.2.7 7.–The moles of VOC emitted can be converted to a mass rate using the following equation:

$$\frac{N_{\text{VOC}} \times MW_{\text{VOC}}}{t} = ER_{\text{VOC}} \quad (24) \quad \underline{\text{(K-24)}}$$

where:

ER_{VOC} = emission rate of the VOC;

MW_{VOC} = molecular weight of the VOC; and

t = time of depressurization.

1.8 8.–Emissions from Vacuum Generating Equipment

Steam ejectors and vacuum pumps are used to pull vacuums on vessels and can be sources of VOC and air toxic emissions. Both come in contact with a stream of gas that potentially contains pollutants. A steam ejector consists essentially of a steam nozzle that produces a high-velocity jet across a suction chamber connected to the vessel being evacuated. The gas from the vessel is entrained into the motive steam as it passes across the suction chamber. Both gas and steam are usually routed to a condenser.

Conventional (mechanical-type) vacuum pumps use a high boiling point oil to lubricate the moving parts. The VOCs which are present in the gas on the suction side may be partially condensed in the elevated pressure inside the vacuum pump. This reduces the amount of VOC emitted in the gas discharge from the pump, but causes contamination (reduced viscosity) of the pump oil. For this reason, if a significant amount of VOC is expected in the gas being evacuated, a liquid ring vacuum pump may be selected.

In a liquid ring vacuum pump, the vacuum is created by the rotating motion of a slug of seal fluid inside the pump casing. The seal fluid is in intimate contact with the gas and VOC being evacuated. A portion of the seal fluid is ejected with the pump discharge, so a system for seal fluid recycle and makeup is required.

Because the seal fluid is in contact with the gas/VOC mixture, mass and heat transfer can occur inside the pump. The emissions from a liquid ring vacuum pump are, therefore, a function of the seal fluid temperature and composition, as well as the inlet gas composition. For purposes of calculation one may assume that the exiting gas is in equilibrium with the seal fluid. The seal fluid must be chosen to be compatible with the gas/VOC being evacuated. In some cases, the seal fluid itself is a VOC and equilibrium with the exiting gas may result in an

increase in VOC level from that in the suction side. In other cases, the seal fluid can act to reduce the VOC level of the gas stream by absorbing (or condensing, in the case of a cooled seal fluid system) some of the VOC in the gas being evacuated.

1.8.1 ~~i~~-Emission Estimation. Emissions from vacuum systems originate from two distinct sources: 1) the first is the gas at the vacuum system discharge, 2) the second is the seal fluid or motive steam. Calculating emissions from the gaseous discharge of systems that serve to induce vacuums on equipment involves the estimation of the amount of air that leaks into the equipment because of the pressure differential between the inside and outside of the vessel. Once this air leakage rate is known, the rate of VOC emissions may be calculated by knowing the vacuum system discharge outlet temperature and pressure.

1.8.1.1 Air Leakage Estimation

The air leakage rate for the equipment may be estimated from the following equations, which correspond to the leakage created by metal porosity and cracks and leakage resulting from seals and components in a system for various vacuum pressure ranges:

1.8.1.1.1 ~~4~~-Leakage from metal porosity and cracks

(For $1 \leq P \leq 10$ mmHg) $W = 0.026 P^{0.34} V^{0.60}$ ~~(25)~~ (K-25)

(For $10 \leq P \leq 100$ mmHg) $W = 0.032 P^{0.26} V^{0.60} D$ ~~(26)~~ (K-26)

(For $100 \leq P \leq 760$ mmHg) $W = 0.106 V^{0.60}$ ~~(27)~~ (K-27)

where:

P = system operating pressure, mmHg;

V = volume, ft³; and

W = air leakage resulting from metal porosities and cracks along weld lines, lb/hr.

1.8.1.1.2 ~~2~~-Leakage from seals and components

(For $1 \leq P \leq 10$ mmHg) $w = \pi D \Theta P^{0.34}$ ~~(28)~~ (K-28)

(For $10 \leq P \leq 100$ mmHg) $w = 1.20 \pi D \Theta P^{0.26}$ ~~(29)~~ (K-29)

(For $100 \leq P \leq 760$ mmHg) $w = 3.98 \pi D \Theta$ ~~(30)~~ (K-30)

where:

D = sealed diameter, inches;

w = acceptable air leakage rate assigned to a system component, lb/yr; and

Θ = specific leakage rate for components, lb/hr/in (presented in Table A-5 of Appendix A of EPA-453/R-93-017).

1.8.1.1.3 ~~3~~–The total air leakage rate, La, in lb/hr, is merely the sum of the two components W and w.

$$La = W + w \quad (\text{31}) \quad \text{(K-31)}$$

Once the air leakage rate is known, the VOC emission rate, in lb/hr, may be calculated using the following equation from the 1978 Pharmaceuticals CTG (see 5.4 of this appendix):⁴

$$SE = MW_{VOC} \frac{La}{29} \left(\frac{P_{system}}{P_{system} - P_i} - 1 \right) \quad (\text{32}) \quad \text{(K-32)}$$

where:

SE = rate of VOC emission, in lb/hr;

MW_{VOC} = molecular weight of VOC, lb/lb-mole;

P_{system} = absolute pressure of receiving vessel or ejector outlet conditions, if there is no receiver;

P_i = vapor pressure of the VOC at the receiver temperature, in mmHg;

La = total air leak rate in the system, lb/hr; and

29 = molecular weight of air, lb/lb-mole.

Calculating emissions from seal fluid or motive steam is analogous to the calculations of VOC emissions from other sources of wastewater, which is discussed below.

2.0 ~~b~~–Evaporative Losses From Wastewater

Evaporative losses from wastewater that is contaminated with VOCs has been examined in detail, but currently is not included in this appendix. Several publications are available to aid the readers in calculating emissions from wastewater treatment systems which include surface impoundments, lagoons, and basins (see 5.5, 5.6, and 5.7 of this appendix).^{5,6,7}

3.0 ~~c~~–Storage Tank Emissions

In general, emissions of VOCs from storage tank working and breathing losses appear to be no different for continuous processes than they are for batch processes. Both types of losses usually are calculated using EPA-derived storage tank loss equations for three types of storage tanks: fixed roof, external floating roof, and internal floating roof. Fixed roof and horizontal pressure tanks appear to be the most common storage vessels used in batch processing. Estimation equations for these tank types and a detailed explanation of their use, may be found in an EPA reference (see 5.8 of this appendix).⁸

4.0 ~~d~~–Equipment Leaks

The calculation of emissions of VOCs from leaking process line components such as valves, pump seals, flanges, and sampling connections is no different for continuous processes than it is for batch processes. Emissions tend to be lower because the amount of time that components are actually in VOC service is less for batch processes than for continuous processes. In the event that no other specific data is available, equipment leak emissions may be estimated using the equipment leak factors derived for the Synthetic Organic Chemical Manufacturing Industry (SOCMI). These factors are readily available, and are included in Table 2 K-2 of this appendix. It is also possible to develop unit-specific emission estimates according to an accepted EPA protocol. The methodology for developing a specific emission estimate for leaking components is contained in another reference (see 5.10 of this appendix).⁴⁰

Table 2 K-2
Average Emission Factors for Fugitive Emissions in SOCMI^a

Equipment Component	"Average" SOCMI factors, Kg/h/source
Pump seals, Light liquid	0.0199
Heavy liquid	0.00862
Valves Gas	0.00597
Light liquid	0.00403
Heavy liquid	0.00023
Compressor seals	0.228
Safety relief valves--gas	0.104
Flanges	0.00183
Open-ended lines	0.0017
Sampling connections	0.0150

^a These factors are appropriate for estimating emissions when no other data (i.e., leakage rates) are available. Source: EPA-953/R-93-026. June 1993.

5.0 e-References

5.1 1--McCabe, W., and J. Smith. Unit Operations of Chemical Engineering, Third Edition. 1976.

5.2 2--Ryan, J.L., and S. Croll. Selecting Vacuum Systems. Chemical Engineering. 88:78. December 14, 1981.

5.3 3--Blakely, P. and G. Orlando. Using Inert Gasses for Purging, Blanketing, and Transfer. Chemical Engineering. 91:97-102. May 28, 1984.

5.4 4--EPA-450/2-78-029. Control of Volatile Organic Emissions from Manufacture of Synthesized Pharmaceutical Products. December 1978.

5.5 5--EPA-450/3-87-026. Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF) Air Emission Models.

5.6 6--Wastewater and Wastes Enabling Document. Version 1.0, July 1992.

5.7 ~~7.~~—Industrial Wastewater Volatile Organic Compound Emissions—
Background Information for BACT/LAER Determinations.

5.8 ~~8.~~—AP-42 Compilation of Air Pollution Emission Factors, Chapter 12.

5.9 ~~9.~~—EPA-453/R-93-026, Protocol for Equipment Leak Emission Estimates.
June 1993.

5.10 ~~10.~~—EPA-450/3-88-010, Protocol for Generating Unit-Specific Emission
Estimates for Equipment Leaks of VOC and VHAP. October 1988.

Footnote

1. Material in this appendix has been derived from guidance in Chapter 3 and Appendix C of EPA's draft CTG for Batch Processes (EPA-453/R-93-017).

APPENDIX L

11/29/1994

Method to Determine Total Organic Carbon for Offset Lithographic Solutions

1.0 ~~a~~–Applicability and Principle.

1.1 ~~1~~–Applicability. This method is applicable for the determination of organic carbon in diluted offset lithographic solutions.

1.2 ~~2~~–Principle. Organic carbon in a sample is converted to carbon dioxide (CO₂) by catalytic combustion or wet chemical oxidation. The CO₂ formed can be measured directly by an infrared detector or converted to methane (CH₄) and measured by a flame ionization detector. The amount of CO₂ or CH₄ is directly proportional to the concentration of carbonaceous material in the sample.

2.0 ~~b~~–Sensitivity and Interferences.

2.1 ~~1~~–Sensitivity. The method is most applicable to measurement of organic carbon above 1 mg/L.

2.2 ~~2~~–Interferences. All distilled water used in making and/or diluting the samples must be acidified with concentrate H₃PO₄ (1 mL of H₃PO₄/1 L of water) and purged with inert gas (He, N₂...) for at least 30 minutes. Inject this water into the Total Organic Carbon analyzer and determine the total concentration (ppm C) of the blank. This method is sufficient for removing most interferences due to inorganic carbon in the water. Do not purge the sample with an inert gas since purging may result in the loss of volatile organic substances.

3.0 ~~c~~–Apparatus.

3.1 ~~1~~–Blender. Waring-type or similar, for blending or homogenizing samples.

3.2 ~~2~~–Total Organic Analyzer. An analyzer capable of measuring carbonaceous material in liquid samples. Consideration should be given to the types of samples to be analyzed, the expected concentration range, and the forms of carbon to be measured.

3.3 ~~3~~–Volumetric Flasks and Volumetric Pipets. For preparing standard solutions and the lithographic solutions.

3.4 ~~4~~–Glass Bottles. For sample collection and storage.

4.0 ~~d~~–Reagents.

4.1 ~~1~~–Water. Distilled water used in preparation of standards and for dilution of samples should be ultrapure to reduce the carbon concentration of the blank. Carbon dioxide-free, double-distilled water is recommended. Ion-exchanged waters are not recommended because of the possibilities of contamination with organic materials from the resins.

4.2 2.—Potassium Hydrogen Phthalate, Stock Solution. 1000 mg carbon/L. Dissolve 0.2128 g of potassium hydrogen phthalate (Primary Standard Grade) in distilled water and dilute to 100.0 mL.

4.3 3.—Potassium Hydrogen Phthalate, Standard Solutions. Prepare standard solutions from the stock solution by dilution with distilled water.

4.4 4.—Blank Solution. Use the same distilled water (or similar quality water) used for the preparation of the standard solutions.

5.0 e.—Sample Preparation.

5.1 1.—Prepare the offset lithographic solutions according to the manufacturer's directions.

5.2 2.—Dilute the offset lithographic solutions with H₂O to be within the calibrated range of the instrument before analyzing. Dilutions of 1-to-100 or greater may be necessary before lithographic solutions can be analyzed.

6.0 f.—Procedure.

6.1 1.—Follow the instrument manufacturer's instructions for calibration, procedure, and calculations.

6.2 2.—Calibrate using at least 3 three standards. The set of calibration standards should consist of one below the expected concentration, one above the expected concentration, and one approximately at the expected concentration.

6.3 3.—Calculate and report the results as mg C/g sample.

7.0 g.—Precision and Accuracy.

7.1 1.—Precision and accuracy determinations for diluted offset lithographic solutions were determined by the method of standard addition. Two analysts in one laboratory analyzed spiked and unspiked diluted solutions. The results are contained in ~~citation 4 of the Bibliography~~ 8.4 of this appendix.

7.2 2.—Precision and accuracy determinations for diluted lithographic cleaning solutions were determined by the method of standard addition. One analyst in one laboratory analyzed spiked and unspiked diluted solutions. The results are contained in ~~citation 4 of the Bibliography~~ 8.4 of this appendix.

8.0 h.—Bibliography.

8.1 1.—Annual Book of ASTM Standards, Part 31, "Water", Standard D 2574-79, p. 469 (1976).

8.2 2.—Standard Methods for the Examination of Water and Wastewater, 14th Edition, p. 532, Method 505, (1975).

8.3 3.—Method 415.1, Methods for Chemical Analysis of Water and Wastes, Environmental Monitoring and Support Laboratory, USEPA, Cincinnati, OH 45268, EPA 600/4-79-020.

8.4 4.—Evaluation of Method 415.1 for Offset Lithographic Solutions. September, 1992.

APPENDIX M

11/29/1994

Test Method for Determining the Performance of Alternative Cleaning Fluids³¹

This appendix presents a test method for evaluating the performance of alternative cleaning fluids. Any fluids may be tested, but the primary intent is that it will be used to evaluate the performance of alternatives relative to a VOC solvent. It is a screening technique designed to determine whether the alternative(s) (or alternatives) cleans at least as well as a currently used VOC solvent in a simple, standardized wiping application. The results of this procedure may not mimic those that would be achieved for a different scenario in an industrial setting (e.g., spraying or wiping a complex shape). However, any cleaning fluids that are unsatisfactory in this test can be eliminated from consideration for more complicated site-specific tests.

This test method has not yet been validated.

1.0 a.—Standard Test Method For Determining the Performance of Alternative Cleaning Fluids.

~~4.—Introduction.~~ Industrial plants use VOC solvents to clean numerous contaminants from a variety of materials in different configurations. Alternative solvents and cleaning fluids exist that would produce lower VOC emissions from many of these cleaning applications. This method involves comparative testing of an existing VOC solvent with alternatives using one standardized cleaning procedure. It is a screening technique that identifies which alternative fluids clean as well as or better than an existing VOC solvent. Because it may not reproduce the plants' actual cleaning procedure, nor determine the effect of the alternative on the performance of coatings applied to the cleaned surface, it is likely that additional site- or industry-specific tests will be needed before the alternatives that pass this screening test are adopted.

The method is based on ASTM Method D 4828-91 for determining the practical washability of organic coatings. Changes were made to the method to allow its use in new applications. The changes include a wider variety of acceptable test panel materials, contaminants, and cleaning fluids. Procedures for evaluating the results are also different. The cleaning apparatus and procedure were not modified.

2.0 ~~iii.—~~Applicability and Principle.

2.1 ~~4.—~~Applicability. This method applies to the determination of the relative ease of removal of contaminants from a variety of materials/surfaces by manual or mechanical cleaning with a sponge and various solvents or other cleaning solutions.

³ Material in this Appendix has been derived from Appendix F of Alternative Control Techniques Document—Industrial Cleaning Solvents, EPA 453/R-94-015.

2.2 2—Principles. A contaminant is applied to a test panel to represent a typical industrial cleaning situation. One portion of the soiled panel is scrubbed with a sponge and the existing solvent, and another portion is scrubbed with a sponge and an alternative solvent or cleaning solution that produces lower VOC. The performance of the alternative is then rated as (1) worse than the existing solvent, or (2) as good as or better than the existing solvent.

3.0 iv. Apparatus.

3.1 1—Sponge and Holder^{4,2};

3.2 2—Contaminant Applicator;

3.3 3—Weight, 100 g;

3.4 4—Balance, Weighing Accurately to 0.1 g;

3.5 5—Doctor or Bird Film Applicator, having a 7-mil (0.018-mm) clearance by 6-in. (150-mm) film width;

3.6 6—Panels of various materials, 17½ by 6½ by ¼ in. (455 by 165 by 6.3 mm);

3.7 7—Washability Machine^{5,3};

3.8 8—Masking Tape;

3.9 9—Straightedge, approximately 17 in (430 mm) in length;

3.10 10—Cotton Tipped Swabs;

3.11 11—Medicine Droppers;

3.12 12—Suction Plate, for drawdowns.

4.0 d. Reagents and Materials.

4.1 1—Contaminants. Examples that may be used with this test method include, but are not limited to pencil, crayon, ball-point pen, waterborne felt-tip markers, grease, and mineral oil.

⁴ A sponge, 3 by 3¼ by 1¼ in. (75 by 95 by 45 mm), Part No. AG-8116, and a metal holder, Part No. AG-8115, available from BYK Gardner, Inc., 2435 Linden Lane, Silver Spring, MD 20910 or a sponge, Part No. WA-2222, and metal holder, Part No. WA-2220, available from Paul N. Gardner Co., 316 N.E. First Street, Pompano Beach, Florida 33060-6699 have been found acceptable for this purpose. An equivalent may be used.

⁵ Washability machine, Model AG-8100, available from BYK Gardner, Inc. or Model WA-2037D, available from the Paul N. Gardner Co., have been found suitable for this purpose. Other straight-line wash testers may be adapted to meet the requirements of this test method emissions.

4.2 ~~2~~–Solvents and Cleaning Solutions. Examples that may be used with this test method include any VOC solvent or alternative cleaning fluid.

4.3 ~~3~~–Test Panels. Different types of panels may be selected to match the cleaning application. Examples include, but are not limited to, glass, stainless steel, aluminum, and plastic. The surface may be painted or unpainted.

5.0 ~~e~~–Preparation of Apparatus.

5.1 ~~4~~–Washability Machine. Level the apparatus before use and operate at 37 ± 1 cpm. (A cycle consists of a complete forward and reverse stroke.)

5.2 ~~2~~–Sponge and Holder. Add sufficient weight to the holder in the form of metal sheets or other flat weights to give a combined weight of 1,000 g, including the dry sponge.

5.3 ~~3~~–Test Panel. Prepare paint coated panels by the following procedure. Stir the material thoroughly and strain, if necessary, to remove all skins and particles. Draw down the coating on the panel. Apply the coating in 3 to 4 s from end to end to prevent pin holes or holidays in the film. Air dry all panels in a horizontal position for 7 seven days in a room maintained at $73 \pm 3.5^{\circ}\text{F}$ ($23 \pm 2^{\circ}\text{C}$) and $50 \pm 5\%$ relative humidity as described in Specification D3924, or under conditions specifically applicable to the material under test. Prepare enough panels with each paint for all the projected tests. Before use, clean the top of the test panel (painted or unpainted) to be sure it is free of specks.

6.0 ~~f~~–Procedure.

6.1 ~~4~~–Application of Contaminants.

6.1.1 ~~i~~–Apply the selected contaminants to the test panel (or coating on the panel) in one straight line parallel to the length of the panel for the manual method of cleaning, or in a pair of lines perpendicular to the length of the panel for the mechanical method of cleaning.

6.1.2 ~~ii~~–Apply solid contaminants using the apparatus shown in Figure M-1 of this appendix. Insert pencil, crayon, pen or similar items into the appropriately sized hole and secure its position so it extends $1\frac{1}{2}$ in. (40 mm) beyond the panel (see Figure M-1(a) of this appendix). Secure the medium in position with a piece of masking tape (see Figure M-1(b) of this appendix). Put the wooden applicator panel at one end of the test panel and place the 100-g weight on its top face at the end nearest to the marking device, as shown in Figure M-1(b) of this appendix, securing it with a piece of tape. Allow the nonweighted end of the wooden applicator panel to rest on the surface of the test panel, then hold it by the outer edges and pull it along the entire length of the panel (see Figure M-1(c) of this appendix).

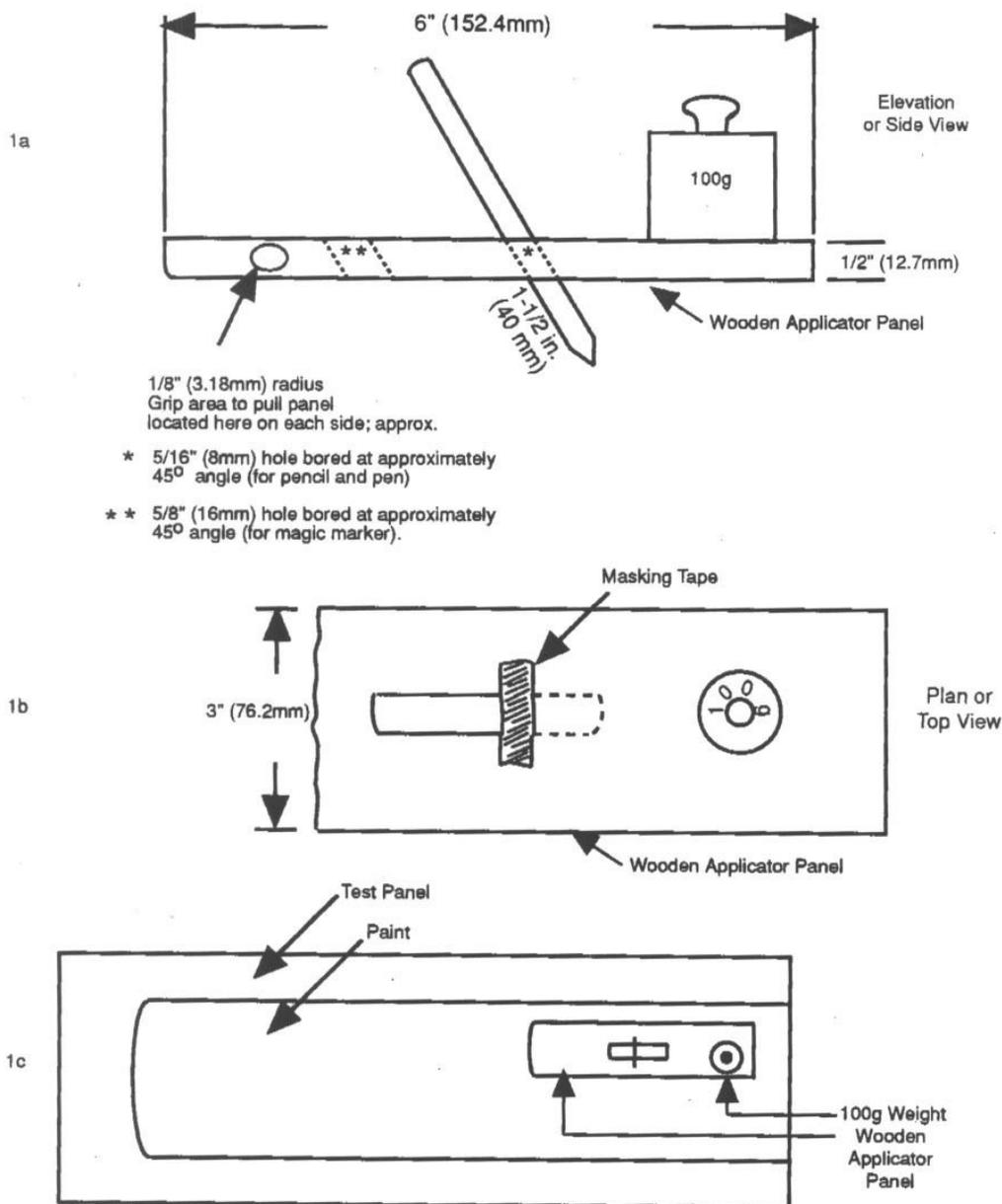


Figure M-1. Contaminant Application.

6.1.3 ~~iii.~~ Apply liquid contaminants using hand-held cotton-tipped swabs. Immerse one end of a cotton-tipped swab in an appropriate solvent or cleaning solution and allow to remain totally immersed until the cotton tip is saturated (approximately 10 to 15 sec). Remove the tip from the liquid and apply the first of two parallel lines to the test panel using the straightedge to assist in drawing the lines. Adjustment of pressure on the cotton tip may be required to provide a line of uniform intensity. Reimmerse the cotton tip in the liquid and then draw the second line. Repeat with a clean or unused cotton tip for each liquid being used. Permit the contaminants to dry at least

4 one hour under the same temperature and humidity conditions as in ~~5.4~~ 5.3 of this appendix.

Note 1 - Only one contaminant may be tested at one time. Typically, as noted above, this will mean the application of one line for manual cleaning or two parallel lines of contaminant for mechanical cleaning. As shown in Figure M-2 of this appendix, one section of the panel will be used to test an alternative cleaning fluid. However, the panel may be long enough to allow evaluation of more than one alternative cleaning fluid in a single test.

6.2 ~~3~~-Cleaning.

6.2.1 ~~i~~—Soak the sponge in the solvent or solution at ambient temperature until saturated. Remove the sponge and squeeze with one hand until no more liquid drips from the sponge. Replace the sponge in the holder and pour 15±1 mL of solvent or cleaning solution on the exposed face of the sponge.

6.2.2 ~~ii~~—Apply 5 mL of solvent or cleaning solution in parallel bands to each contaminant line.

6.3 ~~3~~—Manual Method. Place the sponge and holder at one end of the panel so that its long axis is perpendicular to the length of the panel (see Figure M-2 of this appendix). Rub the sponge across the panel over the contaminant lines, exerting minimum downward pressure. Continue rubbing until all the contaminants are removed or to a maximum of 100 cycles. If all the contaminants are removed prior to 100 cycles, stop and record the number of cycles before proceeding to 6.5 of this appendix.

6.4 ~~4~~—Mechanical Method.

6.4.1 ~~i~~—Place the sponge and holder at one end of the panel so that its long axis is parallel to the length of the panel (see Figure M-2 of this appendix). Attach the sponge and holder to the cable of the washability machine. Allow the sponge to travel a maximum of 100 cycles. If all the contaminants are removed prior to 100 cycles, stop and record the number of cycles before proceeding to 6.5 of this appendix.

6.4.2 ~~ii~~—Remove the test panel and evaluate the condition of each in the path of the sponge and rate as follows:

6.4.2.1 ~~A~~—Worse than existing solvent.

6.4.2.2 ~~B~~—As good as or better than existing solvent. When a contaminant is removed prior to 100 cycles, note the number of cycles in which each contaminant was removed.

7.0 ~~g~~—Report. Report the Following Information:

7.1 4—Type of contaminants, solvents, or cleaning solutions, and washing method used and the results obtained in 6.5 of this appendix.

7.2 2—Any contaminants that were removed in less than 100 cycles.

7.3 3—Any deviation from the recommended procedure.

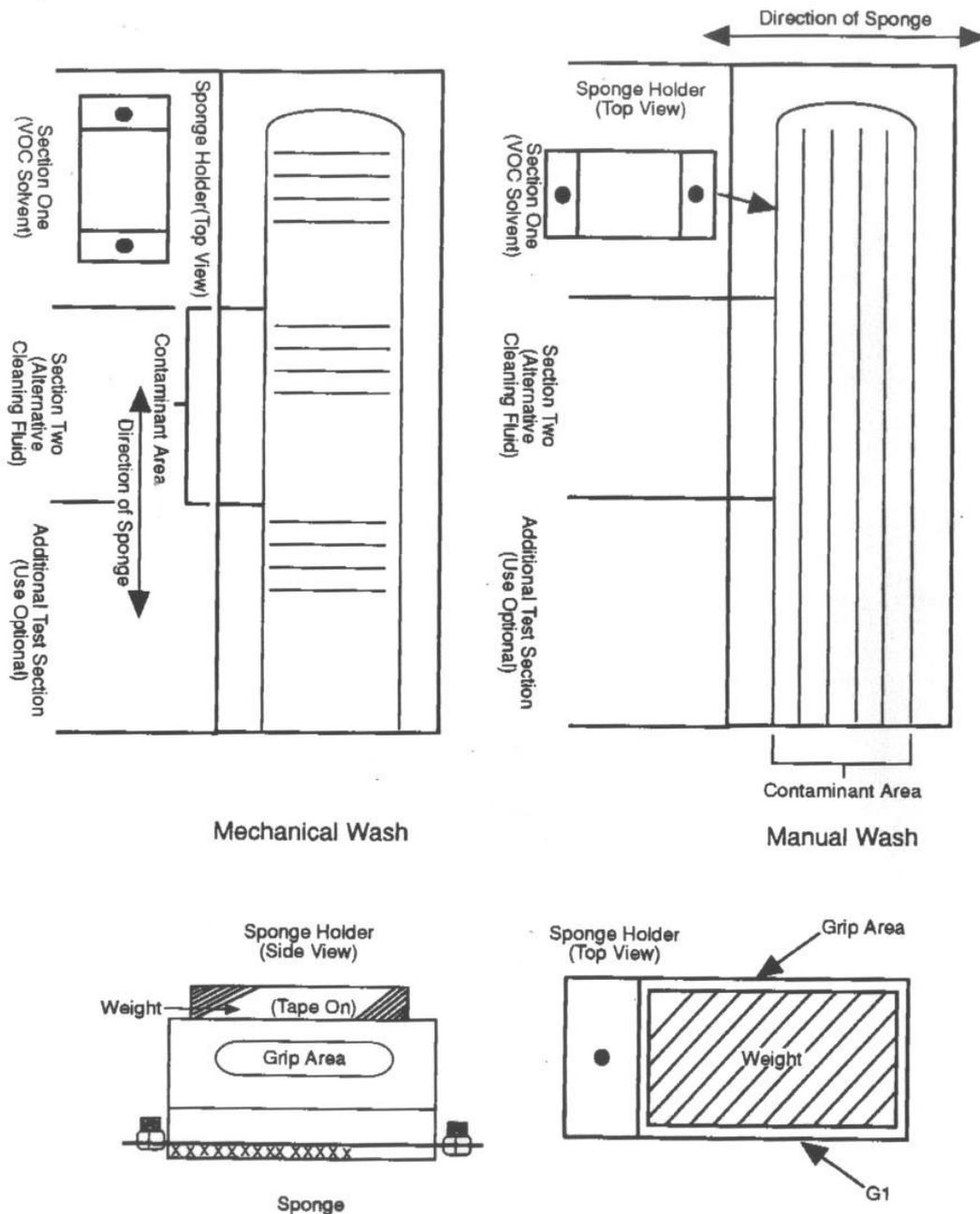


Figure M-2. Panel Layout and Brush Holder Diagram.

8.0 ~~h~~-Precision and Bias

8.1 ~~4~~-Precision - Unknown.

8.2 ~~2~~-Repeatability - Unknown.

8.3 ~~3~~-Reproducibility - Unknown.

8.4 ~~4~~-Bias - Unknown.

Footnotes

1 Material in this Appendix has been derived from Appendix F of Alternative Control Techniques Document—Industrial Cleaning Solvents, EPA-453/R-94-015.

2 A sponge, 3 by 3¼ by 1¾ in. (75 by 95 by 45 mm), Part No. AG-8116, and a metal holder, Part No. AG-8115, available from BYK-Gardner, Inc., 2435 Linden Lane, Silver Spring, MD 20910 or a sponge, Part No. WA 2222, and metal holder, Part No. WA 2220, available from Paul N. Gardner Co., 316 N.E. First Street, Pompano Beach, Florida 33060-6699 have been found acceptable for this purpose. An equivalent may be used.

3 Washability machine, Model AG-8100, available from BYK-Gardner, Inc. or Model WA 2037D, available from the Paul N. Gardner Co., have been found suitable for this purpose. Other straight-line wash testers may be adapted to meet the requirements of this test method emissions.