United States
Environmental Protection
Agency

Office of Air Quality Planning
and Standards
Research Triangle Park NC 27711

EPA-340/1-82-005b
June 1982

Stationary Source Compliance Series

EPA

Standards of Performance for New Stationary Sources -

Volume 2: Proposed Amendments

A Compilation As of May 1, 1982

EPA-340/1-82-005b

Standards of Performance for New Stationary Sources -

Volume 2: Proposed Amendments

A Compilation as of May 1, 1982

by

PEDCo Environmental, Inc.
Cincinnati, Ohio 45246

Contract No. 68-01-6310

EPA Project Officer: Kirk Foster

Prepared for

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Air, Noise and Radiation
Stationary Source Compliance Division
Washington, D.C. 20460

June 1982

SECTION IV

PROPOSED AMENDMENTS

The Stationary Source Compliance series of reports is issued by the Office of Air, Noise and Radiation, U.S. Environmental Protection Agency, to assist the Regional Offices in activities related to compliance with implementation plans, new source emission standards, and hazardous emission standards to be developed under the Clean Air Act. Copies of Stationary Source Compliance reports are available - as supplies permit - from the U.S. Environmental Protection Agency, Office of Administration, General Services Division, MD-35, Research Triangle Park, North Carolina 27711, or may be obtained, for a nominal cost, from the National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22151.

PREFACE

This is Volume 2 of a three-volume compilation of the New Source Performance Standards promulgated under Section III of the Clean Air Act, represented in full as amended. The information contained herein supersedes all compilations published by the U.S. Environmental Protection Agency prior to 1982.

The large number of proposed NSPS regulations and amendments and the increasing amount of full text for promulgated amendments has necessitated dividing the compilation into three volumes. Volume 1 contains the introduction, summary table, and regulations as amended. Volume 2 (this document) contains the full text of all proposed regulations divided by section affected. The Table of Contents also serves as a complete listing of proposed amendments, including Reference Methods and Performance Specifications, cross-referenced, if necessary, to the standard with which they were proposed. Volume 3 presents the full text of all promulgated regulations.

The Stationary Source Compliance Division will issue future supplements to New Source Performance Standards-A Compilation on an as-needed basis. Comments and suggestions should be directed to: Standards Handbooks, Stationary Source Compliance Division (EN-341), U.S. Environmental Protection Agency, Washington, D.C. 20460.

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ENVIRONMENTAL PROTECTION AGENCY

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STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

GENERAL PROVISIONS

SUBPART A

ENVIRONMENTAL PROTECTION AGENCY

[40 CFR Parts 60 and 61]

[FRL 1085-1]

Standards of Performance for New Stationary Sources and National Emission Standards for Hazardous Air Pollutants; Definition of "Commenced"

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed Rule.

SUMMARY: This action proposes an amendment to the definition of "commenced" as used under 40 CFR Parts 60 and 61 (standards of performance for new stationary sources and national emission standards for hazardous air pollutants). The legislative history of the Clean Air Act Amendments of 1977 indicates that EPA should revise the definition of "commenced" to be consistent with the definition contained in the prevention of significant deterioration requirements of the Act. This proposal would effect that revision.

DATES: Comments must be received on or before July 30, 1979.

ADDRESSES: Comments should be submitted to Jack R. Farmer, Chief, Standards Development Branch (MD-13), Emission Standards and Engineering Division, Environmental Protection Agency, Research Triangle Park, North Carolina 27711. Public comments received may be inspected and copied at the Public Information Reference Unit (EPA Library) Room 2922, 401 M Street, S.W., Washington, D.C.

FOR FURTHER INFORMATION CONTACT: Don R. Goodwin, Director, Emission Standards and Engineering Division (MD-13), Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number 919-541-5271.

SUPPLEMENTARY INFORMATION: For many of EPA's regulations, it is important to determine whether a facility has commenced construction by a certain date. For instance, as provided under section 111 of the Clean Air Act, facilities for which construction is commenced on or after the date of proposal of standards of performance are covered by the promulgated standards. The definition of "commenced" is thus one factor determining the scope of coverage of the proposed standards. "Commenced" is currently defined under 40 CFR Part 60 as meaning:

> * * * with respect to the definition of "new source" in section 111(a)(2) of the Act, that an owner or operator has undertaken a continuous program of construction or modification or that an owner or operator has entered into a contractual obligation to undertake and complete, within a reasonable time, a continuous program of construction or modification.

A similar definition (minus the reference to section 111(a)(2)) is used under 40 CFR Part 61. As provided under section 112 of the Act, facilities which commence construction after the date of proposal of a national emission standard for a hazardous air pollutant are subject to different compliance schedule requirements than those facilities which commence before proposal.

The Clean Air Act Amendments of 1977 include a definition of "commenced" under Part C—Prevention of Significant Deterioration (PSD) of Air Quality. The PSD definition of "commenced" requires an owner or operator to obtain all necessary preconstruction permits and either (1) to have begun physical on-site construction or (2) to have entered into a binding agreement with significant cancellation penalties before a project is considered to have "commenced."

On November 1, 1977, Congress adopted some technical and conforming amendments to the Clean Air Act Amendments of 1977. Representative Paul Rogers presented a Summary and Statement of Intent which stated:

> In no event is there any intent to inhibit or prevent the Agency from revising its existing regulations to conform with the requirements of section 165. In fact, the Agency should do so as soon as possible. It is also expected that the Agency will act as soon as possible to revise its new source performance standards and the definition of 'commenced construction' for the purpose of those revised standards to conform to the definition contained in part C.

In view of this background, EPA has decided to make the definition of "commenced" as used under Part 60 consistent with the definitions used under the PSD requirement of Parts 51 and 52. Even though Congress did not specify any changes to the definition under Part 61, it is reasonable to also change that definition to be consistent with those under Parts 60, 51, and 52. The manner in which the definition would be interpreted is expressed in the preamble to the PSD regulations 43 FR 26395-26396. For complete consistency with the Clean Air Act and Parts 51 and 52, a new definition of "necessary preconstruction approvals or permits" has also been added.

EPA does not intend that sources would be brought under the standards by the revised definitions that would not have been covered by the existing definitions. The revised definitions would be effective 30 days after promulgation of the final definitions. Facilities which have commenced construction under the present definitions before the effective date of the revised definitions would be considered to have commenced construction under the revised definitions, i.e., the revised definitions would not be applied retroactively. Note, however, that under the PSD regulations, sources could be required to apply control technology capable of meeting the most recent standard of performance even though that standard is not applicable, because the applicable standard of performance requirements are only the minimum criteria for granting a PSD permit.

During the public comment period, comments are invited regarding the impact of the revised definition. In particular, comments are invited regarding actual compliance problems which may occur because of this revision.

Dated: May 23, 1979.

Douglas M. Costle,

Administrator.

It is proposed to amend 40 CFR Parts 60 and 61 by amending §§ 60.2(i) and 61.02(d) and by adding §§ 60.2(cc) and 61.02(q) as follows:

PART 60—STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

Subpart A—General Provisions

§ 60.2 Definitions.

* * * * *

(i) "Commenced" means, with respect to the definition of "new source" in section 111(a)(2) of the Act, either that:

(1) An owner or operator has obtained all necessary preconstruction approvals or permits and either has:

(i) Begun, or caused to begin, a continuous program of physical on-site construction of the facility to be completed within a reasonable time; or

(ii) Entered into binding agreements or contractual obligations, which cannot be cancelled or modified without substantial loss to the owner or operator, to undertake a program of construction of the facility to be completed within a reasonable time, or

(2) An owner or operator had commenced construction before (effective date of this definition) under

the definition of "commenced" in effect before (effective date of this definition).

* * * * *

(cc) "Necessary preconstruction approvals or permits" means those permits or approvals required under Federal air quality control laws and regulations and those air quality control laws and regulations which are part of the applicable State implementation plan.

(Sec. 111, 301(a) of the Clean Air Act as amended (42 U.S.C. 7411, 7601(a)))

40 CFR Part 60

[AD FRL-1505-7a]

Standards of Performance for new Stationary Sources; Priority List

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed amendment.

SUMMARY: Studies of the asphalt processing and roofing industry have revealed that asphalt is processed at oil refineries and asphalt processing plants as well as at asphalt roofing plants. These locations were not specifically included in the asphalt roofing source category included in the priority list for regulation of new sources under Section 111 of the Clean Air Act, promulgated on August 21, 1979. Therefore, the Administrator is proposing to amend the priority list to specifically include asphalt processing locations in the source category currently listed as asphalt roofing plants. The proposed amendment to the priority list is based on the Administrator's judgment that asphalt blowing stills and storage tanks at asphalt processing facilities and oil refineries contribute significantly to air pollution which may reasonably be anticipated to endanger public health or welfare.

DATES: *Comments.* Comments must be received on or before January 19, 1981.

Public Hearing. A public hearing will be held, if requested. Persons wishing to request a public hearing must contact EPA by December 8, 1981. If a hearing is requested, an announcement of the date and place will appear in a separate **Federal Register** notice.

ADDRESSES: *Comments.* Comments should be submitted (in duplicate if possible) to: Central Docket Section (A-130), Attention: Docket No. OAQPS A-79-39, U.S. Environmental Protection Agency, 401 M Street, SW., Washington, D.C. 20460

Public Hearing. Persons wishing to request a public hearing should notify Ms. Deanna B. Tilley, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone (919) 541-5477.

Background Information Document. Background Information on the emissions from the asphalt processing and roofing manufacturing industry may be obtained from the U.S. EPA Library (MD-35), Research Triangle Park, North Carolina 27711, telephone (919) 541-2777. Please refer to "Asphalt Roofing Manufacturing Industry, Background Information for Proposed Standards," EPA-450/3-80-021a.

Docket. A docket, number OAQPS A-79-39, containing information used by EPA in development of the standards of performance for the asphalt processing and roofing manufacturing industry, is available for public inspection between 8:00 a.m. and 4:00 p.m. Monday through Friday, at EPA's Central Docket Section (A-130), West Tower Lobby, Gallery 1, Waterside Mall, 401 M Street, SW., Washington, D.C. 20460.

FOR FURTHER INFORMATION CONTACT: Ms. Susan R. Wyatt, Emission Standards and Engineering Division (MD-13), Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone (919) 541-5477.

SUPPLEMENTARY INFORMATION:

Proposal To Amend Priority List

The Clean Air Act of 1970 established a program under Section 111 to develop standards of performance for new stationary sources which the Administrator determines may contribute significantly to air pollution which may reasonably be anticipated to endanger public health or welfare. Section 111 of the Clean Air Act Amendments of 1977 requires that the Administrator publish, and from time to time revise, a list of categories of major stationary sources for which standards of performance for new sources are to be promulgated.

In developing priorities, Section 111 specifies that the Administrator consider (1) the quantity of emissions from each source category, (2) the extent to which each pollutant endangers public health or welfare, and (3) the mobility and competitive nature of each stationary source category.

The priority list, which identifies major source categories in order of priority for development of regulations, was proposed on August 31, 1978 and promulgated, after revisions, on August 21, 1979 (40 CFR 60.16, 44 FR 49222). Of the 59 source categories on the list, asphalt roofing plants are listed as number 45.

Source categories are intended to be broad enough in scope to include all processes associated with the particular industry. In the asphalt roofing industry studies have revealed that initial steps in the preparation of asphalt for roofing manufacture may take place not only at roofing plants but also at locations which do not manufacture roofing products. These locations were not specifically listed with the asphalt roofing source category included in the priority list promulgated on August 21, 1979. Blowing stills, where air is forced through hot asphalt flux (crude oil residuum) as the initial step in asphalt processing, may be located at oil refineries and/or asphalt processing plants as well as at asphalt roofing plants. The coating and saturant asphalts which result from the blowing process are stored in tanks located at oil refineries and asphalt processing plants as well as at roofing plants. These two facilities at either an oil refinery or an asphalt processing plant would contribute more than 100 tons of particulate emissions per year and are, therefore, considered major sources.

The emissions, processes, and applicable controls for blowing stills and asphalt storage tanks at oil refineries and asphalt processing plants are the same as those at asphalt roofing plants. It is therefore reasonable to treat the asphalt processing and roofing manufacture industry as a single category of sources for the purposes of establishing standards of performance.

In the Administrator's judgment, asphalt processing operations which take place at oil refineries and asphalt processing plants contribute significantly to air pollution which may reasonably be anticipated to endanger public health or welfare.

Proposed standards of performance for Asphalt Processing and Roofing Manufacture appear elsewhere in this issue of the **Federal Register.**

(Sec. 111, 301(a), Clean Air Act as amended, (42 U.S.C. 7411, 7601(b)))

Dated: November 10, 1980.

Douglas M. Costle,

Administrator.

It is proposed to amend 40 CFR Part 60, subpart A, as follows:

§ 60.16 Priority list.

* * * * *

45. Asphalt Processing and Roofing Manufacture

* * * * *

(Sec. 111, 301(a), Clean Air Act as amended (42 U.S.C. 7411, 7601(a)))

[FR Doc. 80-35906 Filed 11-17-80; 8:45 am]

BILLING CODE 6560-26-M

40 CFR Part 60

[AD—FRL 1625-8a]

Standards of Performance for New Stationary Sources; Priority List; Amendment

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed Rule; Amendment to Priority List.

SUMMARY: The priority list of major source categories for which EPA is to promulgate NSPS includes the category "Industrial Surface Coating: Large Appliances." Studies of the appliance manufacturing industry have revealed that the operations, processes, and emissions characteristic of the coating of certain comparatively small appliances are similar, and in many cases identical, to those associated with larger appliance surface coating. Because there is therefore no reason to distinguish among the emissions from appliance surface coating operations based solely on the size of the appliance being coated, it is appropriate to treat surface coating of all types of appliances as a single source category for the purpose of establishing standards of performance. The Administrator is therefore proposing to amend the priority list to aggregate all appliance surface coating operations in one source category. The proposed amendment is based on the Administrator's judgment that emissions from one appliance surface coating operations contribute significantly to air pollution which may reasonably be anticipated to endanger public health or welfare.

A public hearing will be held to provide interested persons an opportunity for oral presentation of data, views, or arguments concerning the proposed amendment.

DATES: *Comments.* Comments must be received on or before February 23, 1981.

Public hearing. The public hearing will be held on January 28, 1981 beginning at 9:00 a.m.

Request to speak at hearing. Persons wishing to present oral testimony at the hearing should contact EPA by January 21, 1981.

ADDRESSES: *Comments.* Comments should be submitted (in duplicate if possible) to: Central Docket Section (A-130). Attention: Docket No. A-80-6, U.S. Environmental Protection Agency, 401 M Street, SW., Washington, DC 20460.

Public hearing. The public hearing for the proposed standards of performance for appliance surface coating operations will be held at O.A. Auditorium, R.T.P., North Carolina and comments will be received at this time on the proposed amendment to the priority list. Persons wishing to present oral testimony should notify Mrs. Naomi Purkie, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone (919) 541-5331.

Background Information Document. Background information on the emissions from the appliance surface coating industry may be obtained from the U.S. EPA Library (MD-35), Research Triangle Park, North Carolina 27711, telephone (919) 541-2777. Please refer to *Industrial Surface Coating: Appliances—Background Information for Proposed Standards*, EPA-450/3-80-037a.

Docket. A docket, number A-80-6, containing information used by EPA in development of the standards of performance for the appliance surface coating industry, is available for public inspection between 8:00 a.m. and 4:00 p.m., Monday through Friday, at EPA's Central Docket Section, West Tower Lobby, Gallery 1, Waterside Mall, 401 M Street, SW., Washington, DC 20460. A reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: Mr. Gene W. Smith, Emission Standards and Engineering Division (MD-13), Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone (919) 541-5421.

SUPPLEMENTARY INFORMATION:

Proposal to Amend Priority List

Under Section 111 of the Clean Air Act, EPA is required to develop standards of performance for new stationary sources which the Administrator determines may contribute significantly to air pollution which may reasonably be anticipated to endanger public hearlth or welfare. Section 111(f) of the Act, as amended in 1977, requires that the Administrator promulgate a priority list of categories of major stationary sources for which standards of performance for new sources are to be promulgated.

In developing priorities, Section 111 specifies that the Administrator consider (1) the quantity of emissions from each source category, (2) the extent to which each pollutant endangers public health or welfare, and (3) the mobility and competitive nature of each stationary source category.

The priority list, which identifies major source categories in order of priority for development of regulations, was proposed on August 31, 1978, and promulgated, after revisions, on August 21, 1979 (40 CFR 60.16, 44 FR 49222). Of the 59 source categories on the list, large appliance surface coating operations are listed as number 28.

Each source category should be broad enough in scope to encompass emissions from all similar processes and operations. Studies of the appliance manufacturing industry have revealed that the operations, processes, and emissions associated with surface coating operations for appliances of all sizes are similar enough to warrant treatment as a single source category.

Many appliances not customarily considered to be large household appliances are similar in size and shape to common household appliances such as refrigerators, freezers, washers, dryers, and ranges. The coating application methods—flow coat, dip coat, electrodeposition, and air, airless, and electrostatic spray—are identical. These additional appliance coating operations use coating materials similar to those used in large appliance coating operations. Coating performance specifications are also similar except for slight variations depending upon whether the unit is designed for indoor or outdoor use. Therefore, these operations produce the same types, and proportionately the same quantities, of VOC emissions as large appliance surface coating operations.

As a result, there is no reason to distinguish among appliance surface coating operations based solely on the size of the appliance passing through the coating process. It is therefore more appropriate to treat surface coating of all appliances as a single category.

In promulgating the priority list, coating operations for large appliances were found to contribute significantly to air pollution which may reasonably be anticipated to endanger public health or welfare. Accordingly, the category of surface coating operations for all appliances, which encompasses large appliance surface coating operations, also constitutes a major source category and will be treated as a single category of sources for the purpose of establishing standards of performance.

Proposed standards of performance for appliance surface coating operations appear elsewhere in this issue of the **Federal Register**. This proposed rulemaking is issued under the authority of Sections 111 and 301(a) of the Clean Air Act as amended (42 U.S.C. 7411 and 7601(a)).

Dated: December 18, 1980.

Douglas M. Costle,

Administrator.

It is proposed to amend 40 CFR Part 60, § 60.16, by revising item 28 to read as follows:

§ 60.16 Priority list.

* * * * *

28. Industrial Surface Coating: Appliances.

* * * * *

(Secs. 111, 301(a), Clean Air Act as amended (42 U.S.C. 7411, 7601(a))

[FR Doc. 80-40136 Filed 12-23-80; 8:45 am]

40 CFR Part 60

[AD-FRL 1625-8a]

Standards of Performance for New Stationary Sources; Priority List; Amendment

Correction

In FR Doc. 80-40136, appearing on page 85099, in the issue of Wednesday, December 24, 1980, the twenty-eighth line of the "Summary" should have read: "from appliance surface coating."

ENVIRONMENTAL PROTECTION AGENCY

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STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

ADOPTION AND SUBMITTAL OF STATE PLANS FOR DESIGNATED FACILITIES

SUBPART B

40 CFR Part 60

[FRL 1530-1]

California Plan to Control Fluoride Emissions From Existing Phosphate Fertilizer Plants; Standards of Performance for New Stationary Sources

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice of Proposed Rulemaking

SUMMARY: This notice proposes to approve, with certain exceptions, California's plan for controlling fluoride emissions from existing phosphate fertilizer plants. Portions of California's plan were submitted to EPA by the Governor's designee on February 26, and July 16, 1979, and April 7, 1980 to comply with the requirements of Section 111(d) of the Clean Air Act. Section 111(d) requires States to develop plans to control emissions of designated pollutants from certain existing sources.

EPA invites interested persons to comment on the plan, the identified deficiencies, or the consistency of the plan with respect to the requirements of the Clean Air Act.

DATES: Comments may be submited up to September 2, 1980.

ADDRESSES: Comments may be sent to: Regional Administrator, Environmental Protection Agency, Region IX, Attn: Air & Hazardous Materials Division, Planning Branch, Program Development Section (A-2-1), 215 Fremont Street, San Francisco CA 94105.

Copies of the proposed plan are available for public inspection during normal business hours at the EPA, Region IX, office at the above address, and at the following locations:
California Air Resources Board, 1102 "Q" Street, Sacramento CA 95812.
Public Information Reference Unit, Room 2404 (EPA Library), 401 "M" Street SW., Washington, D.C. 20460.

FOR FURTHER INFORMATION CONTACT: Wayne Blackard, Chief, Program Development Section (A-2-1), Environmental Protection Agency, Region IX, 215 Fremont Street, San Francisco CA 94105, (415) 556-2353.

SUPPLEMENTARY INFORMATION:

Proposed Action

EPA evaluated California's plan, hereafter referred to as the plan, by comparing it with the requirements for State plans for designated facilities, as set forth in Subpart B of 40 CFR Part 60—Adoption and Submittal of State Plans for Designated Facilities, and with the EPA Guideline Document: Control of Fluoride Emissions From Existing Phosphate Fertilizer Plants. EPA is proposing to approve the plan, with exceptions, because it is consistent with most of the requirements of Part 60. The exceptions are summarized below.

The plan does not contain an emission inventory of designated facilities and a list of witnesses who appeared at each public hearing. Although the plan requires sources to maintain records on the nature and amount of emissions, it does not provide for periodically reporting this information to the State; there are also no provisions for making periodic inspections of subject sources. In addition, the plan does not provide for correlating any compliance information obtained by the State with applicable emission standards and making this data available to the public.

EPA is working with the California Air Resources Board to correct these deficiencies. It is anticipated that the deficiencies will be corrected within 6 months.

Background

In accordance with Section 111 of the Clean Air Act (amended August 1977, Public Law No. 95-95), "Standards of Performance For New Stationary Sources," EPA has promulgated standards of performance for certain source categories. These standards include emission limits for criteria (pollutants for which National Ambient Air Quality Standards have been published) and non-criteria pollutants, and apply to "new" sources (i.e., new, modified, or reconstructed sources) which commenced construction after the date on which EPA proposed standards for that particular source category.

Paragraph (d) of Section 111 requires States to develop plans for the control of emissions of the non-criteria, or designated, pollutants from "existing" sources. "Existing" sources are defined as those which are present prior to the date on which EPA proposed new source performance standards for that particular source category. The requirements for such plans are set forth in Subpart B of 40 CFR Part 60 (November 17, 1975; 40 FR 53346).

Subpart B states that EPA will publish a guideline document for each source category for which a State plan is required. Once a guideline document is published, and a notice of its availability announced in the Federal Register, States have nine months to adopt and submit a plan for the control of emissions of the designated pollutant from existing sources. The Guideline Document for the control of fluoride emissions from existing phosphate fertilizer plants was published in March, 1977.

Designated pollutants which may contribute to the endangerment of public health are called "health related pollutants" while those that do not are called "welfare related pollutants." This distinction determines the closeness with which the States must follow the Federal guidelines in developing their plans. States have considerable flexibility to consider factors other than technology and costs in establishing plans for the control of welfare related pollutants. EPA has classified fluoride as a welfare related pollutant.

EPA Proposed Actions

On February 26 and July 16, 1979, and April 7, 1980, the Executive Officer of the California Air Resources Board (ARB) submitted a plan for controlling fluoride emissions from existing phosphate fertilizer plants.

California's plan consists of three local regulations.

Rule No.	Rule title	District	Date submitted
Division 20, regulation 2	Phosphate Fertilizer plants.	Bay Area Air Quality Management District.	Feb. 26, 1979
Rule 424	Fluorides—phosphoric acid plants.	San Joaquin County	Feb. 26, 1979.
Rule 424	Fluorides—phosphoric acid plants.	Fresno County	July 16, 1979.

EPA is proposing to approve the plan, with certain exceptions, because it is consistent with most of the requirements of Part 60. A discussion of how the plan compares to the requirements of 40 CFR Part 60 follows.

Public hearing requirements for State plans submitted in accordance with Section 111(d) are set forth in 40 CFR 60.23. The ARB has certified that 30 day notices were given by the local districts prior to the public hearings. The public hearing requirements of 40 CFR 60.23 have been satisfied, with the exception of paragraph (f)(2). Paragraph (f)(2) requires the State to submit a list of witnesses who appeared at each public hearing and a brief summary of their presentations. The requirements of paragraph (f)(2) have not been fulfilled.

In addition, a letter from the ARB referencing the appropriate portions of the California legal code was submitted on April 7, 1980. These references satisfy the EPA requirement that the State show that it has the legal authority to carry out the plan.

The submitted regulations specify emission standards, test methods, and compliance schedules. EPA has evaluated the California plan by comparing it with the requirements for State plans for designated facilities, as set forth in Subpart B of 40 CFR Part 60—Adoption and Submittal of State Plans for Designated Facilities, and with the EPA Guideline Document: Control of Fluoride Emissions From Existing Phosphate Fertilizer Plants.

California's plan fulfills the legal authority requirements of 40 CFR Part 60. These provisions require that the plan show both the State and local agency's legal authority to carry out the plan. California has shown this by including in the plan, references to the appropriate provisions of the State Health and Safety Code.

The plan contains the required emission standards, but does not completely provide for monitoring the status of compliance. Although the plan requires sources to maintain records on the nature and amount of emissions, it does not provide for periodically reporting this information to the State; there are also no provisions for making periodic inspections of subject sources. These requirements have not been completely fulfilled.

Related to the above requirement, the plan must also contain provisions for correlating compliance data with the applicable emission standards, and making this available to the public. This requirement has not been satisfied.

The plan does not contain an emission inventory of designated facilities, and is therefore deficient with respect to this requirement.

EPA is proposing to disapprove those portions of California's plan that do not complete satisfy EPA requirements.

Other Issues

Fresno County's fluoride standard is less stringent than EPA's recommended standard. Since fluoride has been classified as a welfare related pollutant, adoption of a less stringent standard is permissible, if adequate justification is provided. The State should submit justification for this deviation.

Fresno and San Joaquin County have adopted rules for only one of the six source categories contained in the Guideline Document. For the remaining five categories, the State should either certify that no sources exist, or submit the required regulations for those categories.

Public Comments

Under Subpart B of 40 CFR Part 60, the Administrator is required to approve or disapprove the regulations submitted as a plan to control fluoride emissions from existing phosphate fertilizer plants. The Regional Administrator hereby issues this notice setting forth this plan as a proposed rulemaking and advises the public that interested persons may participate by submitting written comments to the Region IX Office. Comments received on or before September 2, 1980, will be considered. Comments received will be available for public inspection at the EPA Region IX Office and at the locations listed in the Addresses section of this notice.

The Administrator's decision to approve or disapprove the proposed plan will be based on the comments received and on a determination of whether the plan meets the requirements of Section 111(d) of the Clean Air Act and Subpart B of 40 CFR Part 60—Adoption and Submittal of State Plans for Designated Facilities.

EPA has determined that these regulations are "specialized" and therefore not subject to the procedural requirements of Executive Order 12044.

(Sec. 111, 301(a), Clean Air Act, as amended) (42 U.S.C. 7411 and 7601(a))

Dated: June 18, 1980.

Sheila M. Prindiville,

Acting Regional Administrator.

[FR Doc. 80-19851 Filed 7-1-80; 8:45 am]

BILLING CODE 6560-01-M

ENVIRONMENTAL PROTECTION AGENCY

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STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

FOSSIL FUEL-FIRED STEAM GENERATORS

SUBPART D

ENVIRONMENTAL PROTECTION AGENCY

[40 CFR Part 60]

[FRL 1094-6]

Standards of Performance for New Stationary Sources; Fossil-Fuel-Fired Industrial Steam Generators

AGENCY: Environmental Protection Agency (EPA).

ACTION: Advance Notice of Proposed Rulemaking.

SUMMARY: EPA seeks comments on its plan to develop and implement new source performance standards for air pollutants from fossil-fuel-fired industrial (non-utility) steam generators. The Clean Air Act, as amended, August 1977, requires the EPA to develop standards for categories of fossil-fuel-fired stationary sources. The standards will require application of the best systems of emission reduction for particulates, sulfur dioxide, and nitrogen oxides to new industrial steam generators.

DATES: Comments must be received on or before August 27, 1979.

ADDRESS: Comments should be submitted to the Central Docket Section (A-130), United States Environmental Protection Agency, 401 M Street, S.W. Washington, D.C. 20460, ATTN: Docket No. A79-02.

FOR FURTHER INFORMATION CONTACT: Stanley T. Cuffe, Chief, Industrial Studies Branch (MD-13), Emission Standards and Engineering Division, United States Environmental Protection Agency, Research Triangle Park, North Carolina 27711, (919) 541-5295.

SUPPLEMENTARY INFORMATION: In December 1971, pursuant to Section 111 of the Clean Air Act, the Administrator promulgated standards of performance for particulate, sulfur dioxide, and oxides of nitrogen from new or modified fossil fuel fired steam generators with greater than 250 million BTU/hour heat input (40 CFR 60.60). Since that time, the technology for controlling these emissions has been improved. In August 1977, Congress adopted amendments to the Clean Air Act which specified that the Environmental Protection Agency develop standards of performance for categories of fossil-fuel-fired stationary sources. The standards are to establish allowable emission limitations and require the achievement of a percentage reduction in the emissions. EPA is required to consider a broad range of issues in promulgating or revising a standard issued under Section 111 of the Clean Air Act.

Pursuant to the requirements of the Act, EPA developed and proposed on September 19, 1978, a revised standard applicable to fossil-fuel-fired utility boilers with heat input greater than 250 MM BTU/hour.

Development of Industrial Boiler Standard

In June 1978, the Agency initiated a program to develop standards which would apply to all sizes and categories of industrial (non-utility) fossil-fuel-fired steam generators. In this program, the Agency is studying the technological, economic, and other information needed to establish a basis for standards for particulate, sulfur dioxide and oxides of nitrogen emissions from fossil-fuel-fired steam generators. Pertinent information is being gathered on eight technologies for reducing boiler emissions: oil cleaning and existing clean oil, coal cleaning and existing clean coal; synthetic fuels; fluidized bed combustion; particulate control; flue gas desulfurization; NOx combustion modifications; and NOx flue gas treatment. The studies for each technology will discuss the characteristics, emission reduction methods and potential control costs, energy and environmental considerations and emission test data. A status report on the studies was presented to the National Air Pollution Control Techniques Advisory Committee (NAPCTAC), on January 11, 1979. Future presentations to the NAPCTAC will be announced in the **Federal Register**. The final technological and economic documentation necessary to support the standards is scheduled for completion by June 1980. Interested persons are invited to participate in Agency efforts by submitting written data, opinions, or arguments as they may desire. The Agency is specifically interested in information on the following subjects.

a. Should one standard be proposed for all industrial applications or should standards be set for separate industrial categories?

b. Should a single standard be proposed for all sizes of industrial boilers or should several standards be proposed for various boiler size categories?

c. Should emerging technologies such as solvent refined coal, fluidized bed combustion, and synthetic natural gas be exempt from industrial boiler standards, should they have separate standards, or should they be required to meet the same standards as conventional boilers burning natural fuels?

d. Will enforcement of standards at cogeneration facilities present special problems which should be considered?

e. How prevalent is the use of lignite and anthracite coal in industrial boilers?

f. Are there special problems which should be considered when controlling particulate, SO_x, or NO_x emissions from combustion of lignite or anthracite coals?

Dated: June 13, 1979.

Douglas M. Costle,

Administrator.

[FR Doc. 79-20056 Filed 6-27-79; 8:45 am]

BILLING CODE 6560-01-M

ENVIRONMENTAL PROTECTION AGENCY

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STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

INCINERATORS

SUBPART E

40 CFR Part 60

[FRL 1310-2]

Standards of Performance for New Stationary Sources: Incinerators; Review of Standards

AGENCY: Environmental Protection Agency (EPA).

ACTION: Review of standards.

SUMMARY: EPA has reviewed its standard of performance for municipal incinerators (40 CFR 60.50, Subpart E). The review is required under the Clean Air Act, as amended August 1977. The purpose of this notice is to announce EPA's intent to investigate the establishment of a revised standard which would be consistent with the performance capabilities of demonstrated best available control technology and which would include a limitation on the opacity of emissions.

DATES: Comments must be received by January 28, 1980.

ADDRESS: Send comments to: Central Docket Section (A-130), U.S. Environmental Protection Agency, 401 M Street SW., Washington, D.C. 20460, Attention: Docket A-79-18. Comments should be submitted in duplicate if possible.

FOR FURTHER INFORMATION CONTACT: Mr. Robert Ajax, Telephone: (919) 541-5271. The document "A Review of Standards of Performance for New Stationary Sources—Incinerators" (EPA-450/3-79-009) is available upon request from Mr. Robert Ajax (MD-13), Emission Standards and Engineering Division, U.S. Environmental Protection Agency, Research Triangle Park, N.C. 27711.

SUPPLEMENTARY INFORMATION:

Background

New Source Performance Standards (NSPS) for incinerators were promulgated by the Environmental Protection Agency on December 23, 1971 (40 CFR 60.50, Subpart E). These standards regulate the emission of particulate matter to the atmosphere from municipal solid waste incinerators having charging rates greater than 45 Mg (50 tons) per day. These regulations apply to any affected facility which commenced construction or modification after August 17, 1971.

The Clean Air Act Amendments of 1977 require that the Administrator of the EPA review and, if appropriate, revise established standards of performance for new stationary sources at least every 4 years [Section 111(b)(1)(B)]. Following adoption of the Amendments, EPA contracted with the MITRE Corporation to undertake a review of the municipal incinerator industry and the current standard. The MITRE review was completed in March 1979. This notice announces EPA's decision regarding the need for revision of the standard. Comments on the results of this review and on EPA's decision are invited.

Findings

Industry Status: In 1972 there were 193 incinerator plants operating in the U.S. By 1977 this number had decreased to 103 plants which include a total of 252 furnaces and a total solid waste disposal capacity of about 36,000 Mg/day (40,000 tons/day). The estimated national particulate emissions from municipal incineration in 1975 were between 60,000 and 100,000 tons or between 0.4 and 0.6 percent of all particulate emissions in the U.S.

Since 1971 five new incinerator facilities involving a total of eight new furnaces with a combined capacity of 2,700 Mg/day (2,970 tons/day) have become operational. In 1978, 17 cities were identified where new incinerators are planned or under construction. Both existing units and the units which are planned or under construction are concentrated primarily in the Northeast and Midwest.

Coincineration: A factor having an increasingly important impact on the use of incineration as a waste disposal process is the increasing cost of energy and the relatively new concept of resource recovery not only for recycling of material but also for utilization of the energy content of solid waste as a processed fuel source. A recent survey indicates that there are at least 28 resource recovery systems in operation, under construction, or in the final contract stage. Total capacity of these operations will be about 27,000 Mg/day (30,000 tons/day), or about three-fourths of the current installed incinerator capacity. For the most part, these systems are characterized by substantial processing of solid waste into usable recycled material and a homogenous fuel.

The processing of solid waste prior to combustion is a growing trend that has implications in the definition of incineration and the applicability of the standard. Refuse derived fuel (RDF) may be used in an industrial or utility boiler which may or may not be located at the new solid waste processing center. Similarly, RDF may be used to provide fuel for incinerating sewage sludge in a fluidized bed reactor. Such coincineration of municipal solid waste and sewage sludge has been practiced in Europe for several years and on a limited scale in the U.S. Where energy resources are scarce and land disposal is economically or technically unfeasible, the recovery of the heat content of dewatered sludge as an energy source will become more desirable. Due to the institutional commonality of these wastes and advances in the preincineration processing of municipal refuse to a waste fuel, many communities may find joint incineration in energy recovery incinerators an economically attractive alternative to their waste disposal problems.

Coincineration of municipal solid waste and sewage sludge as described above is not explicitly covered in 40 CFR 60. The particulate standard for municipal solid waste described in Subpart E (0.18 grams/dscm or 0.08 grains/dscf at 12 percent CO_2) applies to the incineration of municipal solid waste in furnaces with a capacity of at least 45 Mg/day (50 tons/day). Subpart O, the particulate standard for sewage sludge incineration (0.65 grams/kg dry sludge input or 1.3 lb/ton dry sludge), applies to any incinerator that burns sewage sludge with the exception of small communities practicing coincineration. When coincineration is practiced, determination of the applicability of the two standards is made by EPA's Office of Enforcement according to policies which are described in the information document identified at the beginning of this notice. Such determinations are not straight forward, however, due to the differing form of the two standards and the relative stringency which, in terms of particulate matter concentration or grain loading, differs by a factor of more than two.

Particulate Matter Emissions and Control Technology

Control systems on municipal incinerators have evolved from the use of simple settling chambers which remove large particles, to the use of electrostatic precipitators (ESPs) that remove up to 99 percent of all particulate matter. Many of the incinerators constructed prior to 1971 utilized mechanical cyclone collectors with removal efficiencies in the range of 60 to 80 percent. Various scrubber techniques including the submerged entry of gases, the spray wetted-wall cyclone, and the venturi scrubber were also employed. High efficiency electrostatic precipitators were utilized in a limited number of cases.

Since the adoption in 1971 of the new source performance standard, the control device which has been most widely used and which has been most

effective is the electrostatic precipitator. A limited number of venturi scrubbers and, in one case, a fabric filter have also been employed.

In this review of the standard, a total of 19 emission tests were identified which had been performed on 14 incinerators. The control equipment on these incinerators was designed to comply with the Federal new source performance standard for particulate matter or State or local standards which are as stringent or more stringent than the NSPS. The emission tests in each case were performed with EPA Method 5. A summary of the test results is provided in Table 1.

Table 1.—*Municipal Incinerator Test Results*

State	City/name	(Tons/day)	Control	Test results	
				(Gr/dscf at 12 pct CO_2)	Year
Massachusetts	E. Bridgewater	150	F.F.	0.024	1975
Massachusetts	Saugus	600	ESP	0.049	1976
Tennessee	Nashville	360	ESP	0.018	1976
Virginia	Norfolk (Navy)	280	ESP	0.05	1976
Utah	Ogden-3	150	ESP	0.045	1974
District of Columbia	Washington	200	ESP	0.040/0.06	1973
Illinois	Chicago NW	400	ESP	0.030/0.050	1971/75
Maryland	Baltimore No. 4	300	ESP	0.025	1976
Pennsylvania	EC Philadelphia	300	ESP	0.047	1977
Pennsylvania	NW Philadelphia	300	ESP	0.048	1976
Illinois	Calumet	200	VS (15)	0.046/0.049	1974
Kentucky	Louisville	200	VS (15–18)	0.05/0.06	1976
				0.11	1977
Wisconsin	Sheboygan Falls	30–90	S (7–8)	0.416	1976
Rhode Island	Pawtucket	200	VS (35–40)	0.0775	1978

The results shown in Table 1 indicate that ESP control technology is capable of limiting emissions to the values well below the 0.18 g/dscm (0.08 gr/dscf) level at 12 percent CO_2. Specifically, the results from 11 tests performed at 9 facilities employing electrostatic precipitators showed results ranging from .041 to 0.14 g.dscm (0.018 to 0.06 gr/dscf) at 12 percent CO_2; 10 of the 11 were below 0.114 g/dscm (0.05 gr/dscf). The Baltimore Number 4 incinerator emission control system meets the strict Maryland standard for incinerators of 0.07 g/dscm (0.03 gr/dscf) at 12 percent CO_2. Similarly, the Saugus, Massachusetts, facility was designed for the State standard of 0.11 g/dscm (0.05 gr/dscf) at 12 percent CO_2 and was successfully tested at this level of compliance.

The use of scrubbers on municipal incinerators has met with mixed results and an overall difficulty in complying with the particulate emission standard. Although the data obtained from five tests at three venturi scrubber-controlled sources ranged from 0.015 to 0.166 g/dscm (0.046 to 0.0775 gr/dscf), the scrubber performance results, which are discussed in more detail in the information document, indicate that venturi scrubbers for control of municipal waste particulate emissions may involve considerable risk of nonattainment of the current NSPS. The Pawtucket facility venturi scrubber, for example, operates at pressure drops higher than the original design to barely meet the standard of 0.18 g/dscm (0.08 gr/dscf) at 12 percent CO_2.

The Sheboygan Falls, Wisconsin, incinerator utilizes a spray chamber with baffles. Although reportedly designed to meet a 0.08 gr/dscf standard, this type of control technology would not normally be expected to exhibit the control efficiency necessary to obtain the standard.

Since 1971, only the East Bridgewater, Massachusetts, facility has been tested with a fabric filter control device. In 1975, that facility tested at 0.054 g/dscm (0.024 gr/dscf) at 12 percent CO_2, well below the Massachusetts standard of 0.11 g/dscm (0.05 gr/dscf) at 12 percent CO_2. However, problems of bag and baghouse corrosion and periodic high opacity observations have persisted.

Currently, Framingham, Massachusetts, is the only other municipal incinerator facility with a fabric filter control system. The specially coated bags are designed to prevent deterioration and to achieve 0.07 g/dscm (0.03 gr/dscf) at 12 percent CO_2.

Gaseous and Trace Metal Emissions

Gaseous and trace metal emissions are not specifically controlled under the present NSPS although the incinerator and the particulate matter control equipment do limit such emissions. Among possible gaseous emissions, the potential for high levels of hydrochloric acid (HCL) from the increased incineration of polyvinyl chlorides has received particular attention. Similarly, lead and cadmium have been subject to several studies. Cadmium emissions are reported to represent approximately 0.2 percent of all particulate emissions and about 0.4 percent of emissions less than 2 microns. Lead concentrations are reported to represent about 4 percent of all particulate matter and 11 percent of respirable particulates emitted from the scrubber. Emission factors are 9×10^{-1} kg/Mg (18×10^{-1} lb/ton) refuse for cadmium and 1.9×10^{-1} kg/Mg (3.8×10^{-1} lb/ton) refuse for lead.

In this review of the current NSPS no new findings were identified which indicate the need for a specific, nationally applicable limitation on the gaseous or trace metal emissions. There is, however, currently a program underway within EPA to independently look at the need to regulate cadmium from incinerators and other sources. Separate documents have been prepared which examine emissions, resulting atmospheric concentrations, and population exposure. These documents are part of an overall EPA program to satisfy requirements of the 1977 Clean Air Act to evaluate the need to regulate emissions of cadmium to the air.

Opacity

The current NSPS does not contain a standard for opacity because testing of a limited number of incinerators prior to promulgation of the standard in 1971 did not indicate a consistent relationship between emission opacity and particulate mass concentrations. However, a survey of current State regulations shows that every State has an opacity standard for new incinerators of 20 percent or stricter except Illinois (30 percent), Indiana (40 percent), and Delaware (no standard). Maryland has a "no visible emissions" standard and the District of Columbia has a new source ban on the incineration of municipal waste. However, data were not found in this review of the NSPS to determine whether sources are consistently in compliance with these limits.

Conclusions

Based upon a review of the current NSPS and other available information as summarized above, EPA concludes that there is a need to undertake a program to revise the standard. This program, which is expected to begin in FY 1980, will be directed toward:

(1) Investigation of a more restrictive particulate matter limitation consistent with the capabilities of the best available technology. This is based upon the available data which indicate that the capability of electrostatic precipitators applied to incinerators has improved measurably since the standard was developed in 1971. This investigation will include analysis of the costs associated with a more restrictive standard.

(2) Establishment of an opacity standard. Such a standard is considered important by EPA as a means for assessing proper operation and maintenance of particulate matter control equipment and is included in most of the Agency's particulate matter NSPS. Although a relationship between particulate mass and opacity was not established when the standard was adopted in 1971, the additional number of well controlled plants which are now in operation and the widespread existence of State opacity limits are expected to provide a basis for estalishment of an opacity standard. Consistent with EPA policy, such a standard would not be more restrictive than the particulate mass standard.

(3) Establishment of a consistent basis for the limitation of particulate emissions from differing combustion devices independent of the fuel or waste material being fired. While a single standard is probably not possible, there is a need to investigate the possibility of expressing standards for sludge incinerators, and municipal incinerators on a common basis, and of making the standards more uniform. To do so, EPA plans to closely coordinate the development of the industrial and waste-fired boiler standards which are now underway, and the planned revision of the sewage sludge incinerator standard and the municipal incinerator standard.

(4) In addition, if the need to reduce cadmium emissions is indicated as a result of the EPA program noted above, appropriate action will be taken to limit cadmium emissions.

Public Participation

All interested persons are invited to comment on this review, the conclusions and EPA's planned action.

Dated: November 16, 1979.

Barbara Blum,

Acting Administrator.

[FR Doc 79-36474 Filed 11-26-79; 8:45 am]

ENVIRONMENTAL PROTECTION AGENCY

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STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

PORTLAND CEMENT PLANTS

SUBPART F

40 CFR Part 60

Standards of Performance for New Stationary Sources: Portland Cement Plants; Review of Standards

AGENCY: Environmental Protection Agency (EPA).

ACTION: Review of Standards.

SUMMARY: EPA has reviewed the standards of performance for portland cement plants (40 CFR 60.60). The review is required under the Clean Air Act, as amended August 1977. The purpose of this notice is to announce that, based on an assessment of the industry, applicable control technology, and results of performance tests conducted pursuant to the standard, EPA has determined that no revision to the particulate emission limitation is needed but that the standard should be revised to require continuous opacity monitoring.

DATES: Comments must be received by December 21, 1979.

ADDRESS: Comments should be submitted to the Central Docket Section (A-130), U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, D.C. 20460, Attention: Docket No. A-79-19.

The document, "A Review of Standards of Performance for New Stationary Sources—Portland Cement Industry" (EPA-450/3-79-012), is available upon request from Mr. Robert Ajax (MD-13), Emission Standards and Engineering Division, Environmental Protection Agency, Research Triangle Park, North Carolina 27711.

FOR FURTHER INFORMATION CONTACT: Mr. Robert Ajax, telephone: (919) 541-5271.

SUPPLEMENTARY INFORMATION:

Background

On August 17, 1971, the Environmental Protection Agency proposed a standard under Section 111 of the Clean Air Act to control particulate matter emissions from portland cement plants. The standard, promulgated on December 23, 1971, applies to any facility constructed or modified after August 17, 1971, which manufactures portland cement by either the wet or dry process. Specific affected facilities are the: kiln, clinker cooler, raw mill system, finish mill system, raw mill dryer, raw material storage, clinker storage, finished product storage, conveyor transfer points, bagging, and bulk loading and unloading and unloading systems.

The standard prohibits the discharge into the atmosphere from any kiln any gases which:

1. Contain particulate matter in excess of 0.15 kg/Mg (0.30 lb/ton) feed to the kiln, or
2. Exhibit greater than 20 percent opacity.

The standard prohibits the discharge into the atmosphere from any clinker cooler any gases which:

1. Contain particulate matter in excess of 0.050 kg/Mg (0.10 li/ton) feed (dry basis) to the kiln, or
2. Exhibit 10 percent opacity or greater.

The standard prohibits the discharge into the atmosphere from any affected facility other than the kiln and clinker cooler any gases which exhibit 10 percent opacity, or greater.

The Clean Air Act Amendments of 1977 require that the Administrator of the EPA review and, if appropriate, revise established standards of performance for new stationary sources at least every 4 years [Section 111(b)(1)(B)]. This notice announces that EPA has undertaken a review of the standard of performance for portland cement plants. As a result of this review, EPA has concluded that the present particulate emission limit is appropriate, and does not need revision. However, a provision to require opacity monitoring should be added. In addition, EPA is, however, planning to undertake a program, in its Office of Research and Development, to investigate and demonstrate methods such as combustion modifications which could reduce NO_x emissions from combustion used in process sources such as cement plants. Positive results from this program would form the basis for a possible revision to the standard in 1982 or 1983. Comments on these findings and plans are invited.

Findings

Industry Status

Capacity. There are currently 53 cement companies producing portland cement in the U.S. The 53 companies operate 158 cement plants throughout the U.S. with single plant capacity ranging from 50,000 Mg to 2,161,000 Mg per year. The industry also includes 8 plants with only clinker grinding facilities which use either an imported or domestic clinker as feed material. Cement plants are found in nearly every State because of the high cost of transportation. The actual clinker capacity of these plants is also distributed throughout the U.S., although some regions have little capacity due to a lack of demand; and although many areas of the Country are presently experiencing cement shortages and delays, announced capacity increases in these areas are still small.

Energy Considerations. The portland cement industry is very energy intensive with energy costs accounting for approximately 40 percent of the cost of cement. Accordingly, significant emphasis in the industry is on increasing energy efficiency. For this reason, almost all new and planned construction will use the dry process which can be twice as energy efficient as the wet process. Additional savings can be realized by using preheaters, especially suspension preheaters.

These process changes have both positive and negative effects on particulate emissions. The replacement of wet process units with dry process units increases potential emissions, particularly in the grinding, mixing, blending, storage, and feeding of raw materials to the kiln. The suspension preheater, on the other hand, tends to decrease particulate emissions due to its multicyclone construction. It also ensures more thorough contact of the kiln exhaust gases with the feed material which may increase sorption of sulfur oxide from the exhaust on the feed.

Economic Considerations. Almost all cement produced is utilized by the construction industry. As a result, the production of cement follows the cyclical pattern of the construction industry. Relatively high cement production has occurred during periods of growth in new home and other construction markets, and production has decreased in such periods of recession as occurred in 1973-1975.

In contrast, over the short term, production capacity has not closely paralleled actual production. This is due apparently to the lead time required to add capacity, to the difficulty in accurately predicting future demand, and to economic and other factors including the effect of pollution control requirements on the closure of old, marginal plants.

An examination of production and capacity over the past 10 years suggests the difficulty which the industry has experienced in attempting to meet demand while avoiding excess capacity. In the early 1970's, utilization of production capacity was greater than 90 percent. However, wage and price controls were in effect from 1971 to 1973 during which time the industry experienced its lowest profit margin since the 1930's. New plant construction was postponed while some older plants were being closed. As a result, regional cement shortages occurred in 1972-1973. When price controls were removed in

1973, the price of cement jumped 14 percent and some new capacity construction was begun. Shortly thereafter, the Country entered a recession and cement production fell to 70 percent of capacity.

The cyclic occurrence of high demand exceeding capacity has been evidenced again in the past several years. The rapid growth in the construction industry since 1975 has increased the demand for cement and parts of the U.S. have been shortages, particularly in the West. At the same time, the industry has not rapidly added new capacity, although the Bureau of Mines projects high demand in the early 1980's.

In considering whether pollution control costs influenced the recent lag in capacity, the Council on Wage and Price Stability concluded that:

> ... the added pollution control costs do change the way a firm would consider a new investment decision by making larger price increases necessary for the expenditures to be committed. this does not mean that the imposition of these controls has necessarily cause any reduction in new capacity expenditures in the cement industry. However, this analysis does leave open the possibility that an investment decision could be changed for a marginal plant because of pollution control costs (particularly a plant selling cement for $40 per ton and using a 12 percent rate of return). (*Prices and Capacity Expansion in the Cement Industry*, Council on Wage and Price Stability, Washington, D.C., 1977.)

Since cement is already selling for as high as $53 per ton on the West Coast, it is very likely that capital investment will not be stifled by pollution control expenditures.

Emission Control Status

Fifty-one cement kilns and clinker coolers have been identified which are operating and are subject to the new source performance standard. Of these, 49 are in compliance with 0.15 kg/Mg kiln feed (kiln) and 0.05 kg/Mg kiln feed, (cooler) emission limits. One completed kiln has only recently been tested and data are not available; and one facility has notified its State authority that it cannot meet the standards. Also, five cement kilns potentially subject to the standard were identified for which data were not available. The number of sources with other NSPS-affected facilities was not determined, although there are none reported that are not in compliance with the applicable 10 percent opacity standard.

For the 29 kilns and 20 clinker coolers which were in compliance, the kiln test results averaged 0.073 kg/Mg and ranged from a high of 0.142kg/Mg feed to a low of 0.013kg/Mg feed. The range for kilns with emissions controlled by ESP is 0.142 to 0.020 kg/Mg, and for kilns with fabric filter baghouses the range is 0.132 to 0.013 kg/Mg dry kiln feed. The data indicate that neither the ESP nor the baghouse is significantly better at controlling cement kiln particulate matter emissions.

Cement plant clinker coolers have been tested at emission levels ranging from a high of 0.031 kg/Mg to a low of 0.005 kg/Mg dry kiln feed with a mean of 0.024 kg/Mg. Compliance test data on a single wet scrubber show emissions near the mean emission level for fabric filter baghouse controls (0.022 kg/Mg). Data for affected facilities using gravel bed filters indicate a mean emission level of 0.034 kg/Mg dry feed (0.023–0.045kg/Mg).

The compliance test data were analyzed to determine if the type of control technology, the process type (i.e., wet or dry), or interaction of process type and control technology affected the ability to control the emission of particulate matter from portland cement kilns or clinker coolers. This analysis indicates that no control technology in use today is more effective for controlling particulate matter emissions. Although comparison of mean values indicates that the possibility that emissions from dry process kilns are controlled slightly more effectively than wet process kilns, the difference is not statistically significant.

Nitrogen Oxide Emissions

Cement kilns are a very large and presently unregulated source of nitrogen oxides (NO_x) emissions. Based upon estimated NO_x emissions of 1.3 kg/Mg of cement produced and 71.4 million Mg of portland cement produced in 1977, an estimated 93,000 Mg of NO_x were emitted by portland cement plants that year. The main factors that result in the production of NO_x are the flame and kiln temperature, the residence time that combustion gases remain at this temperature, the rate of cooling of these gases, and the quantity of excess air in the flame. Control of these factors may permit the operator to sharply reduce the emission of NO_x, but such practices have not been demonstrated in cement plants for NO_x emissions.

Opacity Monitoring

When the NSPS for portland cement plants was established in 1971 no provisions were included to require continuous monitoring of opacity. This was, in part, because the presence of water vapor in the exhaust gases from wet-process facilities would affect monitor accuracy. In addition, monitoring systems had not been demonstrated at baghouse controlled facilities where stack gases are emitted from roof monitors or multiple stub stacks. However, since the standard was adopted, a monitoring system has been demonstrated at a steel plant utilizing baghouse controls and stub stacks.

Conclusions

On the basis of the findings which are summarized above, EPA has concluded that the current particulate matter standards are appropriate and effective and that no revision is needed. While the compliance test data do show that the mean results are well below the standards, the range of data suggest that the standard is set at a level which reflects the performance of the best systems of emission reduction.

However, it is concluded that the standard should be revised to include provisions requiring the continuous monitoring of opacity. This conclusion is based upon the demonstration of opacity monitors on baghouse stub stacks and on the shift in the portland cement industry toward the dry process, as well as EPA's belief that continuous monitoring represents an important and effective means for assuring proper operation and maintenance of particulate matter control equipment. Adoption of any opacity monitoring requirement will be preceded by a proposal and the opportunity for public comment. The Agency expects to undertake development and to propose this revision during 1980.

It is also concluded that the lack of demonstrated control technology and an emission limitation for NO_x is an important deficiency. The Agency is therefore planning to evaluate, develop, and demonstrate means for limiting NO_x emissions. This program, which will include other industrial process fuel users, will be aimed at transferring technology being employed to control NO_x emissions from steam generators. If this proves successful, the results will be used as a basis for development of NO_x standards.

Public Participation

All interested persons are invited to comment on this review, the conclusions, and EPA's planned action.

Dated: October 16, 1979.

Douglas M. Costle,

Administrator.

[FR Doc. 79-32566 Filed 10-19-79; 8:45 am]

ENVIRONMENTAL PROTECTION AGENCY

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STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

NITRIC ACID PLANTS

SUBPART G

[40 CFR Part 60]

[FRL 1095-1]

Review of Standards of Performance for New Stationary Sources: Nitric Acid Plants

AGENCY: Environmental Protection Agency (EPA).

ACTION: Review of standards.

SUMMARY: EPA has reviewed the standard of performance for nitric acid plants. The review is required under the Clean Air Act, as amended August 1977. The purpose of this notice is to announce EPA's intent not to undertake revision of the standards at this time.

DATES: Comments must be received on or before August 20, 1979.

ADDRESSES: Send comments to the Central Docket Section (A-130), U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, D.C. 20460, Attention: Docket No. A-79-08. The document "A Review of Standards of Performance for New Stationary Sources—Nitric Acid Plants" (EPA report number EPA-450/3-79-013) is available upon request from Mr. Robert Ajax (MD-13), Emission Standards and Engineering Division, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711.

FOR FURTHER INFORMATION CONTACT: Mr. Robert Ajax, (919) 541-5271.

SUPPLEMENTARY INFORMATION:

Background

Prior to the promulgation of the NSPS in 1971, only 10 of the existing 194 weak nitric acid (50 to 60 percent acid) production facilities were specifically designed to accomplish NO_x abatement.

Without control equipment, total NO_x emissions are approximately 3,000 ppm in the stack gas, equivalent to a release of 21.5 kg/Mg (43 lb/ton) of 100 percent acid produced.

At the time of the NO_x New Source Performance Standard (NSPS) promulgation there were no State or local NO_x emission abatement regulations in effect in the U.S. which applied specifically to nitric acid production plants. Ventura County, California, had enacted a limitation of 250 ppm NO_x to govern nitric acid plants as well as steam generators and other sources.

In August of 1971, the EPA proposed a regulation under Section 111 of the Clean Air Act to control nitrogen oxides emissions from nitric acid plants. The regulation, promulgated in December 1971, requires that no owner or operator of any nitric acid production unit (or "train") producing "weak nitric acid" shall discharge to the atmosphere from any affected facility any gases which contain nitrogen oxides, expressed as NO_2, in excess of 1.5 kg per metric ton of acid produced (3.0 lb per ton), the production being expressed as 100 percent nitric acid; and any gases which exhibit 10 percent opacity or greater.

The Clean Air Act Amendments of 1977 require that the Administrator of the EPA review and, if appropriate, revise established standards of performance for new stationary sources at least every 4 years [Section 111(b)(1)(B)]. This notice announces that EPA has completed a review of the standard of performance for nitric acid plants and invites comment on the results of this review.

Findings

Industry Growth Rate

The average rate of production increase for nitric acid fell from 9 percent/year in the 1960–1970 period to 0.7 percent from 1971 to 1977. The decline in demand for nitric acid parallels that for nitrogen-based fertilizers during the same period.

Nitric acid production shows an increasing trend toward plant/unit location and growth in the southern tier of States. In 1971, 48 percent of the nationa[illegible]s in the south. This figu[illegible]4 percent in 1976.

About 50 percent of plant capacity in 1972 consisted of small to moderately sized units (50 to 300-ton/day capacity). Because of the economies of scale some producers are electing to replace their existing units with new, larger units. New nitric acid production units have been built as large as 910 Mg/day (1000 tons/day). The average size of new units is approximately 430 Mg/day (500 tons/day).

Control Technology

A mixture of nitrogen oxides (NO_x) is present in the tail gas from the ammonia oxidation process for the production of nitric acid. In modern U.S. single pressure process plants producing 50 to 60 percent acid, uncontrolled NO_x emissions are generated at the rate of about 21 kg/Mg of 100 percent acid (42 lb/ton) corresponding to approximately 3000 ppm NO_x (by volume) in the exit gas stream. The catalytic reduction process which was considered the best demonstrated control technology at the time the present standard was established has been largely supplanted by the extended absorption process as the preferred control technology for NO_x emissions from new nitric acid plants. The latter control system appears to have become the technology of choice for the nitric acid industry due to the increasing cost and danger of shortages of natural gas used in the catalytic reduction process. Since the energy crisis of the mid-1970's, over 50 percent of the nitric acid plants that had come on stream through mid-1978 and almost 90 percent of the plants scheduled to come on stream through 1979 use the extended absorption process for NO_x control.

Levels Achievable with Demonstrated Control Technology

All 14 of the new or modified operational nitric acid production units subject to NSPS and tested showed compliance with the current standard of 1.50 kg/Mg (3 lb/ton). The average of seven sets of test data from catalytic reduction-controlled plants is 0.22 kg/Mg (0.44 lb/ton), and the average of six sets of test data from extended absorption-controlled plants is 0.91 kg/Mg (1.82 lb/ton). All of the plants tested were in compliance with the opacity standard. It appears that the extended absorption process, while it has become the preferred control technology for NO_x control, cannot control these emissions as efficiently as the catalytic reduction process. In fact, over half of the test results for extended absorption were within 20 percent of the NO_x standard. The extended absorption process thus appears to have limitations with respect to NO_x control, and compares unfavorably with catalytic reduction in its ability to reduce NO_x emissions much below the present NSPS level.

Economic Considerations Affecting the NO_x NSPS

The annualized costs of the extended absorption process and the catalytic reduction NO_x control methods appear to be quite comparable. Capital cost for the extended absorption process is appreciably higher than that for catalytic reduction. However, this is offset by the higher operating cost of the latter system which requires increasingly costly natural gas.

Conclusions

Based on the above findings, EPA concludes that the existing standard of performance is appropriate at this time. While lower emission levels are attainable, the energy penalty and shortages of natural gas are concluded to be a basis for retaining the current standard of performance under Section 111 of the Clean Air Act. However, the recent deregulation will alter the price and availablity of natural gas, and provides a basis for optimism about its future availability for process and pollution control purposes. The Agency, therefore, plans to continue to assess the standard as the effect of deregulation materializes. Moreover, it should be noted that for the purpose of attaining and maintaining national ambient air quality standards and prevention of significant deterioration requirements. State Implementation Plan new source reviews may in come cases require greater emission reductions than those required by the standards of performance for new sources.

Public participation

All interested persons are invited to comment on this review, the conclusions, and EPA's planned action. Comments should be submitted to: Mr. Don Goodwin (MD–13), Emission Standards and Engineering Division, U.S. Environmenal Protection Agency, Research Triangle Park, North Carolina 27711.

Dated: June 11, 1979.

Douglas M. Costle,

Administrator.

[FR Doc. 79-19002 Filed 6-18-79; 8:45 am]

BILLING CODE 6560-01-M

ENVIRONMENTAL PROTECTION AGENCY

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STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

SULFURIC ACID PLANTS

SUBPART H

NEW STATIONARY SOURCES: SULFURIC ACID PLANTS

Review of Performance Standards

AGENCY: Environmental Protection Agency (EPA).

ACTION: Review of Standards.

SUMMARY: EPA has reviewed the standards of performance for sulfuric acid plants (40 CFR 60.80). The review is required under the Clean Air Act, as amended August 1977. The purpose of this notice is to announce EPA's decision to not revise the standards at this time and to solicit comments on this decision.

DATES: Comments must be received by May 14, 1979.

ADDRESS: Send comments to: Mr. Don Goodwin (MD-13), Emission Standards and Engineering Division, Environmental Protection Agency, Research Triangle Park, North Carolina 27711.

FOR FURTHER INFORMATION CONTACT:

Mr. Robert Ajax, telephone: (919) 541-5271. The document "A Review of Standards of Performance for New Stationary Sources—Sulfuric Acid Plants" (EPA report number EPA-450/3-79-003) is available upon request from Mr. Robert Ajax (MD-13), Emission Standards and Engineering Division, Environmental Protection Agency, Research Triangle Park, North Carolina 27711.

SUPPLEMENTARY INFORMATION:

Background

Prior to the proposal of the standard of performance in 1971, almost all existing contact process sulfuric acid plants were of the single-absorption design and had no SO_2 emission controls. Emissions from these plants ranged from 1500 to 6000 ppm SO_2 by volume, or from 10.8 kg of SO_2/Mg of 100 percent acid produced (21.5 lb/ton) to 42.5 kg of SO_2/Mg of 100 percent acid produced (85 lb/ton). Several State and local agencies limited SO_2 emissions to 500 ppm from new sulfuric acid plants, but few such facilities had been put into operation (EPA, 1971).

In August of 1971, the Environmental Protection Agency (EPA) proposed a regulation under Section 111 of the Clean Air Act to control SO_2 and sulfuric acid mist emissions from sulfuric acid plants. The regulation, promulgated in December 1971, requires that no owner or operator of any new sulfuric acid production unit producing sulfuric acid by the contact process by burning elemental sulfur, alkylation acid, hydrogen sulfide, organic sulfides, mercaptans, or acid sludge shall discharge into the atmosphere any gases which contain sulfur dioxide in excess of 2 kg/Mg (4 lb/ton); any gases which contain acid mist, expressed as H_2SO_4, in excess of 0.075 kg/Mg of acid produced (0.15 lb/ton), expressed as 100 percent H_2SO_4; or any gases which exhibit 10 percent opacity or greater. Facilities which produce sulfuric acid as a means of controlling SO_2 emissions are not included under this regulation.

The Clean Air Act Amendments of 1977 require that the Administrator of the EPA review and, if appropriate, revise established standards of performance for new stationary sources at least every 4 years [Section 111(b)(1)(B)]. This notice announces that EPA has completed a review of the standard of performance for sulfuric acid plants and invites comment on the results of this review.

Findings

Industry Growth

Since the proposal, 32 contact process sulfuric acid units have been constructed. Of these, at least 24 units result from growth in the phosphate fertilizer industry and are dedicated to the acidulation of phosphate rock, mainly in the Southern U.S.

In 1976, over 70 percent of the total national production of new sulfuric acid was in the South. It is projected that three of the four units predicted to be coming on line each year will most probably be located in the South.

Best Demonstrated Control Technology

Sulfur dioxide and acid mist are present in the tail gas from the contact process sulfuric acid production unit. In modern four-stage converter contact process plants burning sulfur with approximately 8 percent SO_2 in the converter feed, and producing 98 percent acid, SO_2 and acid mist emissions are generated at the rate of 13 to 28 kg/Mg of 100 percent acid (26 to 56 lb/ton) and 0.2 to 2 kg/Mg of 100 percent acid (0.4 to 4 lb/ton), respectively. The dual absorption process is the best demonstrated control technology for SO_2 emissions from sulfuric acid plants, while the high efficiency acid mist eliminator is the best demonstrated control technology for acid mist emissions. These two emission control systems have become the systems of choice for sulfuric acid plants built or modified since the promulgation of the NSPS. Twenty-eight of the 32 sulfuric acid production plants subject to the standard incorporate the dual absorption process; all 32 plants use the high efficiency acid mist eliminator.

Compliance Test Results

All 32 sulfuric acid production units subject to the standard showed compliance with the current SO_2 standard of 2 kg/Mg (4 lb/ton). The 29 compliance test results for dual absorption plants ranged from a low of 0.16 kg/Mg (0.32 lb/ton) to a high of 1.9 kg/Mg (3.7 lb/ton) with an average of 0.9 kg/Mg (1.8 lb/ton). Information received on the performance of several sulfuric acid plants indicates that low SO_2 emission results achieved in NSPS compliance tests apparently do not reflect day-to-day SO_2 emission levels. These levels appear to rise toward the standard as the conversion catalyst ages and its activity drops. Additionally, there may be some question about the validity of low SO_2 NSPS values, i.e., less than 1 kg/Mg (2 lb/ton), due to errors in the application of the original EPA Method 8. This method was revised on August 18, 1977, to include more detailed procedures to prevent such errors.

All 32 affected sulfuric acid production units also showed compliance with the current acid mist standard of 0.075 kg/Mg of 100 percent acid (0.15 lb/ton). The compliance test data are all from plants with acid mist emission control provided by the high efficien-

cy acid mist eliminator. The data showed a range with a low of 0.008 kg/Mg (0.016 lb/ton) to a high of 0.071 kg/Mg (0.141 lb/ton), and an overall average value of 0.04 kg/Mg (0.081 lb/ton). Acid mist emission (and related opacity) levels are unaffected by factors affecting SO_2 emissions, i.e., conversion efficiency and catalyst aging. Rather, acid mist emissions are primarily a function of moisture levels in the sulfur feedstock and air fed to the sulfur burner, and the efficiency of the final absorber operation. The order-of-magnitude spread observed in compliance test values is probably a result of variation in these factors. Additionally, the potential for imprecision in the application of the original EPA Method 8 may have contributed to this spread.

POSSIBLE REVISION TO STANDARD

The compliance test data indicate that the available control technology could possibly meet both lower sulfur dioxide and sulfuric acid mist emission standards. However, the available test data indicate that variability in indicated emission rates occurs—possibly as a result of process variables, and test method precision. Therefore, to meet a tighter standard designers and operators would need to design for attainment of a lower average emission rate in order to retain a margin of safety needed to accommodate emission variability. The available compliance data do not provide a basis for concluding that this is possible.

In contrast, the effect of catalyst aging is controllable by more frequent replacement. As an outside limit, complete replacement of catalyst in the first 3 beds of a four-bed converter 3 times as frequently as is normally practiced could potentially maintain emissions in the range of 1 to 1.5 kg/Mg and would result in a net emission reduction of approximately 0.3 kg/Mg (0.6 lb/ton).

Based on an estimated sulfuric acid plant growth rate of four new production lines per year between 1981 and 1984, a 50 percent reduction of the present SO_2 NSPS level—from 2 kg/Mg (4 lb/ton) to 1 kg/Mg (2 lb/ton)—would result in a drop in the estimated SO_2 contribution to these new sulfuric acid plants to the total national SO_2 emissions, from 0.04 percent to 0.02 percent (8,000 tons to 4,000 tons).

CONCLUSIONS

Based upon the above findings, EPA concludes that the current best demonstrated control technology, the duel absorption process and the acid mist eliminator are identical in basic design to that used as the rationale for the original SO_2 standard. Therefore, from the standpoint of control technology, and considering costs, and the small quantity of emissions in question, it does not appear necessary or appropriate to revise the present standard of performance adopted under Section 111 of the Clean Air Act. It should be noted that for the purpose of attaining national ambient air quality standards and prevention of significant deterioration, State Implementation Plan new source reviews may in some cases require greater emission reductions than those required by standards of performance for new sources.

PUBLIC PARTICIPATION

All interested persons are invited to comment on this review, the conclusions, and EPA's planned action. Comments should be submitted to: Mr. Don Goodwin (MD-13), Emission Standards and Engineering Division, Environmental Protection Agency, Research Triangle Park, N.C. 27711.

(Section 111(6)(1)(B) of the Clean Air Act, as amended (42 U.S.C. 7411(6)(1)(B)).

Dated: March 9, 1979.

DOUGLAS M. COSTLE,
Administrator.

[FR Doc. 79-7926 Filed 3-14-79; 8:45 am]

ENVIRONMENTAL PROTECTION AGENCY

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STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

PETROLEUM REFINERY

SUBPART J

40 CFR Part 60

[FRL 1295-1]

Standards of Performance for New Stationary Sources: Petroleum Refineries Review of Standards

AGENCY: Environmental Protection Agency (EPA).

ACTION: Review of Standards.

SUMMARY: EPA has reviewed its standard of performance for petroleum refineries (40 CFR 60.100, Subpart J). The review is required under the Clean Air Act, as amended August 1977. The purpose of this notice is to announce EPA's intent to undertake the development of a revised standard which would limit SO_2 emissions from catalyst regenerators.

DATE: Comments must be received by December 21, 1979.

ADDRESS: Send comments to: Central Docket Section (A-130), U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, D.C. 20460, Attention: Docket A-79-09.

The document "A Review of Standards of Performance for New Stationary Sources—Petroleum Refineries" (EPA-450/3-79-008) is available upon request from Mr. Robert Ajax (MD-13), Emission Standards and Engineering Division, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711.

FOR FURTHER INFORMATION CONTACT: Mr. Robert Ajax, Telephone: (919) 541-5271.

SUPPLEMENTARY INFORMATION:

Background

New Source Performance Standards (NSPS) for petroleum refineries were promulgated by the Environmental Protection Agency on March 8, 1974. (40 CFR 60.100, Subpart J). These standards regulate the emission of particulate matter and carbon monoxide, and the opacity of flue gases from fluid catalytic cracking unit (FCCU) catalyst regenerators and FCCU regenerator incinerator-waste heat boilers. They also regulate the emission of sulfur dioxide from fuel gas combustion devices. These regulations apply to any affected facility which commenced construction or modification after June 11, 1973.

The Clean Air Act Amendments of 1977 require that the Administrator of the EPA review and, if appropriate, revise established standards of performance for new stationary sources at least every 4 years [Section 111(b)(1)(B)]. This notice announces that EPA has completed a review of the standard of performance for petroleum refineries and invites comment on the results of this review.

Findings

On the basis of a review of compliance data available in EPA's Regional Offices and a review of literature describing recent control technology applicable to catalyst regenerators and fuel gas combustion devices, EPA has made the following conclusions regarding the need to revise the existing standard.

Particulate Matter

The available data indicate that the current limitation on particulate matter emissions accurately reflects the performance capability of best available control systems. It is, therefore, concluded that no revision should be made to the particulate standard. New technologies such as high efficiency separators, high temperature regenerators, and new catalysts have reduced the total quantity of uncontrolled particulate matter emitted. However, the method established in the standard for calculating the allowable emissions effectively corrects for the reduction due to changes in catalysts and operating procedures.

While it is concluded that the particulate matter standard should not be revised, a question has been raised as to the validity of Reference Method 5 when high concentrations of condensible sulfur compounds are present. This test method, which is used to measure compliance with the particulate standard, operates at a nominal temperature of 120°C and, as such, is capable of collecting condensible matter which exists in gaseous form at stack temperature. If significant quantities of such condensible material exist which are not controllable by the best systems of emission reduction, then a facility employing such systems could be found to be in non-compliance with the standard. An analysis of data available when the standard was established indicated this was not a problem at that time. However, with high sulfur content feed, there is evidence that condensible sulfur oxides may exist at concentrations sufficient to affect compliance.

EPA is currently studying this question. Depending on the results of this study, EPA may revise the standard or the test method.

Carbon Monoxide

The present standard for carbon monoxide emissions was established at a level which would permit regenerator in situ combustion. This method of controlling carbon monoxide emissions offers production and energy efficiencies but is recognized to be less effective than a carbon monoxide boiler. No new data were obtained during this review to alter the original finding that it is not practical to control CO emissions to less than 500 ppm by in situ regeneration and, therefore, no revision in the standard is planned at this time. However, it should be noted that the recent advent and increased use of CO oxidation catalysts and additives may provide data showing that concentrations lower than 500 ppm are achievable. If such data become available, the Agency will consider revision of the standard. It should be further noted that for the purpose of attaining and maintaining the national ambient air quality standards, State Implementation Plan new source reviews may, in some cases, require greater CO emission reductions than those required by the standards of performance for new sources.

At the time the standard was established, EPA concluded that CO emissions should be continuously monitored. A requirement for such monitoring was, therefore, included in the standard. This requirement is applicable to all catalyst regenerators subject to the standard. However, the effective date of the monitoring requirement was deferred until EPA develops performance specifications for CO monitoring systems. EPA has found no basis for revising this monitoring requirement and performance specifications are currently under development and evaluation. It is planned to issue an advanced notice of proposed rulemaking in 1979 setting forth the specifications which have been developed and which will be assessed in field studies.

Sulfur Dioxide

The present standard currently limits SO_2 emissions resulting from the combustion of fuel gas. The catalyst regenerator is also a significant source of SO_2 emissions but is not subject to the standard. The review considered both the need to revise the current limitation and the need to include limitations on SO_2 emissions from the catalyst regenerator..

Available compliance test data indicate that the current standard limiting sulfur to 230 mg H_2S/dscm from combustion of fuel gas is being met and, in some cases, exceeded by a wide margin. Six tests showed an average of 107 mg H_2S/dscm and a range of 7 to 229 mg H_2S/dscm. While these data indicate that a reduction in the present limitation

is possible, the range exhibited is consistent with the control device performance documented at the time the standard was established. On the basis of this, along with the increased sulfur content of feedstock expected with increased imports and the variable crude oil supply conditions now existing, it is concluded that the fuel gas sulfur limitation is appropriate and that no revision is needed.

A deficiency in the current standard limiting sulfur in fuel gas relates to the lack of a continuous monitoring method. EPA recognized the need for continuous monitoring at the time the standard was adopted. However, at that time, no monitoring systems had been demonstrated to be adequate for this purpose and EPA had not established performance specifications for such systems. Consequently, application of the monitoring requirement was deferred until performance specifications could be adopted. Since the adoption of the standard, EPA has pursued a program to develop and assess the performance of an H_2S monitoring system. On this basis, performance specifications are now being developed. It is planned to issue an advanced notice of proposed rulemaking in 1979 setting forth the specifications which have been developed and which will be assessed in field studies.

During the review of the standard, an ambiguity was identifed in the current limitation on sulfur in fuel gas concerning the applicability of this limitation to fuel gas burned in waste-heat boilers. To clarify this, an amendment was prepared which was published in the **Federal Register** on March 12, 1979. This amendment makes clear that fuel gas fired in waste-heat boilers is not exempt from the standard.

Sulfur dioxide emissions from fluid catalytic cracking unit (FCCU) catalyst regenerators are not regulated by the standard. However, sulfur dioxide scrubber technology is available and being used to control steam generator emissions and a limited number of FCCU regenerators. Also, Amoco Oil Company has developed a new cracking process which reduces sulfur oxide emissions from FCCU regenerators. The process uses a new catalyst that retains sulfur oxides and returns them to the reactor where they are removed with the product stream. If a low sulfur product is required, the sulfur will be removed by amine stripping or hydrotreating and eventually recovered in a sulfur recovery unit. Pilot tests indicate that the new catalyst is capable of reducing sulfur oxide emissions 80 to 90 percent and commercial tests are planned to confirm these data.

The potential uncontrolled emissions from new, modified, or reconstructed catalyst regenerators are significant. Uncontrolled emission rates from catalyst regenerators are typically 5 to 10 Mg/day and range up to 100 Mg/day from the largest units. The growth rate in terms of new catalyst regenerators is uncertain due to the present uncertainty of petroleum supplies and demand. However, for perspective a growth rate of 0.5 percent in capacity from 1979 through 1985 would result in additional emissions from uncontrolled new sources of 23 Mg per day in 1986; a growth rate of 0.75 percent would result in additional uncontrolled emissions of 58 Mg SO_x/day. Emissions from modified or reconstructed sources would add to this total.

Based on the existence of these SO_x control technologies, EPA plans to initiate a program later this year to assess the applicability, cost, performance, and non-air environmental impacts of these technologies. If supported by the findings of this program EPA will propose a limit on FCCU SO_x emissions.

Volatile Organic Compounds

The emission of volatile organic compounds (VOC) from FCC unit regenerators is not limited in the present NSPS. These are, however, of concern, both because of their role as oxidant precursors and as potentially hazardous compounds. Of particular concern are the polynuclear aromatic compounds (PNA) because of their potential carcinogenic effects. The most abundant PNA measured in regenerator flue gas is benzo-a-pyrene (BAP) with a concentration of 0.218 kg BAP/1,000 barrels of feed. The concentration of BAP can effectively be reduced in a carbon monoxide boiler to 1.41×10^{-5} kg BAP/1,000 barrels of feed. However, there are no data indicating the concentration of BAP in the flue gas from high temperature (in situ) regeneration nor from regenerators using CO oxidation promoting catalyst. This, therefore, has been identified as an area for future study by EPA's Office of Research and Development.

Public Participation

All interested persons are invited to comment on this review, the conclusions, and EPA's planned action.

Douglas M. Costle,

Administrator.

Dated: October 15, 1979.

[FR Doc. 79-32567 Filed 10-19-79; 8:45 am]

ENVIRONMENTAL PROTECTION AGENCY

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STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

SECONDARY LEAD SMELTERS

SUBPART L

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 60

[FRL 1415-3]

Standards of Performance for New Stationary Sources: Secondary Lead Smelters; Review of Standards

AGENCY: Environmental Protection Agency.

ACTION: Review of standards.

SUMMARY: EPA has reviewed the standards of performance for secondary lead smelters (40 CFR 60.120). The review is required under the Clean Air Act, as amended August 1977. The purpose of this notice is to announce EPA's plans to undertake a program which will be designed, depending upon its findings, to develop fugitive particulate matter emission standards and SO_2 standards applicable to secondary lead smelters.

DATE: Comments must be received by June 16, 1980.

ADDRESS: Comments should be submitted to the Central Docket Section (A-130), U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, D.C. 20460, Attention: Docket No. A-79-20.

FOR FURTHER INFORMATION CONTACT: Mr. Robert Ajax, telephone: (919) 541-5271. The document "A Review of Standards of Performance for New Stationary Sources—Secondary Lead Smelters," EPA-450/3-79-015, is available upon request from Mr. Robert Ajax (MD-13), Emission Standards and Engineering Division, Environmental Protection Agency, Research Triangle Park, North Carolina 27711.

SUPPLEMENTARY INFORMATION:

Introduction

On June 11, 1973, the Environmental Protection Agency proposed a standard under Section 111 of the Clean Air Act to control particulate matter emissions from secondary lead smelters. The standard, promulgated on March 8, 1974, and amended on April 17 and October 6, 1975, applies to any secondary lead smelter under construction, modification, or reconstruction on or after June 11, 1973. The specific lead smelter facilities subject to the standard are reverberatory furnaces (stationary, rotating, rocking, or tilting), blast (cupola) furnaces and pot furnaces of more than 550-lb charging capacity. Furnaces for smelting lead alloy for newspaper linotype are subject to the standards if they meet the same size requirement as applied to pot furnaces.

The Clean Air Act Amendments of 1977 require that the Administrator of EPA review and, if appropriate, revise established standards of performance for new stationary sources at least every 4 years (Section 111(b)(1)(B)). Following the adoption of the amendments, EPA contracted with the MITRE Corporation to undertake a survey of available literature and information pertaining to secondary lead processes, emissions and control technologies, including results from tests of new lead smelters to assess the need for revision of the standard. The survey involved visits to each EPA Regional Office as well as review of recent literature and study results, but did not include visits to plants. Based principally on this review, EPA plans to begin a program to develop standards which would limit the emission of fugitive particulate matter, and sulfur dioxide from secondary lead smelters. This program will include an extensive technical investigation and assessment. Final decisions pertaining to whether standards should be adopted and the level of any such standards will not be made until after these investigations and assessments are completed. The time required to develop these standards for proposal will be approximately 2 years.

Industry Review

Secondary lead produced by smelting of scrap accounts for roughly half of all lead produced in the United States. After a record output of over 626,000 tons in 1976, secondary lead output declined in 1977 to between 588,000 and 600,000 tons. However, production of lead from both primary and secondary sources is expected to grow at an annual rate of slightly under 2 percent or by about 50 percent between 1976 and 2000. This compares with an average annual increase in demand for lead from 1967 to 1976 of about 3 percent. It is expected that the relative share of the market held by secondary lead production will remain near the 50 percent level.

It is estimated, based on an assumed secondary smelter capacity of 50 ton/day, that on the average, two new plants and one to two modified smelters will become subject to NSPS each year. This estimate is consistent with the latest Bureau of Mines data (1978) which show six plants completed or scheduled for completion in the 1977-1979 period (including major expansions of existing plants). Through 1978, six plants have been identified which have come on line subject to the standard.

The secondary lead market is dominated by a few companies. In addition, the trend is toward fewer and larger plants as evidenced by the decrease in the total number of smelters from 160 in 1967 to about 115 in 1975. Overall, the average annual output per smelter is in the range of 5,700 to 6,000 tons. Geographically, the industry is somewhat dispersed with secondary lead smelters located in all of the ten EPA regions.

Emissions and Control Technology

Process Particulate Emissions. The present standard of performance limits the emission of particulate matter from blast or reverberatory furnaces to 50 mg/dscm (0.022 gr/dscf) and to less than 20 percent opacity. In addition, the standard limits the opacity of emissions from pot furnaces to less than 10 percent opacity. For a typical reverberatory or blast furnace with uncontolled emissions of 147 lbs/ton and 193 lbs/ton of feed material respectively, the standard limits emissions to one and 2 lbs/ton. This compares to an estimated controlled emission level of 21 and 28 lbs/ton in the absence of the new source standard. In this review, results from four compliance tests were obtained. The results from reverberatory and blast furnace tests were 0.015 gr/dscf and 0.0135 gr/dscf respectively.

Lead Emissions. The present standard of performance does not specifically limit the atmospheric emission of lead from secondary lead furnaces. However, lead is controlled by the same devices employed to limit particulate matter emissions. Reported lead emission data, although variable, indicate uncontrolled lead emissions to be approximately 23 percent of the total particulate matter emissions. Controlled lead emissions measured in six tests conducted on emissions from seven furnaces were found to range in concentration from 0.009 to 0.0846 lb/ton with five of the six below 0.04 lb/ton. In another survey of 11 controlled secondary lead smelters in the Chicago area, an emission rate of 0.002 lbs lead/ton of product was reported. Results of a further test at a baghouse controlled reverberatory furnace indicated particulate matter and lead concentrations of 0.016 and 0.001 gr/dscf, respectively. The variability in these data and the lack of other simultaneous inlet and outlet data do not allow a precise statement of relative control effectiveness. However, the data do consistently indicate that the ratio of lead to particulate emissions from controlled furnaces is not higher than the ratio (i.e., 23 percent) for uncontrolled furnaces.

Fugitive Emissions. In addition to the material discharged through the stack of a secondary lead furnace, particulate

and gaseous matter may be emitted into the atmosphere in and around a plant from other operations. Some of these fugitive emissions are process-related, e.g., when materials escape from the hoods provided around potential outlet points of a furnace. Others result from auxiliary operations. No fugitive emission points, whether related to processing or to auxiliary operations at the site, are currently subject to specific control under NSPS for secondary lead smelters.

In some situations, fugitive emissions may be high. For example, the high concentration of lead, particularly in the soil, close to two Toronto smelters was ascribed by Canadian investigators to "low-level, dust-producing operations rather than * * * stack fumes." In apparently extreme situations, fugitive particulate emissions from processing may amount to over 15 lb/ton of charge from reverberatory furnaces and as much as 12 lb/ton from blast furnaces. These rates, although much lower than uncontrolled emission rates from furnace stacks, are substantially higher than rates from stacks meeting the NSPS.

Several techniques have been applied to reduce fugitive emission rates and recently significant improvements in the technology for controlling fugitive emissions from both process- and site-related operations in secondary smelting of lead have been reported in Denmark. The methodology uses improved furnaces that minimize the escape of dusts during smelting and also enable baghouse contents to be recharged as collected, thereby eliminating the accumulation of these fines in storage piles where they are subject to transport into the environment. Specialized waste management and housekeeping procedures are used in conjuction with the furnaces to reduce the opportunity for emissions from storage of raw materials and other sources on the site. The technology has been investigated by the EPA Industrial Environmental Research Laboratory in Cincinnati in connection with the National Institute of Occupational Safety and Health (NIOSH). Testing of the furnaces has been conducted under the joint auspices of EPA and NIOSH at a plant in Denmark. Initial reports indicate the technology as having high potential for application in reducing fugitive emissions from secondary lead smelters in the United States.

Sulfur Dioxide. The rate of uncontrolled emissions of SO_2 from secondary lead smelters is approximately 76 lb/ton of lead produced for blast furnaces and of 114 lb/ton for reverberatory furnaces. A reverberatory furnace of 50 tons/day (2.08 tons/hr) would emit about 2.8 tons of SO_2 each day and a blast furnace of the same capacity about 1.9 tons. Assuming an equal mix between blast and reverberatory furnace production, the total secondary lead production in 1975 of 658,500 tons would have resulted in about 31,000 tons of SO_2. Currently, no NSPS for SO_2 from secondary lead smelters are in effect.

SO_2 control is not normally practiced at lead smelters. However, both regenerative SO_2 control systems which are used in the primary smelting industry to control SO_2 and produce sulfuric acid, and non-regenerative scrubbing systems used to control SO_2 emissions from steam generators are potentially applicable to SO_2 control at secondary lead smelters. A more detailed engineering assessment is needed to further assess the applicability of these technologies to determine the best demonstrated control technology and an appropriate level for any standard. In addition, the cost of SO_2 control and the associated economic impact require further study as these may be the primary consideration in analyzing the feasibility of control.

Conclusions

EPA believes that the information obtained in this review of the secondary lead industry does not provide a basis for determining conclusively that the standard should be revised nor at what level any revised standard should be set. However, the available data show that a project should be undertaken to further assess the need for and, as appropriate to develop standards limiting fugitive particulate matter (including lead) and sulfur dioxide emissions from secondary lead plants.

The available particulate matter compliance test data obtained in this review are consistent with the test data used by EPA in establishing the present standard and, although very limited, these data, added to the data used in developing the present standard support the validity of the present standard. Similarly, the data available on lead emissions from furnace stacks suggest that the particulate matter standard is adequate to require installation of control systems which represent best available control technology for both particulate matter and lead. Therefore, a separate standard for lead is considered unnecessary. EPA will welcome any additional data pertaining to this decision on the particulate matter standard and on lead emissions. In addition, EPA in the planned standards development discussed below, will seek to obtain additional recent compliance test data and will assess this in terms of the current standard.

The project to assess the need for and, as appropriate, to develop fugitive particulate matter and sulfur dioxide standards will be undertaken by EPA's Emission Standards and Engineering Division. This project is expected to begin early in 1980 and will follow a standardized approach which involves detailed engineering and economic assessments preceeding proposal of any standards. Standards resulting from this project would be proposed for comment in early 1982.

Dated: April 9, 1980.

Douglas M. Costle,

Administrator.

[FR Doc. 80-11666 Filed 4-16-80; 8:45 am]

BILLING CODE 6560-01-M

ENVIRONMENTAL PROTECTION AGENCY

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STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

SECONDARY BRASS OR BRONZE INGOT PRODUCTION PLANTS

SUBPART M

ENVIRONMENTAL PROTECTION AGENCY

[40 CFR Part 60]

[FRL-1231-1]

Review of Standards of Performance for New Stationary Sources: Secondary Brass and Bronze Ingot Production

AGENCY: Environmental Protection Agency (EPA).

ACTION: Review of Standards.

SUMMARY: EPA has reviewed the standard of performance for secondary brass and bronze ingot production plants (40 CFR 60. 130, Subpart M). The review is required under the Clean Air Act, as amended August 1977. The purpose of this notice is to announce EPA's intent not to undertake revision of the standards at this time.

DATES: Comments must be received on or before August 20, 1979.

ADDRESSES: Comments should be sent to the Central Docket Section (A-130). U.S. Environmental Protection Agency, 401 M Street, SW., Washington, D.C. 20460, Attention: Docket No. A-79-10. The Document "A Review of Standards of Performance for New Stationary Sources—Secondary Brass and Bronze Plat Plants" (EPA-450/3-79-011) is available upon request from Mr. Robert Ajax (MD-13), Emission Standards and Engineering Division, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711.

FOR FURTHER INFORMATION CONTACT: Mr. Robert Ajax, telephone: (919) 541-5271.

SUPPLEMENTARY INFORMATION:

Background

In June of 1973, the EPA proposed a standard under Section 111 of the Clean Air Act to control particulate matter emissions from secondary brass and bronze ingot production plants (40 CFR 60.230, Subpart M). The standard, promulgated in March 1974, limits the discharge of any gases into the atmosphere from a reverberatory furnace which;

1. Contain particulate matter in excess of 50 mg/dscm (0.022 gr/dscf).
2. Exhibit 20 percent opacity or greater.

In addition, any blast (cupola) or electric furnace may not emit any gases which exhibit 10 percent opacity or greater.

The Clean Air Act Amendments of 1977 require that the Administrator of the EPA review and, if appropriate, revise established standards of performance for new stationary sources at least every 4 years [Section 111(b)(1)(B)]. This notice announces that EPA has completed a review of the standard of performance for secondary brass and bronze ingot production plants and invites comment on the results of this review.

Findings

Industry Statistics

In 1969, there were approximately 60 brass and bronze ingot production facilities in the United States. Currently, only 35 facilities are operational, and only one facility has become operational since the promulgation of the NSPS in 1974. No new facilities or modifications are know to be currently planned or under construction.

Ingot production has shown a steady decline from the 1966 peak year production of 315,000 Mg (347,000 tons) to a low of 160,000 Mg (186,000 tons) in 1975, the last year for which nationwide statistics were published. The decline has been caused by a decline in the demand for products made with brass or bronze and large scale substitution of other materials or technologies for the previously used brass or bronze. No information has been reported which would indicate a reversal of the decline in brass and bronze ingot production or in the number of operating plants.

Emissions and Control Technology

The current best demonstrated control technology, the fabric filter, is the same as when the standards were originally promulgated. No major improvements in this technology have occurred during the intervening period.

High-pressure drop venturi scrubbers are used, to some extent, in the brass and bronze industry, but their overall control efficiency is lower than that of fabric filters. Electrostatic precipitators have not been used in the industry due to both the low gas flow rates and high resistivity of metallic fumes.

Only one facility has become subject to the standard since its original promulgation. This facility was tested in February 1978. The average test result of 16.9 milligrams/dry standard cubic meters (mg/dscm), or 0.0074 grains/dry standard cubic feet (gr/dscf), is lower than most of the test data used for justification of the current standard of 50 mg/dscm (0.022 gr/dscf), but this single test is not considered sufficient to draw any overall conclusion about improved control technology.

Fugitive emissions continue to be a problem in the brass and bronze industry. In most cases, these emissions are very difficult to capture and equally difficult to measure during testing. It was primarily for the former reason that the current particulate standard does not apply during pouring of the ingots. This overall situation has not changed in that only complete enclosure of the furnace can result in full control of fugitive emissions. However, information is available indicating that there may be additives capable of reducing fugitive emissions during pouring. Also, improved control of fugitive emissions may be possible through improved hood design.

Conclusions

Based on the above findings, EPA concludes that the existing standard of performance is appropriate and no revision is needed. While extension of the standard to include fugitive emissions would be possible, the lack of anticipated growth in the industry does not justify such action.

PUBLIC PARTICIPATION: All interested persons are invited to comment on this review and the conclusions.

Dated: June 12, 1979.

Douglas M. Costle,

Administrator.

[FR Doc. 79-19003 Filed 6-18-79; 8:45 am]

BILLING CODE 6560-01-M

ENVIRONMENTAL PROTECTION AGENCY

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STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

BASIC OXYGEN PROCESS FURNACES

SUBPART N

ENVIRONMENTAL PROTECTION AGENCY

[40 CFR Part 60]

[FRL 1012-1]

STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES: IRON AND STEEL PLANTS, BASIC OXYGEN FURNACES

Review of Standards

AGENCY: Environmental Protection Agency (EPA).

ACTION: Review of standards.

SUMMARY: EPA has reviewed the standards of performance for basic oxygen process furnaces (BOPFs) used at iron and steel plants. The review is required under the Clean Air Act, as amended in August 1977. The purpose of this notice is to announce EPA's intent to propose amendments to the standards at a later date.

DATES: Comments must be received by May 21, 1979.

ADDRESS: Send comments to: Mr. Don Goodwin (MD-13), Emission Standards and Engineering Division, U.S. Environmental Protection Agency, Research Triangle Park, N.C. 27711.

FOR FURTHER INFORMATION CONTACT:

Mr. Robert Ajax, telephone: (919) 541-5271.

The document "A Review of Standards of Performance of New Stationary Sources—Iron and Steel Plants/Bassic Oxygen Furnaces" (report number EPA-450/3-78-116) is available upon request from Mr. Robert Ajax (MD-13), Emission Standards and Engineering Division, U.S. Environmental Protection Agency, Research Triangle Park, N.C. 27711.

SUPPLEMENTARY INFORMATION:

Background

Particulate matter emissions from BOPFs fall in two categories, primary and secondary. Emissions associated with the oxygen blow portion of the BOPF are termed "primary" emissions. These emissions are generated at the rate of 25 to 28 kg/Mg (50 to 55 lb/ton) of raw steel. Emissions generated during ancillary operations, such as charging and tapping, are termed "secondary" or fugitive emissions. These emissions are generated at a lower rate in the range of 0.5 to 1 kg/Mg (1 to 2 lb/ton) of raw steel.

In June of 1973, EPA proposed a regulation under Section 111 of the Clean Air Act to control primary particulate emissions from basic oxygen process furnaces at iron and steel plants. The regulation, promulgated in March 1974, requires that no owner or operator of any furnace producing steel by charging scrap steel, hot metal, and flux materials into a vessel and introducing a high volume of an oxygen-rich gas shall discharge into the atmosphere any gases which contain particulate matter in excess of 50 mg/dscm (0.022 gr/dscf).

The Clean Air Act Amendments of 1977 require that the Administrator of the EPA review and, if appropriate, revise established standards of performance for new stationary sources at least every 4 years (Section 111(b)(1)(B)). This notice announces that EPA has completed a review of the standard of performance for basic oxygen process furnaces at iron and steel plants and invites comment on the results of this review.

Findings

INDUSTRY GROWTH RATE

The present economic conditions in the United States and worldwide steel industry have created a significant excess U.S. BOPF capacity and a tightening of the availablity of capital for future expansion. Since the promulgation of the BOPF standard, new BOPF construction has declined significantly. For example, three of the four units scheduled for startup in 1978 were originally scheduled to begin production in 1974. This coupled with the lack of any additional industry announcements of new U.S. BOPF contruction, indicates that construction of new BOPFs which would be subject to a revised new source performance standard (NSPS) is not likely to commence before 1980, if then. Construction of new plants beyond 1980 will be dictated by domestic economic conditions and international competition, and is, therefore, uncertain.

PRIMARY EMISSION CONTROL

Review of the literature and performance test data indicates that the use of a closed hood in conjunction with a scrubber or an open hood in conjunction with either a scrubber or electrostatic precipitator currently represents the best demonstrated control technologies for controlling BOPF primary emissions. All BOPFs that have been installed since 1973 incorporate closed hood systems for particulate emission control. The closed hood control system in combination with a venturi scrubber has become the system of choice of the U.S. steel industry because this system saves energy and has generally lower maintenance requirements compared with the older open-hood electrostatic precipitator system. Use of the closed hood system requires that approximately 80 percent less air be cleaned than with the open hood system. The potential also exists with the closed hood system for using the carbon monoxide off-gas as a fuel source.

As of early 1978, no NSPS compliance tests had been carried out since the promulgation of the standard. Pertinent data are available, however, from emission tests on a limited number of new BOPFs. These tests, carried out using EPA Method 5, indicate that primary particulate emission levels of between 32 and 50 mg/dscf (0.014 and 0.022 gr/dscf) are being achieved using the same control technology as that existing at the time the standard for primary emissions was established for BOPFs. The rationale for the current NSPS level of 50 mg/dscm (0.022 gr/dscf) for primary stack emissions, as described in 1973, is therefore, still considered to be valid.

SECONDARY EMISSION CONTROL TECHNOLOGY

Secondary or fugitive emissions not captured by the BOPF primary emissions control system during various BOPF ancillary operations currently amount to more than 100 tons annually. One of the principal sources of these emissions, the hot metal charging cycle, can generate amounts of fugitive emissions on the order of 0.25 kg/Mg (0.5 lb/ton) of charge. These emissions are presently uncontrolled in most of the older BOPFs and only partially controlled in most BOPFs that have come on stream during the past 5 years.

Control of secondary emissions involves a developing technology that requires in-depth study to determine the most effective methods of fume capture. Although potentially expensive to construct, the complete furnace enclusure equipped with several auxiliary hoods is currently the only demonstrated technology exhibiting the potential for effectively minimizing fugitive emissions from a new BOPF.

Seven new BOPFs installed in the U.S. in the past 7 years have incorporated partial or full furnace enclosures as part of the original particulate emission control system. Since these designs had deficiencies, these systems are operating with varying degrees of success. Six new furnace enclosure installations due to commence operations in 1978, including four on new BOPFs and two retrofit installations, will incorporate a secondary hood inside the furnace enclosure with sufficient volume for fugitive emission control.

CLARIFICATION OF WORDING OF NSPS STANDARD

Review of the existing standard revealed possible ambiguity in the wording of the NSPS with regard to the

definitions of a BOPF. Also, the definition of the operating cycle during which sampling is performed requires clarification. Specifically, the stack emissions averaged over the oxygen blow part of the cycle could be significantly different from the emissions averaged over a period or periods that includes scrap preheating and turndown for vessel sampling. The current standard is unclear as to which averaging time should be used. Since no tests to date have come under the NSPS, averaging time has not been an issue; however, interpreting the standard will be a problem until this matter is resolved.

CONCLUSIONS

Based upon the above findings, the following conclusions have been reached by EPA:

(1) The best demonstrated systems of emissions control at the time the standard for primary emissions was established for BOPF have not changed in the past 5 years. (See APTD-1352c (EPA/2-74-003), Background Information for New Source Performance Standards, Volume 3, Promulgated Standards.) These technologies control emissions to a level consistent with the current standard; therefore, revision to the existing standard is not required, if only primary emissions are to be controlled.

(2) Secondary or fugitive emissions from BOPFs represent a major air pollution emission source. EPA, therefore, intends to initiate a project to revise the existing standard of performance to include fugitive emissions. This development project is planned to begin during 1979 and lead to a proposal 20 months after initiation. In addition, an assessment of foreign technology, which ahs been initiated by the Agency, will be included in the basis for the revised standard. The assessment may lead to further conclusions about the allowable emissions from the primary gas cleaning stack due to the interdependence of primary and secondary control technologies.

(3) The ambiguities in the present standard concerning definition of a BOPF and the operating cycle to be measured should be clarified, and a project to do so has been initiated.

PUBLIC PARTICIPATION

All interested persons are invited to comment on this review, the conclusions, and EPA's planned action. Comments should be submitted to: Mr. Don Goodwin (MD-13), Emission Standards and Engineering Division, U.S. Environmental Protection Agency, Research Triangle Park, N.C. 27711.

Dated: March 9, 1979.

BARBARA BLUM,
Acting Administrator.

[FR Doc. 79-8360 Filed 3-20-79; 8:45 am]

ENVIRONMENTAL PROTECTION AGENCY

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STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

SEWAGE TREATMENT PLANTS

SUBPART O

40 CFR Part 60

[FRL 1310-3]

Standards of Performance for New Stationary Sources: Sewage Treatment Plants; Review of Standards

AGENCY: Environmental Protection Agency (EPA).

ACTION Review of standards.

SUMMARY: EPA has reviewed the standards of performance for sewage treatment plant sludge incinerators (40 CFR 60.150). The review is required under the Clean Air Act, as amended August 1977. The purpose of this notice is to announce EPA's plan to defer decision on the need to revise the standards and to undertake a program to further assess emission rates, control technology, and the current standard.

DATES: Comments must be received by January 28, 1980.

ADDRESS: Comments should be submitted to the Central Docket Section (A-130), U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, D.C. 20460, Attention: Docket No. A-79-17.

FOR FURTHER INFORMATION CONTACT: Mr. Robert Ajax, telephone: (919) 541-5271. The document "A Review of Standards of Performance for New Stationary Sources—Sewage Sludge Incinerators" (EPA-450/3-79-010) is available upon request from Mr. Robert Ajax (MD-13), Emission Standards and Engineering Division, Environmental Protection Agency, Research Triangle Park, North Carolina 27711.

SUPPLEMENTARY INFORMATION:

Background

Prior to the promulgation of the NSPS in 1974, most sewage sludge incinerators utilized low pressure scrubbers (2 to 8 in. WG) to reduce emissions to the atmosphere. These scrubbers were designed to meet State and local standards that were on the order of 0.2 to 0.9 grams/dry standard cubic meter (dscm) or 0.1 to 0.4 grains/dry standard cubic foot (dscf) at 50 percent excess air. Incineration standards, for the most part, reflected general incineration of all types with emphasis on municipal solid waste. A separate standard for sewage sludge incineration emissions was unusual. Control efficiencies, based on an uncontrolled rate of 0.9 grains/dscf, were between 50 and 90 percent.

In June of 1973, the Environmental Protection Agency proposed a standard under Section 111 of the Clean Air Act to control particulate matter emissions from sewage sludge incinerators. The standard, promulgated in March 1974 and amended in November 1977, applies to any incinerator constructed or modified after June 11, 1973, that burns wastes containing more than 10 percent sewage sludge (dry basis) produced by municipal sewage treatment plants, or charges more than 1000 kg (2205 lb/day) municipal sewage sludge (dry basis). The standard prohibits the discharge of particulate matter at a rate greater than 0.65 grams/kg of dry sludge input (1.30 lb/ton) and prohibits the discharge of any gases exhibiting 20 percent opacity or greater.

The Clean Air Act Amendments of 1977 require that the Administrator of the EPA review and, if appropriate, revise established standards of performance for new stationary sources at least every 4 years [Section 111(b)(1)(B)]. This notice announces that EPA has undertaken a review of the standard of performance for sewage sludge incinerators and sets forth initial findings based on this review. EPA is however, deferring a final decision on the need to revise the standard until further data can be obtained and analyzed pertaining to the form of the standard, parameters affecting emission rates, and coincineration. Comments on these findings and this action are invited.

Findings

Status of Sewage Sludge Incinerators

It is estimated that approximately 240 municipal sludge incinerator units are presently in operation. A large number of incinerators were built in the 1967-1972 period and this growth has continued, although at a somewhat slower rate since 1972. A compilation of incinerator units subject to the construction grants program indicated that 92 new units were either in the contruction or planning stages in mid-1977. A total of 23 sludge incinerators have been identified which are subject to the standard and which have been tested for compliance.

Emission Rates and Control Technology

Particulate matter from the inert material in sludge is present in the flue gas of sewage sludge incinerators. Uncontrolled emissions may vary from as low as 4 g/kg (8 lb/ton) dry sludge input to as high as 110 g/kg (220 lb/ton) dry sludge input depending upon the incinerator type and the sludge composition (e.g., percent volatile solids, percent moisture, and source treatment). Since adoption of the standard, wet scrubbers operating with pressure drops in the range of 7 to 32 in. WC and a mean of 20 in. WG have been employed exclusively and have been successful for controlling emissions to the level required by the standard. The average emission from tests of 26 facilities since 1974 was 0.55 g/kg with a standard deviatin of 0.35 g/kg (1.1 ±0.7 lb/ton) dry sludge input. When tests from one obviously underdesigned facility and three facilities not subject to the standard were deleted, the average emission was 0.45 g/kg with a standard deviation of 0.17 g/kg (0.91 ± 0.33 lb/ton) dry sludge input or about 30 percent below the standard. The scrubber configurations which were employed included three-stage perforated plate impingment scrubbers operating at 7 to 9 in WG and venturi scrubbers, or venturi scrubbers in series with various impingment plate scrubbers operating in the 9 to 32 in. WC range.

While these test results are consistent with the standard, an analysis of the test results shows an inconsistent relationship between scrubber pressure drop and emissions as expressed in units of the standard. This appears to be due to both the facility type and input sludge composition, particularly solids content. Moreover, experimental data from some of the tested units suggest that incinerators burning sludge below 20 percent solids may have difficulty complying with the NSPS. Because combustion air requirements per unit of dry sludge increase with increasing sludge moisture, actual stack volume concentrations of 0.01 grains/dry standard cubic meter or less are needed to meet the standard when high moisture sludges are incinerated. For example, two incinerators burning sludges of 16 percent solids achieved only marginal compliance and low volume concentrations of 0.009 and 0.010 grains/acf.

An additional finding based on an analysis of the test data which are now available concerns the relationship between emissions expressed in terms of grain loading on a dry basis and emissions per weight of dry sludge burned. As initially proposed, the standard was expressed as a volume concentration standard equal to 0.031 grains/dscf. Due to comments received relative to the use of dilution air and the difficulties involved in measuring and correcting to dry volume, the promulgated standard was established at 1.3 lb/dry ton sludge input. This was based on data available at the time of promulgation showing that the promulgated and proposed standards were equivalent. However, an analysis

of the data which are now available indicate a nominal equivalence between 1.8 lb/ton dry sludge and 0.031 grains/dscf for typical sludges.

One factor at least partially responsible for the difference in equivalent emission factors, in addition to affecting the relationship between pressure drop and mass emissions, is the moisture content in the input sludge. The average solids content of the sludge associated with the data cited above is 24 percent. However, tests of two other facilities with input sludge having a relatively high solids content of between 27 and 33 percent showed an equivalence similar to that found by EPA in 1973 (e.g., 0.03 grains/dscf equivalent to 1.3 lb/ton dry sludge input).

Opacity levels from successful emissions tests never exceeded 15 percent and were most often either 0 or 5 percent. These results are similar to those found when the standard was first proposed as a 10 percent value with exceptions allowed during 2 minutes of a 60 minute test cycle. This standard was changed to 20 percent with no exemptions except during startup, shut down, or malfunctions. The current data indicate that the rationale used to arrive at the 20 percent opacity level till applies. This rationale, in addition to field observations obtained with Method 9, involved instrumental data and theoretical projections of the opacity which could, under extreme conditions, occur at a facility complying with the particulate matter standard. A reevaluation of this standard was undertaken and reaffirmation was announced in the **Federal Register** on February 18, 1976.

Application of the Standard to Coincineration

The coincineration of municipal solid waste and sewage sludge has been practiced in Europe for several years, and on a limited scale in the U.S. However, as energy resources become scarce and more costly, and where land disposal is economically or technically unfeasible, the recovery of the heat content of dewatered sludge as an energy source will become more desirable. Due to this and the institutional commonality of these wastes and advances in the preincineration processing of municipal refuse to a waste fuel, many communities may find joint incineration in energy recovery incinerators an economically attractive alternative to their waste disposal problems.

Coincineration of municipal solid waste and sewage sludge, as described above, is not explicitly covered in 40 CFR 60. The particulate standard for municipal solid waste described in Subpart E (0.18 g/dscm or 0.08 g/dscf at 12 percent CO_2) applies to the incineration of municipal solid waste in furnaces with a capacity of at least 45 Mg/day (50 tons/day). Subpart O, the particulate standard for sewage sludge incineration (0.65 g/kg dry sludge input or 1.3 lb/ton dry sludge), applies to any incinerator that burns sewage sludge, with the exception of small communities practicing coincineration.

To clarify the situation when coincineration is involved, EPA adopted the policy that when an incinerator with a capacity of at least 45 Mg/day (50 tons/day) burns at least 50 percent municipal solid waste, then the Subpart E applies regardless of the amount of sewage sludge burned. When more than 50 percent sewage sludge and more than 45 Mg/day (50 tons) is incinerated, the standard is based upon Subpart O or, alternatively, a proration between Subparts O and E. The proration scheme, however, has a discontinuity when a municipal incinerator burns 50 percent solid waste.

The alternative of prorating the Subparts E and O is not straightforward, since the two standards are stated in different units. The proration scheme requires a transformation of the municipal incineration standard (Subpart E) from grams per dry standard cubic meter (grains per dry standard cubic foot) at 12 percent CO_2 to grams per kilograms (pounds per dry ton) refuse input, or a transformation of the sewage sludge standard (Subpart O) from grams per dry kilograms (pounds per dry ton) input to grams per dry standard cubic meter at 12 percent CO_2. Such transformations are dependent on the percent CO_2 in the flue gas stream, the stoichiometric air requirements, excess air, the volume of combustion products to require air, and percent moisture in refuse or sludge, and the heat content of the sludge and solid waste.

Other Pollutants

Incineration of sewage sludge results in the emission to the atmosphere of trace elements and compounds, some of which are hazardous or potentially hazardous. Substances of concern include mercury, lead, cadmium, pesticides, and organic matter. Among these, mercury emissions from sewage sludge incinerators are specifically limited under the National Emission Standards for Hazardous Air Pollutants (40 CFR 61.50 et seq.).

The emission of other trace compounds and elements, while not subject to specific limitations is controlled by particulate matter control equipment or directly by the high temperatures in the combustion process and with the exception of cadmium, no data were obtained during this review to indicate a need for specific limitations on emissions of these materials resulting from incineration of typical sludges. Tests have shown high destruction efficiencies for pesticides, and organics in sewage sludge incinerators. Similarly, test data suggest that high pressure scrubbers of the type normally employed to meet the particulate standards also reduce lead emissions to below the level required to meet ambient standards. In contrast, data suggest that cadmium emissions may not be adequately controlled. A separate program is underway in EPA to independently assess the need to regulate cadmium. Final decisions on this will be announced in a separate action. In the event that the need to limit cadmium emissions from sewage sludge incinerators is indicated, appropriate action will be taken.

Conclusions

The available test data support the validity of the standard. However, the marginal compliance of several facilities operating with high pressure drops, the apparent relationship between sludge moisture content and emission rates, and the inconsistent relationship between pressure drop and scrubber performance as measured in terms of the standard are matters which require further study. Such a study will be undertaken later and will include further analysis of data regarding sludge dewatering, incinerator types, control technology, and the relationship between control device operating parameters, sludge solids content, emission rates, and alternative forms for expression of emission rates. This will also include an analysis of alternative means for establishment of standards applicable to coincineration. A final conclusion on the need for revision of the standard will not be made until this study is complete.

Dated: November 16, 1979.

Barbara Blum,

Acting Administrotor.

[FR Doc. 79-36473 Filed 11-26-79: 8:45 am]

ENVIRONMENTAL PROTECTION AGENCY

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STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

PHOSPHATE FERTILIZER PLANTS

SUBPARTS T, U, V, W, X

40 CFR Part 60

[AD-FRL-1551-7]

Review of Standards of Performance for New Stationary Sources: Phosphate Fertilizer Plants

AGENCY: Environmental Protection Agency (EPA).

ACTION: Review of Standards.

SUMMARY: EPA has reviewed the standards of performance for control of total fluoride emissions from phosphate fertilizer plants (40 FR 33152). The review is required under the Clean Air Act, as amended August 1977. The purpose of this notice is to announce EPA's intent not to undertake revision of the standards at this time.

DATES: Comments must be received on or before December 22, 1980.

ADDRESSES: *Comments.* Send comments to the Central Docket Section (A-130), U.S. Environmental Protection Agency, 401 M Street, SW., Washington, D.C. 20460, Attention: Docket No. A-80-10.

Docket: Docket No. A-80-10, containing supporting information used in reviewing the standards, is available for public inspection and copying between 8:00 a.m. and 4:00 p.m., Monday through Friday, at EPA's Central Docket Section, West Tower Lobby, Gallery 1, Waterside Mall, 401 M Street, SW., Washington, D.C. 20460. A reasonable fee may be charged for copying.

Background Information Document. The document "Review of New Source Performance Standards for Phosphate Fertilizer Industry" (EPA report number EPA-450/3-79-038) is available upon request from the U.S. EPA Library (MD-35), Research Triangle Park, N.C. 27711, telephone (919) 541-2777.

FOR FURTHER INFORMATION CONTACT: Mr. Stanley T. Cuffe, (MD-13) U.S. Environmental Protection Agency, Research Triangle Park, N.C. 27711; telephone (919) 541-5295.

SUPPLEMENTARY INFORMATION:

Background

Fluoride was the only pollutant other than the criteria pollutants, specifically named as requiring Federal action in the March 1970 "Report of the Secretary of Health, Education, and Welfare to the United States (91st) Congress." The report concluded that "inorganic fluorides are highly irritant and toxic gases" which, even in low ambient concentrations, have adverse effects on plants and animals. The United States Senate Committee on Public Works in its report on the Clean Air Amendments of 1970 (Senate Report No. 91-1196, September 17, 1970, page 9) included fluorides on a list of contaminants that have broad national impact and require Federal Action.

The "Engineering and Cost Effectiveness Study of Fluoride Emissions Control" (contract EHSD 71-14), published in January 1972, listed the phosphate fertilizer industry among the largest fluoride emitters in the United States, accounting for nearly 14 percent of the total soluble fluorides emitted annually at that time.

On October 22, 1974 (39 FR 37602), under section 111 of the Clean Air Act, and amended, the Administrator proposed standards of performance for five new affected facilities within the phosphate fertilizer industry as follows: Wet-process phosphoric acid plants, superphosphoric acid plants, diammonium phosphate plants, triple superphosphate plants, and granular triple superphosphate storage facilities.

The regulation, promulgated on August 6, 1975 (40 FR 33152), limits total fluoride emissions to the following weights per unit of P_2O_5 input: Wet process phosphoric acid, 0.01 g/kg (0.02 lb/ton); superphosphoric acid, 0.005 g/kg (0.01 lb/T); diammonium phosphate, 0.03 g/kg (0.06 lb/T); triple superphosphate and granular triple superphosphate, 0.1 g/kg (0.20 lb/T). Emission limits for granular triple superphosphate storage facilities are 2.5×10^{-4} g/hr per kilogram stored (5×10^{-4} lb/hr ton). There is no opacity regulation.

The Clean Air Act Amendments of 1977 require that the Administrator of EPA review and, if appropriate, revise established standards of performance for new stationary sources at least every 4 years (Section 111(b)(1)(B)). This notice announces that EPA has completed a review of the standard of performance for phosphate fertilizer plants and invites comment on the results of this review.

Findings

Industry Growth Rate

During the years 1974 through 1979, the production capacity of the domestic fertilizer industry increased as follows: For wet process phosphoric acid, 46 percent; superphosphoric acid, 66 percent; diammonium phosphate, 25 percent; and triple superphosphate, 15 percent. Superphosphoric acid contains much less water per unit of P_2O_5 than does wet process phosphoric acid; therefore, the resulting saving in weight and shipping costs has encouraged increasing the capacity for manufacturing superphosphoric acid. Also, superphosphoric acid is less corrosive than wet process phosphoric acid and can be stored with less deposition of impurities. Additions to triple superphosphate capacity have decreased because of the recent trends toward liquid fertilizers, which are easier for the farmer to apply.

The estimated growth from 1980 to 1985 in domestic phosphate fertilizer plants is limited, for the following reasons. Facilities for the manufacture of phosphate fertilizer from phosphate rock were overbuilt in the 1970's and are only now approaching full utilization of production capacity. The use of phosphate fertilizer in the United States decreased about 9 percent in 1978, partly because of alleged overfertilization of some soils. Potential production increases outside the United States may reduce exports.

Control Technology

Current Control Technology

There have been no notable improvements in the design of aqueous scrubbers since the present standards were promulgated. Some improvement has been reported in the operation of the scrubber with less plugging and with reduced downtime when plugging occurs.

Emerging Control Technology

The gypsum pond is considered to be one of the major fluoride emission sources in a phosphate fertilizer plant. However, the pond emits a relatively large weight of fluoride from an area that is very great compared with that of the other sources. Nevertheless, pond contribution to ground level concentration of fluorides is evidently small, as indicated by the effectiveness of scrubber controls in reducing high ground level concentrations.

An interesting recent development is claimed to permit eliminating about half of the pond area with a resulting pond fluoride emission reduction of about 50 percent. This reduction is made by shifting the plant cooling load from the pond to a closed-circuit cooling tower. The cooling tower in turn supplies a fluoride scrubbing system with water. Fluoride evolution from this scrubbing system has been reduced at one of two plants by partial recovery of fluoride as salable 25 percent fluosilisic acid and by liming to further prevent or reduce

fluoride emissions. It is not practical to depend on liming alone, however, because of the costs of the large tonnage of lime that would be required. These processes that combine pond area reduction with closed cooling tower, scrubber, and liming systems now appear to be in their development stage. More experience is needed to determine their costs and performances.

The hemihydrate process, an old process revived by the Japanese, makes wet process phosphoric acid by crystallizing calcium sulfate twice in different forms. The final crystal is the familiar dihydrate, but this product contains very little phosphate in the crystal. This decrease in the phosphate content of the gypsum crystals increases the yield of phosphoric acid and also produces a purer and more salable gypsum. In addition, 30 percent or more of the fluoride originally present in the phosphate rock is said to be recoverable in salable form. The hemihydrate process has not been demonstrated in the United States. Domestic rock causes difficulties in this process, and the hemihydrate process would have to be investigated fully to determine whether these difficulties can be overcome.

One plant makes triple superphosphate directly from wet process phosphoric acid and calcium carbonate. The only potential for fluoride emissions arises from the fluoride content of the wet process phosphoric acid. This might be advantageous in a local situation; but the balance of the potential fluoride evolution would only be transferred elsewhere to wherever the wet process acid was made from phosphate rock.

One fertilizer plant has added a dry absorption process that is due to come on line in 1980. In this process a dry absorbent is continuously injected into the plant tailgas stream. The dry solid adsorbs gaseous fluorides, and both the original and the added particulates are then removed in a following baghouse. Operating data will be needed to assess this new process.

Results Achievable With Demonstrated Control Technology

Emission source test results were available for one of the emerging control technologies. Source tests for the plant that manufactures triple superphosphate directly by reacting calcium carbonate and wet process phosphoric acid showed fluoride emissions just under the new source performance standard of 0.1 g/kg P_2O_5 input (0.20 lb/T).

Conclusions

Based on the above findings, EPA concludes that the existing standards of performance for fluorides are still appropriate. There have been no notable improvements in aqueous scrubber control technology. Further significant fluoride reductions by scrubbing are unlikely if ordinary gypsum pond water is used. Emerging technologies or their variants may later permit further reductions in fluoride emissions.

EPA is studying radioactive particulate emissions from the phosphate fertilizer industry. If control is found advisable, emission regulations will be developed by the Office of Radiation Programs for this source under Section 112 of the Clean Air Act.

Public Participation

All interested persons are invited to comment on this review. Comments should be submitted to the Central Docket Section as stated under "Addresses" above.

Dated: November 17, 1980.

Douglas M. Costle,

Administrator.

[FR Doc. 80-36452 Filed 11-20-80; 8:45 am]

BILLING CODE 6560-26-M

ENVIRONMENTAL PROTECTION AGENCY

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STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

FERROALLOY PRODUCTION FACILITIES

SUBPART Z

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 60

[AD-FRL 1698-1]

Review of Standards of Performance for New Stationary Sources: Ferroalloy Production Facilities

AGENCY: Environmental Protection Agency (EPA).

ACTION: Review of Standards.

SUMMARY: EPA has reviewed the standards of performance for ferroalloy production facilities (41 FR 18497, 41 FR 20659). The review is required under the Clean Air Act, as amended August 1977. The purpose of this notice is to announce EPA's intent not to undertake revision of the standards at this time.

DATE: Comments must be received on or before March 27, 1981.

ADDRESS: Comments: Send comments to the Central Docket Section (A-130), U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, D.C. 20460, Attention: Docket No. A-80-45.

Docket: Docket No. A-80-45, containing supporting information used in reviewing the standards, is available for public inspection and copying between 8:00 a.m. and 4:00 p.m., Monday through Friday, at EPA's Central Docket Section, West Tower Lobby, Gallery 1, Waterside Mall, 401 M Street, S.W., Washington, D.C. 20460. A reasonable fee may be charged for copying.

Background Information Document. The document "A Review of Standards of Performance for New Stationary Sources—Ferroalloy Production Facilities" (EPA report number EPA-450/3-80-041) is available upon request from the U.S. EPA Library (MD-35), Research Triangle Park, N.C. 27711, telephone (919) 541-2777.

FOR FURTHER INFORMATION CONTACT: Mr. Stanley T. Cuffe, Chief, Industrial Studies Branch, Emission Standards and Engineering Division, (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, N.C. 27711. Telephone: (919) 541-5295.

SUPPLEMENTARY INFORMATION:

Background

On October 21, 1974, EPA proposed a standard under Section 111 of the Clean Air Act to control particulate matter and carbon monoxide emissions from electric submerged-arc furnaces in the ferroalloy industry. The standard, promulgated on May 4, 1976, applies to any facility constructed or modified after October 21, 1974. The standard for particulate matter under § 60.262 limits the discharge to the atmosphere from electric submerged-arc furnaces to:

1. 0.45 kg/MW-h (0.99 lb/MH-h) for those furnaces that produce silicon metal and high-silicon-content ferroalloys.
2. 0.23 kg/MW-h (0.51 lb/MW-h) for those furances that produce other designated ferroalloys and calcium carbide.
3. Less than 15 percent opacity from any control device serving an electric arc furnace.
4. Zero visible emissions from the fume capture system of the furnace.
5. Zero visible emissions from the fume capture system during the tapping operation for at least 60 percent of the tapping period, except when a blowing tap occurs.
6. 10 percent opacity or less from associated dust handling equipment.

The standard for carbon monoxide emissions under § 60.263 limits discharge to the atmosphere to less than 20 percent by volume.

The current standard does not cover other types of ferroalloy production facilities. The electrolytic and metalothermic processes are used at 12 locations to produce relatively small quantities of specialty metals. Because of their limited applicaton and relatively low air pollution potential, excluson of these processes appears justified.

The Clean Air Act Amendments of 1977 require that the Administrator of EPA review the established standards of performance for new stationary sources (NSPS) at least every 4 years and revise them as appropriate [Section 111(b)(1)(B)]. EPA has completed such a review of the standard of performance for the ferroalloy industry and has decided not to revise this standard. EPA invites comments on this decision and on the findins on which it is based.

Findings:

Industry Statistics

In 1971, there were approximately 145 electric submerged-arc furnaces used for the production of ferroalloys and 13 for calcium carbide production. Domestic production at that time was approximately 1.8 Tg (2 million tons) per year. Because of a sharp increase in imports of ferroalloys, however, domestic production has declined to a current level of approximately 1.35 Tg (1.5 million tons) per year, and the number of furnaces has decreased to 89 for ferroalloy production and 7 for calcium carbide production. Since no new furnaces have been built or modified since 1974, none are currently subject to the new source performance standard; and none are expected to be built in the near future.

Control Technology

Current best demonstrated control technology for the open-type electric submerged-arc furance is the fabric filter system. These furnaces account for approximately 86 percent of domestic capacity. Emissions for most of these furnaces are currently controlled with fabric filter systems, and a few are equipped with high-pressure-drop aqueous scrubbers. Existing semi-sealed and closed furnace emissions are all controlled by aqueous scrubbers. No major improvements in the control technology or in processing technology have occurred since the emission standard was proposed in 1974. The installation of available control systems on existing furnaces has generally enabled compliance with State regulations.

Control of particulate emissions from the furnace tapping operations is a problem because many existing facilities do not have adequate hooding. On new furnaces, however, hoods can be designed into the entire system and better fume capture can be expected. Control of fugitive particulate emissions from electric submerged-arc furnaces for ferroalloy production has not been as extensively developed as it has in other segments of the steel industry. No ferroalloy production facilities currently

operate with a building fume evacuation system, and no furnaces have been provided with a complete enclosure to reduce fugitive emissions.

Results Achievable with Demonstrated Control Technology

Because no furnaces are currently subject to new source performance standards, no formal Federal compliance tests have been made. Nevertheless, standard EPA test methods have been used to determine compliance with various State particulate emission regulations, and no unique testing problems have occurred. Limited new test data for determining compliance with State emission regulations show that emissions from existing facilities equipped with high-efficiency control equipment ranged from 0.022 to 0.25 kg/MW-h (0.05 to 0.54 lb/MW-h). In general, State and local visible emissions standards are also being met, except during tapping operations at some plants.

Additional Pollutants

Recently, information on the emissions of organic compounds has also been obtained. This information shows that organic compounds, included polynuclear aromatic hydrocarbons, may be emitted from electric submerged-arc furnaces. More data are required to determine the quantity and nature of these emissions to the atmosphere. Emissions of trace metals vary widely among furnaces and depend on the feed materials; however, these emissions are low and are controlled by conventional particulate control equipment. Gaseous emissions are not significant, and high concentrations of carbon monoxide are reduced by flaring the vent gas. Control techniques for carbon monoxide have not been further improved.

Conclusions

Based on this review of the current NSPS, no revision of the standard is planned at this time. This decision is based on:

1. Lack of growth and new construction in the industry.
2. Indication from limited recent test data that the existing standard can be met.

The available particulate matter compliance test data required by some States show that emissions are consistent with NSPS requirements, and although limited, these data support the present standard. Similarly, the data available on furnace emissions indicate that the particulate emission standard is resulting in the installation of control equipment that represents best demonstrated control technology.

All interested parties are invited to comment on this review, the conclusions, and EPA's planned course of action.

Dated: January 13, 1981.

Douglas M. Costle,

Administrator.

[FR Doc. 2456 Filed 1-23-81; 8:45 am]

BILLING CODE 6560-26-M

ENVIRONMENTAL PROTECTION AGENCY

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STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

ELECTRIC ARC FURNACES (STEEL INDUSTRY)

SUBPART AA

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 60

[FRL 1415-2]

Review of Standards of Performance for New Stationary Sources; Electric Arc Furnaces (Steel Industry)

AGENCY: Environmental Protection Agency.

ACTION: Proposed Rule.

SUMMARY: EPA has reviewed its standards of performance for electric arc furnaces in the steel industry (40 CFR 60.270, Subpart AA) as required under the Clean Air Act, as amended August 1977. EPA intends to explore revising the standards to reflect demonstrated best available control technology for electric arc furnaces and would add argon-oxygen decarbonization (AOD) furnaces to the standard. Visible emission limitations would be reduced to be consistent with improved control technology.

DATES: Comments must be received by June 20, 1980.

ADDRESSES: Send comments to: Central Docket Section (A-130), U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, D.C. 20460, Attention: Docket A-79-33. Comments should be submitted in duplicate if possible.

FOR FURTHER INFORMATION CONTACT: Mr. Stanley T. Cuffe, Telephone: (919) 541-5295. The document "A Review of Standards of Performance for Electric Arc Furnaces in the Steel Industry" is available upon request from Mr. Stanley T. Cuffe, (MD-13), Chief, Industrial Studies Branch, Emission Standards and Engineering Division, U.S. Environmental Protection Agency, Research Triangle Park, N.C. 27711.

SUPPLEMENTARY INFORMATION:

Background

On October 21, 1974, EPA proposed a standard under Section 111 of the Clean Air Act to control particulate matter emissions from electric arc furnaces (EAF) in the steel industry. The standard, promulgated on September 23, 1975, applies to any facility constructed or modified after October 21, 1974. The standard for particulate matter under § 60.272 limits the discharge to atmosphere from an electric arc furnace of any gases that:

1. Contain particulate matter in excess of 12 mg/dscm (0.0052 gr/dscf).
2. Exhibit 3 percent opacity or greater from a control device.
3. Exhibit greater than zero opacity from a shop, due solely to operation of any EAF(s), except:
   a. Shop opacity greater than zero percent, but less than 20 percent, may occur during charging periods.
   b. Shop opacity greater than zero percent, but less than 40 percent, may occur during tapping periods.
   c. Zero opacity from a shop shall apply only during periods when process flow rates and pressures are being monitored.
   d. Where the capture system is operated such that the roof of the shop is closed during the charge and the tap, and emissions to the atmosphere are prevented until the roof is opened after completion of the charge or tap, the shop opacity standards shall apply when the roof is opened and shall continue to apply for the length of time defined by the charging and/or tapping periods.

The standard for particulate matter also limits the discharge to atmosphere from dust handling equipment any gases which exhibit 10 percent opacity or greater.

The Clean Air Act Amendments of 1977 that require the Administrator of EPA review, establish standards of performance for new stationary sources (NSPS) at least every 4 years, and revise them as appropriate [Section 111(b)(1)(B)]. EPA has completed such a review of the standard of performance for electric arc furnaces in the steel industry and has decided to begin a project to revise the standard. EPA invites comments on this decision and on the findings on which it is based.

Findings

Industry Statistics

In 1972, there were approximately 299 EAF's in the United States. In 1977, there were approximately 303 EAF's being operated in the United States. However, about 30 EAF's were being installed between 1974 and 1979, which indicates that some older furnaces were probably shutdown and replaced. Only five of the new furnaces were subject to the standards.

Information on planned new facilities or modifications is limited by the reluctance of industry to state future plans because of current economic uncertainties. Nevertheless, EAF production should continue to increase. An EAF is flexible, can operate wholly on steel scrap, is adapted to ultrarapid melting, can make specialty steels, and can be quickly brought on line or taken off production. In addition, an EAF is relatively low in pollution potential, and emission controls are well demonstrated. These EAF advantages are substantiated by industry statistics showing that production in 1977 was about 25.4 Mg (27.9 million tons) and 29 Mg (31.9 million tons) in 1978 versus 21.5 Mg (23.7 million tons) in 1972, when the NSPS document was being developed.

Emissions and Control Technology

The current best demonstrated control technology, the fabric filter, is the same as that used when the standards were promulgated. No major improvements in this technology have occurred during the intervening period; however, one company has installed a proprietary wet scrubber, which appears to be almost as effective as a fabric filter and meets the standards.

Although the fabric filter technology has not changed, the effectiveness of pickup systems for various process and fugitive emissions has improved significantly.

Some EAF shops are now operating with closed roofs and a controlled fugitive emission pickup system in the roof to draw any indoor emissions into the control device. This system may utilize small openings in the ductwork to draw emissions slowly out of the roof area, or it may include dampers in the openings that can be opened or closed to remove these rooftop emissions. The roof emissions include charging and tapping emissions, and those that escape the direct furnace evacuation system and the canopy hoods above the furnace. The closed-roof and fugitive emission pickup system was designed to meet some local agencies no-visible-emission requirements from an EAF shop.

Other recent technology includes total enclosure of the furnace within the EAF building. The system is designed to capture all emissions of the furnace operation cycle (meltdown, charging, tapping, and slagging). Hoods are strategically located for capture of the charging, tapping, and slagging emissions. Additionally, during the charging operation, a curtain of air is blown across the roof opening to direct the emissions into the intake duct of the control device. This system theoretically prevents almost all emissions from escaping the enclosure and building.

Another new concept for containing emissions from the EAF is a partial enclosure around the furnace. The furnace itself may be equipped with the conventional direct shell evacuation and canopy hood system, but the partial enclosure around the furnace acts as a stack to direct fugitive furnace emissions upward into the emission capture system. Separate hoods are used to capture emissions during the tapping and slagging operation. The EAF

shop roof is closed and the area above the furnace and below the canopy hood must be kept clear so that the furnace can be charged normally by a crane. The partial enclosure is large enough to allow the furnace cover to be swung over the tapping area, where it can capture emissions from the ladle pouring spout and tapping hoods. This total system is reported to be virtually 100 percent effective in capturing all emissions from the furnace shop during normal operations.

Although about 30 furnaces were reported to have started operation from 1974 to 1979, only 5 commenced construction after the proposal of NSPS and therefore were subject to regulation. Only one of these five furnaces has been tested for visible emissions because the others have not completed their startup. Although the latter met the NSPS for visible emissions, the furnace shop did create an enforcement issue. The furnace shop has a closed roof; however, some visible emissions from charging or tapping operations drifted out the material access doors of the shop when they were open. Also, these charging and tapping emissions became intermingled and were emitted simultaneously due to other furnaces operating in the shop. The enforcement issue arose when it became unclear how to enforce NSPS when charging, tapping, and other shop emissions became mixed and escaped from the doors instead of the roof. These problems are expected to be recurring, as other new furnaces start operation and the NSPS may require further study to clarify the visible emission standard to cover this situation.

Four other recently constructed EAF's were required by local agencies to at least meet NSPS even though their construction started before NSPS proposal. One shop with two partially-enclosed furnaces using canopy hoods and sealed roof was tested for particulate and visible emissions. The local agency concluded that the system would meet NSPS based on their source tests. However, the control system uses a pressure baghouse, and the testing was conducted by company personnel in the presence of local agency observers. In tests of various compartments of the baghouse with a Hi-Vol sampler, the results show that the emissions ranged from 0.0097 mg/dscm (0.0000042 gr/dscf) to 0.08 mg/dscm (0.0000346 gr/dscf) during twelve 4- to 5-hour tests. However, this is not an official EPA testing method and further investigation by EPA will be necessary to substantiate this data.

The current standard does not cover several types of electric furnaces. The unregulated electric furnaces are: vaccum-arc remelting (VAR), vacuum induction melting (VIM), electro-slag remelting (ESR), and consumable electrode melting (CEM) which are primarily used to produce small tonnages of specialty steels. Investigation by EPA during this review revealed that the VAR, VIM, CEM, and ESR furnaces do not produce any significant emissions; therefore, they should not be considered for NSPS. Furthermore, these low polluting specialty furnaces are not capable of being replacements for the much larger conventional electric arc furnace which has a higher pollution potential.

Argon-oxygen decarbonization furnaces were found to be a highly significant emitter of particulate and visible emissions, and these furnaces are becoming an integral part of EAF shops that produce stainless steels. AOD furnaces are economical and flexible to operate; therefore, their use is expected to increase. Because AOD furnaces operate within an EAF shop, produce significant amounts of particulate and visible emissions, and use similar air pollution control devices, AOD furnaces should be included in the NSPS study for the EAF. One AOD furnace with canopy hood and baghouse was tested for particulate emissions. The average test result of 6.9 mg/dscm (0.0030 gr/dscf) for the AOD furnace is lower than the current EAF standard of 12 mg/dscm (0.0052 gr/dscf). Hence, the NSPS review for EAF should include AOD furnaces.

Conclusions

Based upon the review of the current NSPS previously summarized, a program to revise the standard is needed. This program, which is expected to begin in fiscal year 1980, will be directed toward:

1. Reviewing new particulate emission data based on the capabilities of the best available technology today. The investigation will include analysis of costs associated with this technology.
2. Reviewing new opacity data from recently designed efficient exhaust techniques, closed roofs for fugitive emissions, and improved hood collection for charging, tapping, and slagging emissions. These systems, where installed, appear to significantly reduced visible emissions from EAF shops.
3. Consideration of including the AOD furnace emissions in the revised EAF standard, or development of a separate standard for these furnaces. They are a highly visible source of particulate emissions.

All interested parties are invited to comment on this review, the conclusions, and EPA's planned course of action.

Dated April 11, 1980.

Douglas M. Costle,

Administrator.

[FR Doc. 80-11284 Filed 4-18-80; 8:45 am]

BILLING CODE 6560-01-M

ENVIRONMENTAL PROTECTION AGENCY

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STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

SURFACE COATING OF METAL FURNITURE

SUBPART EE

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 60

[AD-FRL 1533-7]

Standards of Performance for New Stationary Sources; Surface Coating of Metal Furniture

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule and notice of public hearing.

SUMMARY: The proposed standards of performance would limit emissions of volatile organic compounds (VOC) from new, modified, and reconstructed metal furniture surface coating facilities. The proposed emission limit is 0.70 kilogram of VOC per liter of coating solids applied. Reference Method 24 would be used to determine the VOC content or organic coating materials and Reference Method 25 would be used to determine the VOC concentration in an exhaust gas stream. Both reference methods were promulgated on October 3, 1980, (45 FR 65956). The proposed standards implement Section 111 of the Clean Air Act and are based on the Administrator's determination that surface coating of metal furniture contributes significantly to air pollution. The intent is to require new, modified, and reconstructed metal furniture surface coating facilities to use the best demonstrated system of continuous emission reduction, considering costs, nonair quality health, and environmental and energy impacts.

A public hearing will be held to provide interested persons an opportunity for oral presentation of data, views, or arguments concerning the proposed standards.

DATES: *Comments.* Comments must be received on or before February 8, 1981.

Public Hearing. A public hearing will be held on January 9, 1981 beginning at 9:00 a.m.

Request to Speak at Hearing. Persons wishing to present oral testimony must contact EPA by January 2, 1981.

ADDRESSES: *Coments.* Comments should be submitted (in duplicate if possible) to: Central Docket Section (A-130), Attention: Docket Number A-79-47, U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, D.C. 20460.

Public Hearing. The public hearing will be held at the Environmental Research Center Auditorium, Research Triangle Park, N.C. Persons wishing to present oral testimony should notify Ms. Deanna Tilley, Standards Development Branch (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5477.

Background Information Document. The Background Information Document (BID) for the proposed standards may be obtained from the U.S. EPA Library (MD-35), Research Triangle Park, North Carolina 27711, telephone number (919) 541-2777. Please refer to "Surface Coating of Metal Furniture—Background Information for Proposed Standards," EPA-450/3-80-007a.

Docket. Docket No. A-79-47, containing supporting information used in developing the proposed standards, is available for public inspection and copying between 8:00 a.m. and 4:00 p.m., Monday through Friday, at EPA's Central Docket Section, West Tower Lobby, Gallery 1, Waterside Mall, 401 M Street, SW, Washington, D.C. 20460. A reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: Mr. Gene W. Smith, Standards Development Branch, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5421.

SUPPLEMENTARY INFORMATION:

Proposed Standards

The proposed new source performance standards (NSPS) would apply to new surface coating facilities at metal furniture manufacturing plants. In addition, existing surface coating facilities would be covered if they were to undergo a modification that would result in an increase of VOC emissions or a reconstruction. Emission of VOC from each affected facility would be limited to 0.70 kilogram of VOC per liter of coating solids applied. This numerical emission limit takes into account the mass of VOC per liter of coating solids in the paint and the transfer efficiency with which it is applied to yield the mass of VOC per liter of coating solids applied. The numerical emission limit could be met by the use of high solids coatings (i.e., 68 percent by volume solids coating with a solvent density of 0.88 kilogram per liter) applied at a 60 percent transfer efficiency. Transfer efficiencies of 60 percent or greater can be attained when applying high solids coatings with manual or automatic electrostatic spraying equipment.

The proposed standards could also be met with the use of other coating types applied by various application techniques. Examples of these include waterborne coatings (equivalent in emissions reduction to a 75 percent solids coating) applied by electrostatic, air or airless spray, dip, electrodeposition, or flow techniques; powder coatings (100 percent solids) applied by electrostatic spray or fluidized bed; and paints with lower solids content (less than the 68 percent by volume solids coating) if the increased solvent content is offset by higher transfer efficiencies.

The proposed standards could also be met with an emission control system which consists of a capture system and an emission control device or a combination of an emission control system and a low-organic-solvent coating (high solids or waterborne). Either of these methods would be acceptable if the owner or operator could show the Administrator that the control technology would achieve the proposed standards.

Although none of these control options are universally applicable, at least one option is available for all products produced by the metal furniture industry.

To determine compliance, performance tests would be conducted each calendar month. This would consist of calculating the monthly weighted average mass of VOC per volume of coating solids applied using the transfer efficiency values provided in the proposed standards. The owner or operator would obtain the information necessary to calculate emissions from formulation data supplied by the manufacturer of the coating or from an analysis of each coating by Reference Method 24 or by an equivalent or alternative method acceptable to the Administrator. Coating and organic solvent usage data would be obtained from company records. In the case of a question regarding the VOC content of coatings, Reference Method 24 would serve as the means by which the VOC content of the coating, and the resultant emissions, would be determined. Violations would be reported within 10 calendar days after the end of the calendar month.

When an incinerator is used to achieve compliance, Method 25 would be used during an initial 3-hour compliance test to determine the control efficiency. During this initial compliance testing with Method 25 the incinerator combustion temperature would be recorded and reported. The proposed standards also contain performance test provisions for an affected facility that uses an organic-solvent recovery system to attain compliance. The owner or operator would be required to calculate, by the equations contained in the proposed standards, the uncontrolled VOC emissions from each affected facility and the emissions reduction achieved by the recovery device. The owner or operator would also be

require to record daily the amount of organic solvent recovered by the system.

EPA estimates that the proposed standards would affect 800 new and 1,200 modified or reconstructed sources between 1980 and 1985.

Summary of Environmental, Energy, and Economic Impacts

The typical "uncontrolled" metal furniture manufacturer applies paint that contains about 35 percent by volume solids. In contrast, a Control Techniques Guideline (CTG) document entitled "Control of Volatile Organic Emissions from Existing Stationary Sources, Volume III: Surface Coating of Metal Furniture" (EPA-450/2-77-032) which defines reasonably available control technology (RACT) recommends that a 60 percent by volume solids coating be adopted by States in their State Implementation Plans (SIPs). The same metal furniture manufacturer applying a CTG-complying coating would emit about 60 percent less VOC than when applying the uncontrolled coating. It is estimated that this CTG recommendation could reduce emissions of VOC from about 49.8 megagrams per year to about 19.4 megagrams per year. The proposed standards would reduce VOC emissions to about 13.7 megagrams per year for the typical plant which is an additional 30 percent emission reduction below the CTG recommendation. Also, when compared to uncontrolled emissions, the proposed standards would reduce national VOC emissions from new, modified, and reconstructed facilities by about 53 gigagrams during the fifth year.

The impact of the proposed standards on water pollution would depend on the control option selected. For example, water use in spray booths would be unnecessary when powder coatings are used. Therefore, there would be a decrease in wastewater discharged when the proposed standards are met by employing powder coatings. Wastewater discharges could be expected not to increase for plants which utilize high solids and waterborne coatings. The quality of wastewater discharged is expected to remain the same for plants that apply high solids coatings when compared to that from plants that apply solvent-borne coatings. However, the quality of wastewater discharged from plants applying waterborne coatings could be reduced because these coatings contain water-miscible solvents. Finally, where incineration is used, the water pollution impact would depend on the type of coating used.

The impact on solid waste generation also depends on the control option selected. Powder coatings are generally recycled so that there is little waste. High solids and waterborne coatings produce about the same amount of solid waste as solvent-borne coatings. The use of emission control systems on a bake oven is expected to have no effect on the amount of solid waste generated from the types of coatings applied.

Energy savings could be possible for all uncontrolled coating facilities that employ any of the available control options to meet the proposed standards. Compliance with the proposed standards by using a 68 percent of volume solids coating would result in an energy savings of up to 8.9 petajoules over the first 5 years of the proposed standards due to a decrease in solvent usage. This is equivalent to approximately 230,000 cubic meters (1.45 million barrels) of crude oil.

For a typical metal furniture manufacturer complying with the recommended CTG, energy requirements would vary depending upon which control option is employed to meet the proposed standards. Energy consumption would decrease by about 20 percent (1500 gigajoules) if powder coatings were used. Energy consumption would increase, however, with the use of waterborne coatings or with incineration plus a CTG coating by about 3 percent (230 gigajoules) and 7 percent (520 gigajoules), respectively.

The economic impact summary presented in this section is based on the total anticipated costs of constructing and operating a new coating facility. Many of the control options considered involve a redesigning of the coating facility rather than simply adding equipment to an existing design. Usually powder coatings and waterborne coatings, for example, could not be applied in a spray booth equipped to use a solvent-based coating. For this reason, the capital and annualized costs represent a comparison of the total cost of each type of controlled facility rather than an incremental difference in the cost of each type of facility.

For a new typical spray coating facility with two painting lines the initial capital and annualized costs do not vary significantly regardless of which control option would be employed to comply with the proposed standards. Capital costs for each facility using the different control options are expected to range from about $960,000 (high solids coatings) to about $1,200,000 (waterborne coatings). The capital cost for a typical CTG coating facility or a typical uncontrolled coating facility would be about $960,000. The industrywide incremental capital cost of complying with the proposed standards over the first 5 years is expected to range from zero to $252,000,000 depending upon line changes because of the selected control option. This range is based on the projection of 2,000 affected facilities during the first 5 years of the proposed standards. The initial annualized costs for the different control options would range from about $600,000 to $700,000. These initial annualized costs would be comparable to the initial annualized costs for a typical CTG coating facility ($620,000) and a typical uncontrolled facility ($630,000).

Total annualized costs (or savings) vary depending upon which control option would be employed to comply with the proposed standards for all new, modified, and reconstructed spray coating plants (e.g., large, medium, and small sizes). For these facilities the fifth year industrywide annualized costs for incineration, and for waterborne coatings, would be about $18,000,000. An industrywide savings of $15,000,000 would result in the fifth year if high solids coatings were used. The total industrywide annualized costs for powder coatings could vary from a savings of $2,000,000 to a cost of $126,000,000 depending upon achieved coating thickness and other factors. The projected industrywide annualized cost to comply with the proposed standards, based on an anticipated mix of low-organic-solvent coatings, would be about $11,000,000.

The economic impacts of the proposed standards were evaluated based upon reduced profitability, inflationary impact, and expected price increases. The highest profit impairment is expected for small metal furniture manufacturers (4,000 liters of coatings consumed annually) regardless of control option. The maximum impact could result in about a 1.3 percent increase in the wholesale price of a metal furniture product from the small manufacturer.

Several industry representatives submitted comments, following the National Air Pollution Control Techniques Advisory Committee (NAPCTAC) presentation, related to the anticipated economic impact of the proposed standards. These comments, along with the supporting data provided, have been incorporated into the BID and are reflected in the preceding summary. However, the Administrator welcomes additional comments related to the economic impact analysis. Comments should contain specific information and data pertinent to the issue and suggested alternative courses of action that would avoid this impact.

Rationale

Selection of Source for Control

The "Priority List and Additions to the List of Categories of Stationary Sources," promulgated at 44 FR 49222 on August 21, 1979, ranked sources according to the impact that the standards promulgated in 1980 would have on emissions and public health in 1990. The surface coating of metal furniture is listed as a minor source category on this listing. This classification as a minor source is due primarily to the fact that individual metal furniture surface coating facilities typically emit less than 100 tons of VOC per year. However, the Priority List states that "the metal furniture coating industry is also a significant source of VOC emissions, and there are over 300 existing facilities with the potential to emit more than 100 tons per year."

There are approximately 1,400 metal furniture manufacturing establishments in the United States which paint their products. These metal furniture manufacturers are located throughout the country and are generally situated in highly populated urban areas. In fact, 70 percent of the industry is concentrated in nine highly populated states. The size range of these establishments and the types of metal furniture products produced are diverse. A large metal furniture manufacturer may have six or more coating lines while a small manufacturer may have only one coating line. The total number of coating lines in this industry is estimated to be about 3,100. This is approximately two coating lines for each establishment, which is considered to be a "typical" manufacturer. This typical manufacturer would consume from 67,600 to 87,000 liters of coating annually, and paint 780,000 square meters of metal furniture products. About 85 percent of the new coating lines are expected to apply paint by spraying methods.

The metal furniture industry emits about 95.5 gigagrams (1975 data) of VOC per year. The emissions of VOC result from usage of solvent-borne coatings by the industry. These paints contain organic solvent mixtures of aromatics, saturated and unsaturated aliphatics, alcohols, ketones, esters, and ethers. The emissions of these organic solvents contribute to ozone formation in urban atmospheres. EPA has established a National Ambient Air Quality Standard (NAAQS) for ozone of 0.12 microgram per cubic meter which is currently exceeded in those states where metal furniture manufacturing establishments are concentrated. Information concerning health and welfare effects associated with ozone can be found in "Air Quality Criteria for Ozone and Other Photochemical Oxidants," EPA-600/8-78-004, April 1978.

Moreover, the metal furniture industry is projected to have an annual growth rate of 4 percent. The growth rate is expected to remain at this level through 1985. Based on this growth, the industry will contribute increasing amounts of VOC to urban atmospheres.

Therefore, industrial surface coating of metal furniture was selected for regulation. This selection is based upon the metal furniture industry's priority listing, the number of affected facilities, painting method, the yearly VOC emission rate, the growth rate of the industry, and the location of this industry in or near highly populated urban areas.

Selection of Pollutants and Affected Facilities

Metal furniture manufacturers emit both particulate matter and VOC. Particulate matter is presently being controlled by the industry; however, VOC emissions are not controlled. They are emitted from the coating application, touch-up, flash-off, and bake oven areas. VOC emissions occur when the coating is applied and while the coated metal furniture part travels on a conveyor line through the application area. The coating on the metal furniture parts traveling on a conveyor line is the source of VOC in the flash-off and bake oven areas. The remainder of the operations at a metal furniture manufacturing plant are not included in the proposed standards because these are not significant sources of VOC. Touch-up operations are not included because they consume very little paint in comparison to the total amount of paint used in the coating application area. Clean-up operations would not be regulated under the proposed standards because VOC emissions from these operations are very difficult to quantify and control. Therefore, the affected facility is the combined coating application area, flash-off area, and bake oven area. This combination was selected as the affected facility because emissions from each area and their controls relate directly to the coating of the product.

The last consideration made concerning the affected facility was whether or not to establish a lower "cutoff" level of paint consumption in order to exempt smaller facilities from the proposed standards. The approach employed was to consider a cutoff level based on the amount of paint used or the capacity of the coating line. However, no cutoff level was established because of the possibility of wide variations in the amount of paint consumed yearly. The variability in the amount of paint consumed is a function of the economy. As a result, the consumption rate of paint may vary significantly from year to year. Several methods of determining the rated capacity of a coating line were investigated, but no decision was reached as to which would be most equitable. The Administrator specifically invites comments concerning this issue. Any comments submitted to the Administrator on this issue, however, should contain specific information and data pertinent to an evaluation of the magnitude and severity of any adverse impact and suggest alternative courses of action to avoid this impact.

Selection of Basis of Proposed Standards

Three control technologies were identified for reducing VOC emissions from metal furniture coating lines: (1) low-organic-solvent coatings, (2) transfer efficiency improvements based on coating application technique, and (3) emission control systems. Low-organic-solvent coatings include powder, high solids, and waterborne coatings. All of these coatings are presently being applied to metal furniture parts. None of the three types of coatings, however, are universally applicable for all metal furniture products because of differences in appearance needs, desired film thickness, required color changes, and other customer demands.

Powder coatings offer the largest emission reduction because they do not contain organic solvents. Powder coatings are applied by either electrostatic spraying devices or fluidized bed processes. Application of powder coatings to metal furniture parts by electrostatic spraying requires electrically charging the powder particles which are then attracted to the grounded part. In contrast, in the fluidized bed process the metal part is preheated, then dipped into a bed of air-fluidized particles. Both thermoset and thermoplastic powder coatings are being successfully applied in the metal furniture industry. Thermoset powders harden during heating as a result of cross-linking or polymerizing of the resin in the coating. Thermoplastic powders soften with the application of heat and resolidify during cooling. Powder coatings are normally selected when a thick and durable coating is required. However, thinner film thicknesses are now being achieved with thermoset powders. Powder coatings are applied electrostatically at thicknesses from 2.54×10^{-2} to 20.3×10^{-2} millimeters (1.0 to

8.0 mils). Coating thicknesses achieved with the fluidized bed process range from 15.2×10^{-2} to 152×10^{-2} millimeters (6.0 to 60 mils). Powder coatings cannot be used, however, at facilities requiring a large number (greater than 10) of color changes per day.

Coatings containing from 50 to 80 percent by volume solids are being applied to metal furniture parts instead of conventional solvent-borne coatings that contain 25 to 35 percent by volume solids. These coatings reduce VOC emissions by replacing much of the organic solvent with solids. For a 68 percent by volume solids coating, the VOC emission reduction achieved relative to an uncontrolled and a CTG coating is 73 and 30 percent, respectively. The use of coatings containing up to 68 percent solids is demonstrated in this industry with all applicable electrostatic spraying techniques, including guns, disks, and bells. Although coatings containing greater than 68 percent solids are currently being applied in the industry, their use has not been adequately demonstrated using a manual electrostatic spraying device. At present, the majority of the metal furniture industry using high solids coatings applies single-component heat-converted materials. These coatings form a film when they are cured inside an oven. Coating thicknesses achieved range from 2.54×10^{-2} to 3.81×10^{-2} millimeters (1.0 to 1.5 mils). Several metal furniture facilities using high solids coatings are complying with existing SIP regulations based upon the CTG-recommended coating. High solids coatings cannot be used, however, when a facility desires an especially thick coating or when the method of application is dip or flow coating.

Waterborne coatings are applied by spray, dip, electrodeposition, or flow techniques. All four application methods are used in the metal furniture industry. The majority of waterborne coatings currently applied contain about an 82/18 water-to-organic solvent ratio, with 35 percent by volume solids present in the paint. Waterborne coatings applied by the electrodeposition process usually contain less solids by volume. These coatings are able to achieve coating thicknesses comparable to conventional organic solvent-based coatings. Substitution of a typical waterborne coating applied by electrostatic spraying or dipping could be expected to reduce VOC emmissions relative to the uncontrolled and CTG-recommended facilities by about 80 and 50 percent, respectively. A waterborne coating applied by electrodeposition reduces VOC emissions for the uncontrolled and CTG-recommended facilities by about 95 and 85 percent, respectively. As with powder and high solids coatings, waterborne coatings cannot be used in all cases because of the limited film thicknesses achievable and the problems associated with electrostatically spraying such a highly conductive material.

The second control technology is improvement of transfer efficiency, based upon the method employed to apply the coating. Transfer efficiency defines the effectiveness at which solids are applied to the metal furniture part. The lower the transfer efficiency, the higher the VOC emission rates because more coating must be used to achieve the same thickness. The lowest transfer efficiencies reported range from 25 to 50 percent; these are for air and airless spraying equipment. Higher transfer efficiencies (60 to 95 percent) for spraying equipment are obtained with the electrostatic type equipment. The transfer efficiency of 60 percent represents the lower end of a range of efficiencies reported by paint suppliers and application equipment vendors. Therefore, 60-percent transfer efficiency was selected as the basis for the proposed standards. Although the highest transfer efficiencies are achieved with dip, electrodeposition, and flow coating techniques, about 85 percent of this industry uses traditional spraying techniques.

The only emission control system known to be in use in this industry is an incinerator, located at one plant. This incinerator is used to control VOC emissions from a bake oven. Incineration of VOC emissions is about 96 percent efficient. This efficiency was determined from stack test data obtained by EPA during the development of the proposed standard for automobile and light-duty truck surface coating operations.

Specific control options selected from the available control technologies include 65 and 70 percent by volume solids coatings, waterborne coatings, powder coatings, and a CTG-complying coating plus incineration. Based upon a comparison with CTG level of control (i.e., 60 percent by volume solids coating), four regulatory alternatives were established. These regulatory alternatives (labeled I, II, III, and IV) require, respectively, no additional control above the CTG (no NSPS), 30 percent above the CTG, 50 percent above the CTG, and 85 percent above the CTG.

All of the control option may be employed to achieve Regulatory Alternatives I and II. Regulatory Alternative III requires the use of waterborne coatings or a control options that provides equal or higher emission reduction.

Regulatory Alternative IV is based upon the highest emission reduction that may be achieved above the CTG-recommended level of control for a spray and dip coating line. The highest emission reduction for the spray coating line is about 99 percent (powder coatings), and the highest for a dip coating line is about 85 percent (waterborne applied by electrodeposition). As a result, VOC emission reduction above CTG-recommended requirements for Regulatory Alternative IV was established at 85 percent so that both powder and waterborne (electrodeposition) may be employed to achieve the designated emission reduction.

Environmental impacts were also evaluated for the four regulatory alternatives. None of the alternatives resulted in increased solid waste generation or decreased water quality. Also, when compared to uncontrolled facilities, there are energy savings possible with each regulatory alternative. The energy impact for a facility complying with the CTG-recommended level is about the same as that for each regulatory alternative.

For all regulatory alternatives the estimated total capaital costs are about the same. However, total annualized costs for the first 5 years of the proposed standards would vary depending on which control option is utilized to achieve the control level specified by each regulatory alternative. If coatings containing 60 to 70 percent by volume solids are employed to comply with Regulatory Alternatives I and II, there is a potential for annualized savings. Regulatory Alternative III results in the highest annualized costs if waterborne coatings are employed to achieve the required regulatory alternative.

The proposed standards are based on Regulatory Alternative II. This selection was based on the decision that all estimated impacts associated with Regulatory Alternative II were considered to be reasonable. This alternative also provides all facilities with at least one control option that could be used to comply with the proposed standards. Basing the proposed standards on an alternative that would require the use of waterborne or powder coatings would preclude the use of high solids coatings. This approach would prevent some facilities from complying with the proposed standards because of their inability to use powder or waterborne

coatings. Basing the proposed standards on the use of incineration was rejected because of the cost and energy impacts associated with this option. There is also a potential for an annualized cost saving with Regulatory Alternative II.

Selection of Format of Proposed Standards

A number of difference formats for the proposed standards are available. The format ultimately selected must be compatible with any of the control options that could be used to comply with the proposed standards. The formats considered were emission limits expressed in terms of: (1) the concentration of VOC emissions in the exhaust gases discharged to the atmosphere; (2) overall control efficiency; (3) mass of VOC emissions per unit of production; (4) mass of VOC emissions per volume of coating (less water); and (5) mass of VOC emissions per volume of coating solids applied.

The major advantage of a concentration format is simplicity of enforcement. Compliance could be directly measured using Reference Method 25. There are, however, two significant drawbacks to the use of this format. Regardless of the control approach chosen, emission testing would be required for each stack exhausting gases from the surface coating operations. Another potential problem with this format is the difficulty of determining whether dilution air is intentionally added to reduce the concentration of VOC in the gases discharged to the atmophere, or whether the air is added to the application or drying operations to optimize performance and maintain a safe working space. The concentration format therefore, is unacceptable.

A control efficiency format would require coating facilities to reduce emissions by a specified percentage. This has the advantage of allowing each facility to use whatever method is preferred to reduce the emissions. The disadvantage is that a baseline emission rate must be established for each facility to determine how much the emissions must be reduced to comply with the proposed standards. This baseline is likely to vary from plant to plant. In addition, this type of format would require well operated facilities to reduce emissions by the same percentage as poorly operated facilities. This could place the well-operated coating facilities at an economic disadvantage relative to their competitors. For these reasons, this format was not selected.

A format of mass of VOC emissions per unit of production would relate emissions to individual plant production on a direct basis. Where high solids or conventionally applied waterborne coatings are employed, the average VOC content of the coating materials could be determined by using Reference Method 24 or coating supplier's formulation. The volume of coating materials used and the percent solids could be determined from purchase records. VOC emissions could then be calculated by multiplying the VOC content of the coating materials by the volume of coating materials used in a given time period, and dividing the result by the number of furniture items produced during that time period. This would provide a VOC emission rate per unit of production. Consequently, procedures to determine compliance would be direct and straightforward. However, this procedure woud be very time consuming because it would require data collection every time the product mix was varied or a new part was added. In addition, this format would not account for the difference in surface coating requirements for various items due to size and configuration. This would result in a different emission standard for every piece of metal furniture coated. As a result, manufacturers of larger items would be required to reduce VOC emissions more than manufacturers of smaller items. For these reasons, this format was not selected.

The fourth format, mass of VOC emissions per volume of coating applied (minus water), is the one employed in the CTG document. The principal advantage of this format is that enforcement is relatively simple. However, one disadvantage is that transfer efficiency is not part of the format and as a result, a CTG or NSPS coating may emit more VOC than a non-complying coating because of the differences of obtainable transfer efficiencies due to different painting techniques. Also, it is difficult to determine a numerical limit for affected facilities using a new coating and add-on control equipment because this format does not consider transfer efficiency. As a result, this format was not selected.

The last format, which uses mass of VOC emissions per volume of coating solids applied, has the advantage of not requiring stack emission tests unless add-on emission control devices are used to comply with the proposed standards. Dilution air in the exhaust stream would not present a problem with this format. The problem of varyng part sizes and configurations would be eliminated because the format is in terms of volume of coating solids applied, which is independent of the surface area and number of items coated. This format would also allow flexibility in the selection of control systems because it is usable with any of the control methods. The format also takes into consideration the transfer efficiency of the coating technique. Because this format overcomes the varying dilution air and part size problems inherent with the other formats and considers transfer efficiency where other formats do not, it has been selected as the format for the proposed standards.

Selection of Numerical Emission Limit

The numerical emission limit selected for the proposed standards is 0.70 kilogram of VOC per liter of coating solids applied. This numerical emission limit is based on the selection of Regulatory Alternative II as the basis of the proposed standards. Regulatory Alternative II was previously defined as an additional 30 percent reduction in VOC emissions beyond that recommended in the CTG document. Establishing the numerical emission limit based upon Regulatory Alternative II permits each metal furniture manufacturer to select one of the available control options to achieve compliance. The numerical emission limit of the proposed standard could be calculated from the following conditions:

1. The use of a coating material containing 68 percent by volume solids.
2. The coating is applied at a transfer efficiency of 60 percent.
3. The solvents in the coating material have a density of 0.88 kilogram per liter.

These conditions are based on data provided by the metal furniture industry, and coating and application equipment vendors. Each of the conditions represents currently available technology which has been used successfully in the metal furniture industry.

For a coating system meeting the conditions stated above, the emission rate is calculated to be 0.70 kilogram of VOC per liter of coating solids applied. Due to the numerous emission reduction techniques available and the flexibility allowed by the format of the proposed standards, a variety of technologies may be used to meet the emission limit. The proposed standards can be achieved as a minimum by using any of the low-organic-solvent coatings, if applied electrostatically. Low-organic-solvent coatings applied by dip, flow, or electrodeposition techniques will also achieve the proposed numerical limit because of the high transfer efficiency of these methods. Powder coatings applied

by electrostatic spray or fluidized bed meet the proposed numerical limit. As a result, all of the control options can meet the proposed numerical limit.

Modification and Reconstruction Considerations

New source performance standards apply to modified and reconstructed, as well as to new facilities. Upon modification or reconstruction, an existing facility becomes an affected facility. The criteria for making modification and reconstruction determinations are presented in § 60.14 and § 60.15, respectively, of the general provisions of 40 CFR Part 60, and are applicable to all standards of performance promulgated under Section 111 of the Clean Air Act.

If the proposed standards go into effect, during the first 5 years there are expected to be about 2,000 affected facilities. Of these 2,000 affected facilities, approximately 60 percent are expected to be modified or reconstructed facilities, which would be required to comply with the proposed standards.

The metal furniture industry has expressed concern that expenditures made to comply with SIP requirements might bring the facility under the proposed standards as a reconstruction. The industry believes that it is unfair for compliance with one regulation to trigger coverage by a more stringent regulation. Comments are requested on the legality and economic consequences of an exemption from the reconstruction provisions under these circumstances. Any comments submitted to the Administrator, however, should contain specific information and data pertinent to an evaluation of the magnitude and severity of any adverse impact and suggested alternative courses of action that would avoid this impact.

Method of Determining Compliance

The procedure for determining monthly compliance with the proposed standards could vary depending on which control option is selected by the facility. The compliance determination procedure for all facilities begins as follows:

1. Calculate the mass of VOC, as applied, of all coating materials used during the calendar month for which the determination is being made. The data necessary to calculate the mass of VOC may be obtained from the coating formulator or through a coating analysis using Reference Method 24. When coating formulation data are used, the owner or operator must also include all dilution solvents added to the coating at the facility.

2. VOC emissions are then calculated by dividing the mass of VOC (step 1) by the multiplication product of the coating solids by volume applied and the appropriate transfer efficiency expressed as a decimal.

If the VOC emissions calculated in step 2 are greater than the proposed numerical emission limit, the facility is in violation of the proposed standards for the month and additional control is necessary. In situations where a lower solvent content coating or an increased transfer efficiency is used to bring the facility into compliance, the preceding steps are repeated in subsequent performance tests using the new set of conditions. However, if the facility chooses to achieve compliance by adding a control device, the following additional steps must be followed:

1. The initial compliance determination requires the use of Reference Method 25 to determine the VOC concentration in the effluent gas stream before and after the control device. Calculate the control efficiency of the device by using the test results.

2. Determine the percentage of the total VOC emissions from the facility which enter the emission control device.

3. Calculate the overall VOC emission reduction efficiency achieved by multiplying the percentage of VOC emissions which enter the control device (step 2) by the efficiency of the control device.

Detailed procedures, as well as the equations to be used for these calculations, are containd in the proposed standards. These procedures would require determining the VOC emissions from the coating materials used in each surface coating operation. This could be accomplished by periodic analysis of paint samples collected at the application area; however, such an analysis is expensive and time consuming. Paint companies routinely perform analyses of the solids and solvent content of the coatings they sell. This represents an inexpensive method of determining the VOC emissions from the coating. Therefore, a record of the coating supplier's coating formulation or analysis of the solvent and solids content of all coating materials purchased for each coating line within a plant would be required to be maintained. The Administrator would reserve the right to require Reference Method 24 testing to assure that compliance with the proposed standards is being achieved. This in itself, however, would not provide sufficient information to determine compliance because solvent paint dilutions may occur prior to paint application. In order to account for this, a record would also be required of all organic solvent which is purchased and used for the purpose of coating dilution by each coating line within the plant. This information would allow calculation of the total mass of VOC in all coatings consumed after viscosity control, thereby permitting determination of whether the applied coating formulation conforms to the requirements of the proposed standards.

Selection of Monitoring Requirements

Monitoring requirements are normally included in standards of performance to ensure that emission control requirements are met and that control devices are properly operated and maintained.

The owner or operator would be required to calculate and record the VOC emissions per volume of applied solids from each affected facility for each calendar month. Each monthly calculation would be considered a performance test. Where incineration is used to comply with the proposed standards, a monitoring device would be required to continuously record the combustion temperature of the control device. Following the performance test, the combustion temperature would be monitored and any period of more than 3 hours during which the temperature drops more than 50°C below the compliance test level would be reported quarterly.

Selection of Performance Test Methods

Performance tests would be required for add-on control devices to determine compliance with the proposed standards. Reference Method 25, "Determination of Total Gaseous Non-Methane Organic Emissions as Carbon," would be used to measure VOC concentration before and after the add-on control device. The estimated cost for conducting a test with this method before and after the control device is about $4,000.

The solids and organic solvent content of coatings would be determined based upon the paint supplier's coating formulation. However, Reference Method 24, "Determination of Volatile Organic Matter, Water Content, Density, Volume Solids, and Weight Solids of Surface Coatings," would be used to verify the paint supplier's data. This method combines several ASTM procedures which are published industry techniques.

Measurement of transfer efficiency would not be required for the proposed standards. Instead, transfer efficiency numbers are provided for each coating application technique. These numbers are based upon data collected from metal furniture manufacturers, paint

manufacturers, and paint application equipment manufacturers. However, if a manufacturer can justify to the Administrator's satisfaction that other values for transfer efficiencies are appropriate, the Administrator will approve their use on a case-by-case basis. In making this determination the Administrator will consider: (1) the surface area of all parts painted on the new coating line, (2) the number of parts painted, (3) the coating consumed and the procedures used to measure consumption, (4) the thickness of applied coating, and (5) the method of calculating transfer efficiency.

Impact of Reporting Requirements

During 1980 to 1985, there are expected to be about 2,000 affected facilities. The time required for compiling the initial compliance report for a typical spray painting plant (two coating lines) would be about 23 person-hours. The total time required by the industry for all of the affected facilities would be about 46,700 person-hours by 1985.

An additional report would be required for affected facilities that install a new add-on control device. For a typical plant the time required for performing the initial compliance test, compiling data and reviewing the test report would be about 400 person-hours. After the initial compliance test, the incinerator combustion temperature would be reported quarterly.

The Administrator specifically invites comments concerning the reporting requirements of the proposed standards. These requirements can be found in § 60.314 and § 60.315 of the proposed standards. Any comments submitted to the Administrator should contain specific information and data pertinent to an evaluation of the magnitude and severity of any adverse impact and should suggest alternative courses of action to avoid this impact. Recommended alternative reporting requirements should contain complete instructions and should state all the reasons why the recommended requirements would be considered an improvement.

Public Hearing

A public hearing will be held to discuss the proposed standards in accordance with Section 307(d)(5) of the Clean Air Act. Persons wishing to make oral presentations should contact EPA at the address given in the ADDRESSES section of this preamble. Oral presentations will be limited to 15 minute each. Any member of the public may file a written statement before, during, or within 30 days after the hearing. Written statements should be addressed to the Central Docket Section address given in the ADDRESSES section of this preamble.

A verbatim transcript of the hearing and written statements will be available for public inspection and copying during normal working hours at EPA's Central Docket Section in Washington, D.C. (see ADDRESSES section of this preamble).

Docket

The docket is an organized and complete file of all the information submitted to or otherwise considered in the development of this proposed rulemaking. The principal purposes of the docket are (1) to allow interested parties to readily identify and locate documents so that they can intelligently and effectively participate in the rulemaking process, and (2) to serve as the record in case of judicial review.

Miscellaneous

As prescribed by Section 111, establishment of standards of performance for surface coating of metal furniture was preceded by the Administrator's determination (40 CFR 60.16, 44 FR 49222, dated August 21, 1979), that these sources contribute signficantly to air pollution which may reasonably be anticipated to endanger public health or welfare. In accordance with Section 117 of the Act, publication of this proposal was preceded by consultation with appropriate advisory committees, independent experts, and Federal departments and agencies. The Administrator will welcome comments on all aspects of the proposed regulation, including economic and technological issues.

It should be noted that standards of performance for new sources established under Section 111 of the Clean Air Act reflect:

> * * * application of the best technological system of continuous emission reduction which (taking into consideration the cost of achieving such emission reduction, and nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated [Section 111(a)(1)].

Although there may be an emission control technology available that can reduce emissions below those levels required to comply with standards of performance, this technology might not be selected as the basis of standards of performance due to costs associated with its use. Accordingly, standards of performance should not be viewed as the ultimate in achievable emission control. In fact, the Act requires (or has the potential for requiring) the imposition of a more stringent emission standard in several situations.

For example, applicable costs do not necessarily play as prominent a role in determining the "lowest achievable emission rate" (LAER) for new or modified source locating in nonattainment areas, i.e., those areas where statutorily-mandated health and welfare standards are being violated. In this respect, Section 173 of the Act requires that new or modified sources constructed in an area where ambient pollutant concentrations exceed NAAQS must reduce emissions to the level that reflects LAER, as defined in Section 171(3) for such category of source. The statute defines LAER as that rate of emissions based on the following, whichever is more stringent:

(A) the most stringent emission limitation which is contained in the implementation plan of any State for such class or category of source, unless the owner or operator of the proposed source demonstrates that such limitations are not achievable, or

(B) the most stringent emission limitation which is achieved in practice by such class or category of source.

In no event can the emission rate exceed any applicable new source performance standard [Section 171(3)].

A similar situation may arise under the prevention of significant deterioration of air quality provisions of the Act (Part C). These provisions require that certain sources [referred to in Section 169(1)] employ "best available control technology" (BACT) as defined in Section 169(3) for all pollutants regulated under the Act. Best available control technology must be determined on a case-by-case basis, taking energy, environmental and economic impacts, and other costs into account. In no event may the application of BACT result in emissions of any pollutants which will exceed the emissions allowed by any applicable standard established pursuant to Section 111 (or 112) of the Act.

In all events, SIPs approved or promulgated under Section 110 of the Act must provide for the attainment and maintenance of NAAQS designed to protect public health and welfare. For this purpose, SIPs must in some cases require greater emission reduction than those required by standards of performance for new sources.

Finally, States are free under Section 116 of the Act to establish even more stringent emission limits than those established under Section 111 or those necessary to attain or maintain the NAAQS under Section 110. Accordingly, new sources may in some cases be subject to limitations more stringent than standards of performance under Section 111, and prospective owners and

operators of new sources should be aware of this possibility in planning for such facilities.

This regulation will be reviewed four years from the date of promulgation as required by the Clean Air Act. This review will include an assessment of such factors as the need for integration with other programs, the existence of alternative methods, enforceability, and improvements in emission control technology and reporting requirements. The reporting requirements in this regulation will be reviewed as required under EPA's sunset policy for reporting requirements in regulations.

Section 317 of the Clean Air Act requires the Administrator to prepare an economic impact assessment for any new source standard of performance promulgated under Section 111(b) of the Act. An economic impact assessment was prepared for the proposed regulations and for other regulatory alternatives. All aspects of the assessment were considered in the formulation of the proposed standards to ensure that the proposed standards would represent the best system of emission reduction considering costs. The economic impact assessment is included in the Background Information Document.

Dated: November 21, 1980.

Douglas M. Costle

Administrator.

It is proposed that 40 CFR Part 60 be amended by adding a new Subpart EE as follows:

Subpart EE—Standards of Performance for Surface Coating of Metal Furniture

Sec.

60.310 Applicability and designation of affected facility.
60.311 Definitions and symbols.
60.312 Standards for volatile organic compounds.
60.313 Performance tests and compliance provisions.
60.314 Monitoring of emissions and operations.
60.315 Reporting and recordkeeping requirements.
60.316 Test methods and procedures.

Authority: Secs. 111, 114, and 301(a) of the Clean Air Act, as amended, (42 U.S.C. 7411, 7414, 7601(a)), and additional authority as noted below.

Subpart EE—Standards of Performance for Surface Coating of Metal Furniture

§ 60.310 Applicability and designation of affected facility.

(a) The affected facility to which the provisions of this subpart apply is the volatile organic compound (VOC) emitting portion of each metal furniture surface coating line which is defined as the paint application area, the flash-off area, and the bake oven area.

(b) This subpart applies to any affected facility on which construction, modification, or reconstruction is commenced after November 28, 1980.

§ 60.311 Definitions and symbols.

(a) All terms used in this subpart not defined below are given meaning in the Act and in Subpart A of this part.

"Bake oven" means a device which uses heat to dry or cure coatings.

"Dip coating" means a method of applying coatings in which the part is submerged in a tank filled with the coatings.

"Electrodeposition (EDP)" means a method of applying coatings in which the part is submerged in a tank filled with the coatings and in which an electrical potential is used to enhance deposition of the coatings on the part.

"Electrostatic spray application" means a spray application method that uses an electrical potential to increase the transfer efficiency of the coatings.

"Flash-off area" means the portion of a surface coating line between the coating application area and bake oven.

"Flow coating" means a method of applying coatings in which the part is carried through a chamber containing numerous nozzles which direct unatomized streams of coatings from many different angles onto the surface of the part.

"Spray application" means a method of applying coatings by atomizing and directing the atomized spray toward the part to be coated.

"Transfer efficiency" means the ratio of the amount of coating solids transferred onto the surface of a part or product to the total amount of coating solids used.

"VOC content" means all volatile organic compounds (VOC) that are in coatings and evaporate during the application, drying, or curing process. VOC are expressed in terms of kilograms of VOC per liter of coating solids applied.

(b) All symbols used in this subpart not defined below are given meaning in the Act and in Subpart A of this part.

C_{aj} = concentration in gas stream in the "jth" vent after control device (parts per million as carbon)

C_{bi} = concentration in gas stream in the "ith" vent before control device (parts per million as carbon)

C_k = concentration in gas stream in the "kth" uncontrolled vent (parts per million as carbon)

D_{ci} = density of the "ith" coating (kilogram per liter)

D_{dj} = density of the "jth" diluent VOC-solvent (kilogram per liter)

D_r = density of VOC-solvent recovered by emission control device (kilogram per liter)

E = emission control device efficiency (inlet versus outlet, fraction)

F = capture efficiency (captured versus potential, fraction)

G = weighted average mass of VOC per volume of coating solids applied (kilograms of VOC per liter of coating solids applied)

i = indexing subscript designating the "ith" coating or "ith" vent before control device, ranges from 1 to n

j = indexing subscript designating the "jth" diluent VOC-solvent or the "jth" vent after control device, ranges from 1 to m

k = indexing subscript designating the "kth" uncontrolled vent, ranges from 1 to n

L_{ci} = volume of "ith" coating, as received (liters)

L_{dj} = volume of "jth" diluent VOC-solvent added to coating (liters)

L_r = volume of VOC-solvent recovered by emission control device (liters)

L_s = volume of coating solids (liters)

M_d = mass of VOC-solvent added to coating for dilution purposes (kilograms)

M_o = mass of VOC-solvent in coating, as received (kilograms)

M_r = mass of VOC-solvent recovered by emission control device (kilograms)I16L_{ci}=volume of "ith" coating, as received (liters)

L_{dj}=volume of "jth" diluent VOC-solvent added to coating (liters)

L_r=volume of VOC-colvent recovered by emission control device (liters)

L=volume of coating solids (liters)

M_d=mass of VOC-solvent added to coating for dilution purposes (kilograms)

M_o=mass of VOC-solvent in coating, as received (kilgrams)

M_r=mass of VOC-solvent recovered by emission control device (kilograms)

m=a known variable quantity of different diluent VOC-solvents or controlled vents

N=VOC emissions (kilograms of VOC per liter of coating solids applied)

n=a known variable quantity of coatings or vents

Q_{aj}=volumetric flow rate in the "jth" vent after control device (dry standard cubic meters per second)

Q_{bi}=volumetric flow rate in the "ith" vent before control device (dry standard cubic meters per second)

Q_k=volumetric flow rate in the "kth" uncontrolled vent (dry standard cubic meters per second)

R=overall VOC emission reduction efficiency (fraction)

T = transfer efficiency for each surface coating application method (fraction)
V_{si} = volume fraction of solids in the "ith" coating, as received (fraction)
W_{oi} = weight fraction of VOC-solvent in the "ith" coating, as received (fraction)
z = indexing subscript designating the "zth" control device

§ 60.312 Standards for volatile organic compounds (VOC).

(a) On and after the date on which the initial performance test required to be conducted by § 60.8(a) is completed, no owner or operator subject to the provisions of this subpart shall cause the discharge into the atmosphere of VOC emissions from any metal furniture coating line in excess of 0.70 kilogram of VOC per liter of coating solids applied.

§ 60.313 Performance tests and compliance provisions.

(a) Sections 60.8(d) and (f) do not apply to the performance test procedures required by this subpart.

(b) Each owner or operator of an affected facility shall conduct a performance test for each calendar month for each affected facility according to the procedures in this section, except as specified in § 60.315.

(1) Each owner or operator shall compute the weighted average mass of VOC per volume of coating solids applied for each month except as specified in § 60.313(c) and (d). Each monthly calculation is considered a performance test for the purposes of this subpart. Each owner or operator shall determine the composition of the coatings or by formulation data suppplied by the manufacturer of the coating or by analysis of each coating by Reference Method 24. The Administrator may require an owner or operator who uses manufacturer's formulation data to determine the VOC content of the coatings by Reference Method 24 or an equivalent or alternative method acceptable to the Administrator. Each owner or operator shall determine the coating and dilution solvent usage from company records. Each owner or operator shall obtain the density of each dilution solvent from the supplier of the dilution solvents. The weighted average mass of VOC per volume of coating solids applied for each month will be determined by the following procedures.

(2) Compute the mass of VOC from all coating materials, as applied, in any surface coating operation by the equation:

$$M_o + M_d = \sum_{i=1}^{n} L_{ci} D_{ci} W_{oi} + \sum_{j=1}^{n} L_{dj} D_{dj}$$

(3) Compute the total volume of coating solids used during each month by the equation:

$$L_s = \sum_{i=1}^{n} L_{ci} V_{si}$$

(4) Compute the weighted average mass of VOC per volume of coating solids applied by the equation:

$$G = \frac{M_o + M_d}{L_s T}$$

Values for transfer efficiency (fraction) are to be selected from the following table:

Application method	Transfer efficiency (T)
Air atomized spray	0.25
Airless spray	0.25
Manual electrostatic spray	0.60
Nonrotaional automatic electrostatic spray	0.70
Rotating head electrostatic spray (manual and automatic)	0.80
Dip coat	0.90
Flow coat	0.90
Electrodeposition	0.95
Powder application	0.95

If the owner or operator can justify to the Administrator's satisfaction that other values for transfer efficiencies are appropriate, the Administrator will approve their use on a case-by-case basis. Where more than one application method is used on an individual surface coating operation, the owner or operator shall perform an analysis to determine the relative volume of coating solids materials applied by each method. The owner or operator shall use these relative volumes of solids to compute a weighted average transfer efficiency for the operation. The Administrator will review and approve this analysis on a case-by-case basis.

(5) For affected facilities with no add-on control devices, N = G
Where N is less than or equal to 0.70 kilogram of VOC per liter of coating solids applied, compliance with § 60.312 is demonstrated and no further calculations are required.

(6) For affected facilities where N is greater than 0.70 kilogram of VOC per liter of coating solids applied, the facility is not in compliance with § 60.312. Compliance with § 60.312 may be achieved by a change to a lower-organic-solvent content type of coating material, through an increase in transfer efficiency or through the addition of an add-on control device.

(i) If an affected facility selects a change of coating materials, compliance must be demonstrated by performing the calculations described in § 60.313(b)(1), (2), (3), (4), and (5).

(ii) If compliance is to be demonstrated through an increase in transfer efficiency, the calculations described in § 60.313(b)(4) and (5) must be performed.

(iii) Where add-on emission control equipment is used, the control efficiency must be calculated as described in § 60.313(c) or (d):

(c) Each owner or operator subject to the provisions of this subpart, who uses an incinerator, shall determine compliance by the following procedures.

(1) The owner or operator shall use Reference Method 25 to determine the VOC concentration in the effluent gas before and after the emission control device for each stack that is equipped with an emission control device. The owner or operator shall use Reference Method 2 to determine the volumetric flow rate of the effluent gas before and after the emission control device on each stack.

(2) The owner or operator shall determine the fraction efficiency of each emission control device by the following equation:

$$E_z = \frac{\sum_{i=1}^{n} Q_{bi} C_{bi} - \sum_{j=1}^{m} Q_{aj} C_{aj}}{\sum_{i=1}^{n} Q_{bi} C_{bi}}$$

(3) The owner or operator shall determine capture efficiency of the incinerator by calculating the fraction of total VOC discharged from the surface coating line which enters each emission control device on that operation by the following equation:

$$F_z = \frac{\sum_{i=1}^{n} Q_{bi} C_{bi}}{\sum_{i=1}^{n} Q_{bi} C_{bi} + \sum_{k=1}^{m} Q_k C_k}$$

(4) The owner or operator shall determine the overall emission reduction efficiency of incineration systems by the following equation:

$$R = \sum_{z=1}^{n} E_z F_z$$

(5) The owner or operator shall determine the mass of VOC per volume of coating solids applied emitted after the control device(s) on the applicable surface coating line using the following equation:

$$N = G(1-R)$$

(6) For affected facilities where N is less than or equal to 0.70 kilogram of VOC per liter of coating solids applied, compliance with § 60.312 is demonstrated and no further calculations are required.

(7) For affected facilities where N is greater than 0.70 kilogram of VOC per liter of coating solids applied, the facility is not in compliance with § 60.312 for the month and additional control is required to bring the facility into compliance for future operation.

(d) Each owner or operator subject to the provisions of this subpart, who uses an emission control system that recovers the VOC in order to comply with § 60.312, shall determine compliance for each calendar month by the following procedures:

(1) Calculate the weighted average mass of VOC per volume of coating solids applied emitted after the control device(s) on the applicable surface coating line using the following procedure:

(i) Calculate the total mass of VOC recovered in the calendar month (kilograms) by the equation:

$$M_r = L_r D_r$$

(ii) Calculate the overall emission reduction efficiency of the solvent recovery system by the equation:

$$R = \frac{M_r}{M_o + M_d}$$

(iii) Calculate mass of VOC emitted by the equation:

$$N = G(1-R)$$

(2) For affected facilities where N is less than or equal to 0.70 kilogram of VOC per liter of coating solids applied, the facility has demonstrated compliance with § 60.312 and no further calculations are required.

(3) For affected facilities where N is greater than 0.70 kilogram of VOC per liter of coating solids applied, the facility is not in compliance with § 60.312 for the month and additional control is required to bring the facility into compliance for future operation.

§ 60.314 Monitoring of emissions and operations.

(a) The owner or operator of an affected facility which uses an incinerator to comply with the emission limits specified under § 60.312 shall install, calibrate, maintain, and operate temperature measurement devices acording to the following procedures:

(1) A temperature measurement device shall be installed in the firebox of each incinerator.

(2) Each temperature measurement device shall be installed, calibrated, and maintained according to accepted practice and the manufacturer's specifications. Each device shall have an accuracy of the greater of ± 0.75% of the temperature being measured expressed in degrees Celsius or ± 2.5°C.

(3) Each temperature measurement device shall be installed in a location that is representative of the temperature in the firebox of each incinerator.

(4) Each temperature measurement device shall be equipped with a recording device so that a permanent continuous record is produced.

(b) For the purposes of reports required under § 60.315, periods of excess emissions for incinerators are defined as any period of 3 hours or longer during which the average incinerator temperature, when the coating line is in operation, is more than 28° C (50° F) less than the average incinerator temperature during the most recent performance test at which the emission control device efficiency was determined as specified under § 60.313(c).

§ 60.315 Reporting and recordkeeping requirements.

(a) Each owner or operator of an affected facility shall include the following data in the initial performance test report required under § 60.8:

(1) Where compliance is achieved without the use of add-on control devices, the owner or operator shall report for each affected facility the weighted average mass of VOC per volume of coating solids applied during the calendar month.

(2) Where compliance is achieved through the use of incineration, the owner or operator shall include the following data in the initial performance test required under § 60.8(a) or subsequent performance tests during which Reference Method 25 is utilized.

(i) The combustion temperature,

(ii) The weighted average mass of VOC per volume of coating solids applied before and after the incinerator,

(iii) Capture efficiency,

(iv) The emission control device efficiency used to attain compliance with the applicable emission limit specified under § 60.312.

(b) Following the initial performance test report, each owner or operator of an affected facility shall record the weighted average mass of VOC per volume of coating solids applied for each affected facility during each calendar month and shall report within 10 calendar days each instance in which the weighted average is greater than the limit specified in § 60.312. Each monthly determination shall be considered a performance test.

(c) Where compliance with § 60.312 is achieved through the use of incineration,

the owner or operator shall continuously record the incinerator combustion temperature and report on a quarterly basis any periods of excess emissions which occurred during each month or submit a report indicating that no periods of excess emissions occurred.

(d) Where compliance with § 60.312 is achieved through the use of a solvent recovery system, the owner or operator shall record and maintain daily records of the amount of solvent recovered by the system for each affected facility.

(e) Each owner or operator subject to the provisions of this subpart shall maintain at the source, for a period of at least 2 years, all records, data, and calculations which were used to determine the VOC content of coatings and the weighted average mass of VOC per volume of coating solids applied for each affected facility.

(Sec. 114 of the Clean Air Act, as amended (42 U.S.C. 7414))

§ 60.316 Test methods and procedures.

(a) The reference methods in Appendix A to this part except as provided under § 60.8(b) shall be used to determine compliance with § 60.312 as follows:

(1) Method 24, or coating manufacturer's formulation date, for use in the determination of VOC content of each batch of coating as applied to the surface of the metal parts.

(2) Method 25 for the measurement of VOC concentration in the effluent gas entering and leaving the control device for each stack equipped with an emission control device.

(3) Method 1 for sample and velocity traverses.

(4) Method 2 for velocity and volumetric flow rate.

(5) Method 3 for gas analysis.

(6) Method 4 for stack gas moisture.

(b) For Method 24, the coating sample must be at least a 1 liter sample taken at a point where the sample will be representative of the coating material as applied to the surface of the metal part.

(c) For Method 25, the minimum sampling time for each run is 60 minutes and the minimum sample volume is 0.003 dry standard cubic meters except that shorter sampling times or smaller volumes, when necessitated by process variables or other factors, may be approved by the Administrator.

(Sec. 114 of the Clean Air Act, as amended (42 U.S.C. 7414))

[FR Doc. 80-37084 Filed 11-26-80; 8:45 am]

BILLING CODE 6560-26-M

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 60

[AD-FRL-1749-5]

Standards of Performance for New Stationary Sources; Surface Coating of Metal Furniture; Extension of Comment Period

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule; extension of comment period.

SUMMARY: This action provides for a 30-day extension of the comment period for the proposed standards of performance for surface coating of metal furniture. These standards were proposed in the Federal Register on November 28, 1980 (45 FR 79390). This action responds to a request from the Health Industry Manufacturers Association for an extension of the comment period. This extension will allow additional time for the industry to further evaluate the proposed standards and submit additional information and data.

DATES: Comments must be postmarked no later than March 10, 1981. Also, written comments responding to, supplementing, or rebutting written or oral comments received at the public hearing on January 9, 1981, must be postmarked no later than March 10, 1981.

ADDRESS: Comments should be submitted (in duplicate if possible) to: Central Docket Section (A-130), Attention: Docket Number A-79-47, U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, D.C. 20460

FOR FURTHER INFORMATION CONTACT:

Mr. Gene W. Smith, Standards Development Branch, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5421.

Dated: February 4, 1981.

Paul Stolpman,

Acting Assistant Administrator for Air, Noise, and Radiation.

[FR Doc. 81-4536 Filed 2-6-81; 8:45 am]

ENVIRONMENTAL PROTECTION AGENCY

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STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

STATIONARY INTERNAL COMBUSTION ENGINES

SUBPART FF

[FRL 1099-5]

[40 CFR Part 60]

Stationary Internal Combustion Engines; Standards of Performance for New Stationary Sources

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule.

SUMMARY: The proposed standards, which would apply to facilities that commence construction 30 months after today's date, would limit emissions of nitrogen oxides (NO_x) from new, modified, and reconstructed stationary gas, diesel, and dual-fuel internal combustion (IC) engines to 700 parts per million (ppm), 600 ppm, 600 ppm, respectively at 15 percent oxygen (O_2) on a dry basis. A revision to Reference Method 20 for determining the concentration of nitrogen oxides and oxygen in the exhaust gases from large stationary IC engines is also proposed.

The standards implement the Clean Air Act and are based on the Administrator's determination that stationary IC engines contribute significantly to air pollution. The intent is to require new, modified, and reconstructed stationary IC engines to use the best demonstrated system of continuous emission reduction, considering costs, non-air quality health, and environmental and energy impacts.

A public hearing will be held to provide interested persons an opportunity for oral presentation of data, views, or arguments concerning the proposed standards.

DATES: *Comments.* Comments must be received on or before September 21, 1979.

Public Hearing. The public hearing will be held on August 22, 1979 beginning at 9:30 a.m. and ending at 4:30 p.m.

Request to Speak at Hearing. Persons wishing to attend the hearing or present oral testimony should contact EPA by August 15, 1979.

ADDRESSES: *Comments.* Comments should be submitted to Mr. Jack R. Farmer, Chief, Standards Development Branch (MD-13), Emission Standards and Engineering Division, Environmental Protection Agency, Research Triangle Park, North Carolina 27711.

Public Hearing. The public hearing will be held at the Environmental Research Center Auditorium, Room B101, Research Triangle Park, N.C. 27711. Persons wishing to attend or present oral testimony should notify Mary Jane Clark, Emission Standards and Engineering Divison (MD-13), Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5271.

Standards Support Document. The support document for the proposed standards may be obtained from the EPA Library (MD-35), Research Triangle Park, North Carolina 27711, telephone number (919) 541-2777. Please refer to "Standards Support and Environmental Impact Statement: Proposed Standards of Performance for Stationary Internal Combustion Engines," EPA-450/3-78-125a.

Docket. The Docket, number OAQPS-79-5, is available for public inspection and copying at the EPA's Central Docket Section, Room 2903 B, Waterside Mall, Washington, D.C. 20460.

FOR FURTHER INFORMATION CONTACT: Mr. Don R. Goodwin, Director, Emission Standards and Engineering Division (MD-13), Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone (919) 541-5271.

SUPPLEMENTARY INFORMATION:

Proposed Standards

The proposed standards, which are summarized in Table A, would apply to all new, modified, and reconstructed stationary internal combustion engines as follows:

1. Diesel and dual-fuel engines greater than 560 cubic inch displacement per cylinder (CID/cyl).
2. Gas engines greater than 350 cubic inch displacement per cylinder (CID/cyl) or equal to or greater than eight cylinders and greater than 240 cubic inch displacement per cylinder (CID/cyl).
3. Rotary engines greater than 1500 cubic inch displacement per rotor.

The proposed standards, which would go into effect 30 months after the date of proposal (i.e., today's date), would limit the concentration of NO_x in the exhaust gases from stationary gas, diesel and dual-fuel IC engines to 0.0700 percent by volume (700 ppm), 0.600 percent by volume (600 ppm), and 0.0600 percent by volume 600 ppm, respectively, at 15 percent oxygen (O_2) on a dry basis. These emission limits are adjusted upward linearly for IC engines with thermal efficiencies greater than 35 percent.

Table A.—*Summary of Internal Combustion Engine New Source Performance Standard*

Internal combustion engine size and fuel type	NO_x emission limit* (ppm)	Applicability date
Diesel Engines > 560 CID/cyl or > 1500 CID/rotor	600	30 months from date of proposal (i.e., today's date)
Dual-Fuel Engines > 560 CID/cyl or > 1500 CID/rotor	600	30 months from date of proposal (i.e., today's date)
Gas Engines > 350 CID/cyl or ≥ 8 cylinders *and* > 240 CID/cyl or 1500 > CID/rotor.	700	30 months from date of proposal (i.e., today's date)

*NO_x emission limit adjusted upward for internal combustion engines with thermal efficiencies greater than 35 percent. Measured NO_x emissions adjusted to standard atmospheric conditions of 101.3 Kilopascals (29.92 inches mercury), 29.4 degrees Centigrade (85 degrees Farhenheit), and 17 grams moisture per kilogram dry aid (75 grains moisture per pound of dry air) in determining compliance with the NO_x emission limit.

The proposed standards would be referenced to standard atmospheric conditions of 101.3 kilopascals (29.92 inches mercury), 29.4 degrees centigrade (85 degrees Fahrenheit), and 17 grams mositure per kilogram dry air (75 grains moisture per pound of dry air). Measured NO_x emission levels, therefore, would be adjusted to standard atmospheric conditions by use of ambient correction factors included in the standard. Manufacturers, owners, or operators may also elect to develop custom ambient condition correction factors, in terms of ambient temperature, and/or humidity, and/or ambient pressure. All correction factors would have to be substantiated with data and approved for use by EPA before they could be used for determining compliance with the proposed standards.

Emergency-standby IC engines and all one- and two-cylinder reciprocating gas engines would be exempt from the NO_x emission standard.

Summary of Environmental and Economic Impacts

The proposed standards would reduce uncontrolled NO_x emissions levels from stationary IC engines by about 40 percent. Based on industry growth projections, a reduction in national NO_x emissions of about 145,000 megagrams per year (160,000 tons per year) would

be realized in the fifth year after the standards go into effect. Except for a few local areas (e.g., Los Angeles), there are currently no state standards liminting NO_x emissions from IC engines.

The proposed standards, however, would increase uncontrolled CO and HC emissions levels from stationary IC engines. Based on industry growth projections, an increase in national CO emissions of about 216,000 megagrams (238,000 tons) annually would be realized in the fifth year after the standards go into effect. Similarly, an increase in national total HC emissions of about 4600 megagrams (5000 tons) annually would be realized in the fifth year after the standards go into effect.

The large increase in CO emissions is due primarily to carbureted or naturally aspirated gas engines. These engines operate closer to stoichiometric conditions under which a small change in the air-to-fuel ratio results in a large increase in CO emissions.

Though total national CO emissions would increase significantly, ambient air CO concentrations in the immediate vicinity of these carbureted or naturally aspirated gas engines would not be adversely affected. As a result of the proposed standards of performance, the CO emissions from a naturally aspirated engine would increase about 160 percent. NO_x emissions from the same engine, however, would decrease concurrently about 40 percent.

Thus, there exists a trade-off between NO_x emissions reduction and CO emissions increase, particularly for carbureted or naturally aspirated gas engines. It should be noted though that CO emissions are considered to be a local problem since CO readily reacts to form CO_2. Additionally, most naturally aspirated gas engines are operated in remote locations where CO is not a problem. NO_x emissions, however, are linked to the formation of photochemical oxidants and are subject to long range transport. Also, NO_x emission control techniques are essentially design modifications, not add-on equipment, therefore, NO_x emissions reductions are much harder to achieve than CO or HC emissions reductions which may be achieved more easily from other sources.

One alternative is to propose a CO emissions limit based on the use of oxidizing catalysts. These catalysts can provide CO and HC emissions reductions on the order of 90 percent. Initial capital costs are high, however, averaging about $7500 for a typical 1000 horsepower naturally aspirated gas engine, or about 15 percent of the purchase price of this engine. EPA feels these costs for control of CO emissions are unreasonable.

The trade-off between NO_x and CO emissions appears reasonable. However, EPA invites comments from state and local air pollution control agencies, environmental groups, the industry, and other interested individuals concerning all aspects of the attractiveness of these standards which reduce NO_x emissions at the expense of CO emissions.

Industry has requested a waiver from the national mobile source standards for diesel engines used in light duty vehicles. Based on their tests, industry believes that the application of NO_x control techniques to these mobile diesel engines causes increased particulate (smoke) emissions. The plumes from most well maintained large-bore stationary IC engines, however, are virtually invisible when the engine is operating at steady state. Though excessive retard will cause diesel and dual fuel units to emit smoke, the NO_x control results used in the development of this standard were only considered if the plume did not exceed ten percent visibility. Therefore, EPA feels the NO_x control techniques used to meet the proposed standards for large stationary IC engines will not cause excessive visible and/or particulate emissions. However, EPA invites comments on the aspects of the proposed standards which reduce NO_x emissions at the expense of visible and/or particulate emissions.

There would be essentially no adverse water pollution, solid waste, or noise impact resulting from the proposed standards.

The energy impact of the proposed standards would be small. Turbocharged gas IC engine fuel consumption would be increased about two percent. Dual-fuel IC engine fuel consumption would be increased about three percent. Diesel IC engine fuel consumption would be increased about seven percent. Naturally aspirated gas IC engine fuel consumption would be increased by about eight percent. The fifth year energy impact of the proposed standards would be equivalent to an increase in fuel oil consumption of about 1.5 million barrels of oil per year (4,300 barrels of oil per day). This represents an increase of only 0.03 percent of the oil projected to be imported in the United States five years after the standards go into effect. In addition, these estimates are based on "worse-case" assumptions which yield the greatest energy impacts, and actual impacts are expected to be lower.

The economic impacts of the proposed standards are considered reasonable. The proposed standards would increase IC engine manufacturers' total capital investment requirements for developmental testing of engine models by about $5 million. These expenditures would be made over a two year period. Analysis of financial reports and other public financial information indicates that the manufacturers' overhead budgets are sufficient to support these requirements without adverse impact on their financial positions. The proposed standards would not give rise to a significant sales advantage for one or two manufacturers over competing manufacturers. The maximum intra-industry sales losses, based on "worst-case" assumptions, would be about six percent.

The proposed standards would increase the total annualized costs to users of a large stationary IC engines of all fuel types by about two to seven percent. The capital cost or purchase price of a large stationary IC engine would increase by about two percent.

The proposed standards would increase the total annualized costs for all engine users by about $32 million in the fifth year after standards go into effect. The total capital investment requirements for all users would equal about 9.6 million on a cumulative basis over the first five years the standards are in effect.

These impacts would result in price increases for the end products or services provided by the industrial and commercial users of large stationary IC engines. The electric utility industry would pass on a price increase after five years of 0.02 percent. After five years, delivered natural gas prices would increase 0.04 percent. Even after a full phase-in period of 30 years, during which new controlled engines would replace all existing uncontrolled engines, the electric utility industry would pass on a price increase of only 0.1 percent. Delivered natural gas prices would increase only 0.3 percent.

Rationale—Selection of Source for Control

Stationary IC engines are sources of NO_x, hydrocarbons (HC), particulates, sulfur dioxide (SO_x), and carbon monoxide (CO) emissions. NO_x emissions from IC engines, however, are of more concern than emissions of these other pollutants for two reasons. First, compared to total U.S. emissions for each pollutant, NO_x is the primary pollutant emitted by stationary engines. Second, EPA has assigned a high priority to development of standards of

performance limiting NO_x emissions. A study by Argonne National Laboratory, "Priorities and Procedures for Development of Standards of Performance for New Stationary Sources of Atmospheric Emissions" (EPA-450/3-76-020), concluded that national NO_x emissions from stationary sources would increase by more than 40 percent between 1975 and 1990 in the absence of additional emission controls. Applying best technology to all sources would reduce this increase but would not prevent it from occurring. This unavoidable increase in NO_x emissions is attributable largely to the fact that current NO_x emission control techniques are based on combustion redesign. In addition, few NO_x emission control techniques can achieve large (i.e., in the range of 90 percent) reductions in NO_x emissions. Consequently, EPA has assigned a high priority to the development of standards of performance for major NO_x emission sources wherever significant reductions in NO_x can be achieved. Studies have shown that IC engines are significant contributors to total U.S. NO_x emissions from stationary sources. Internal combustion engines account for 16.4 percent of all stationary source NO_x emissions, exceeded only by utility and packaged boilers.

Studies have investigated the effect that standards of performance would have on nationwide emissions of particulates, NO_x, SO_x, HC, and CO from stationary sources. The "Priority List for New Source Performance Standards under the Clean Air Act Amendments of 1977," which was proposed in the August 31, 1978, **Federal Register**, ranked sources according to the impact, in tons per year, that standards promulgated in 1980 would have on emissions in 1990. This ranking placed spark ignition IC engines second and compression ignition IC engines third on a list of 32 stationary NO_x emission sources. Consequently, stationary IC engines have been selected for development of standards of performance.

Selection of Pollutants

Nitrogen oxides, hydrocarbons, and carbon monoxide.—Stationary IC engines emit the following pollutants: NO_x, CO, HC, particulates, and SO_x. The primary pollutant emitted by stationary IC engines is NO_x, accounting for over six percent (or 16 percent of all stationary sources) of the total U.S. inventory of NO_x emissions.

Stationary IC engines also emit substantial quantities of CO and HC. Numerous small (1-100 hp) spark ignition engines, which are similar to automotive engines, account for about 20 percent of the uncontrolled HC emissions and about 80 percent of the uncontrolled CO emissions. The large annual production of these small spark ignition engines (approximately 12.7 million), however, makes enforcement of a new source performance standard for this group difficult.

Large-bore engines, which account for three-quarters of NO_x emissions from stationary IC engines, contribute relatively small amounts to nationwide HC and CO emissions, especially if one considers that 80 percent of the HC emissions from large-bore IC engines are methane. An additional factor in considering CO and HC control is that inherent engine characteristics result in a trade-off between NO_x control and control of CO and HC.

As mentioned before, in some cases, particularly naturally aspirated gas engines, the application of NO_x emission control techniques could cause increases in CO and HC emissions. This increase in CO and HC emissions is strictly a function of the engine operating position relative to stoichiometric conditions, not the NO_x control technique. These engines operate closer to stoichiometric conditions under which a small change in the air-to-fuel ratio results in a large increase in CO emissions. Any increase in CO and HC emissions, however, represents an increase in unburned fuel and hence a loss in efficiency. Since IC engines manufacturers compete with one another on the basis of engine operating costs, which is primarily a function of engine operating efficiency, the marketplace will effectively ensure that CO and HC emissions are as low as possible following application of NO_x control techniques.

Though total national CO emissions would increase significantly, ambient air CO concentrations in the immediate vicinity of these carbureted or naturally aspirated gas engines would not be adversely affected. As a result of the proposed standards of performance, the CO emissions from a natually aspirated engine would increase about 160 percent. NO_x emissions from the same engine, however, would decrease concurrently about 40 percent.

Thus, there exists a trade-off between NO_x emissions reduction and CO emissions increase, particularly for carbureted or naturally aspirated gas engines. It should be noted though that CO emissions are considered to be a local problem as CO readily reacts to form CO_2. Additionally, most naturally aspirated gas engines are operated in remote locations where CO is not a problem. NO_x emissions, however, are linked to the formation of photochemical oxidants and are subject to long range transport. NO_x emissions reductions are also much harder to achieve than CO or HC emissions reductions which may be achieved more easily from other sources.

In addition, promulgation of CO standard of performance could, in effect, preclude significant NO_x control. NO_x emissions are primarily a function of combustion flame temperature. Decreasing the air-to-fuel ratio of a gas engine lowers the flame temperature and consequently reduces NO_x formation. As will be discussed later, this technique is the most effective means of reducing NO_x emissions from gas engines. CO emissions, however, are primarily a function of oxygen availability. Decreasing the air-to-fuel ratio reduces oxygen availability and consquently increases CO emissions. Hence naturally aspirated gas engines show a pronounced rise in CO emissions as the air-to-fuel mixture becomes richer (i.e., decreasing air-to-fuel ratio). Thus, placing a limit on CO emissions from internal combustion engines could effectively limit the decrease in the air-to-fuel ratio which would be applied to reduce NO_x emissions from naturally aspirated gas engines and, consequently, could limit the amount of NO_x emissions reduction achievable.

One alternative is to propose a CO emissions limit based on the use of oxidizing catalysts. These catalysts can provide CO and HC emissions reductions on the order of 90 percent. Initial capital costs are high, however, averaging about $7500 for a typical 1000 horsepower naturally aspirated gas engine, or about 15 percent of the purchase price of this engine. EPA feels these costs for control of CO emissions are unreasonable.

The trade-off between NO_x and CO emissions appears reasonable, and consequently, only NO_x emissions from large stationary IC engines were selected for control by standards of performance.

EPA, however, invites comments from state and local air pollution control agencies, environmental groups, the industry, and interested individuals concerning all aspects of the attractiveness of these standards which reduce NO_x emissions at the expense of CO emissions.

Particulate.—Virtually no data are available on particulate emission rates from stationary IC engines. It is believed, however, that particulate emissions from stationary IC engines are

very low because the plumes from most of these engines are not visible. Therefore, neither particulate emissions nor visible emissions (plume opacity) were selected for control by standards of performance.

Sulfur oxides.—Sulfur oxides (SO_x) emissions from an IC engine depend on the sulfur content of the fuel and the fuel consumption of the engine. Scrubbing of IC engine exhausts to control SO_x emissions does not appear to be reasonable from an economic viewpoint. Therefore, the only viable means of controlling SO_x emissions would be combustion of low sulfur fuels. IC engines, however, currently burn low-sulfur fuels and will likely continue to do so because of the lower operating and maintenance costs associated with combustion of these fuels. Therefore, SO_x emissions were not selected for control by standards of performance.

Selection of Affected Facilities

A relatively small number of large-bore IC engines account for over 75 percent of all NO_x emissions from stationary engines. The remaining smaller bore IC engines, which make up the majority of all engine sales, are, from a NO_x emission standpoint, a considerably less significant segment of the industry. These engines have different emission characteristics due to their size, design, and operating parameters. The NO_x reduction technology developed for use on the large-bore IC engines may not be directly applicable to these smaller engines. Therefore, at this time, only large-bore engines have been selected for control by standards of performance.

Diesel engines.—The primary high usage (large emissions impact) domestic application of large-bore diesel engines during the past five years has been for oil and gas exploration and production. The market for prime (continuous) electric generation and other industrial applications all but disappeared after the 1973 oil embargo, but was quickly replaced by sales of standby electric units for building services, utilities, and nuclear power stations. The rapid growth in the oil and gas production market occurred because diesel units are being used on oil drilling rigs of various sizes. Sales of engines to export applications have also grown steadily since 1972, and are now a major segment of the entire sales market.

Medium-bore as well as large-bore engines are sold for oil and gas exploration, standby service, and other industrial applications. Applying standards of performance to medium-bore engines serving the same applications as large-bore designs would increase the number of affected facilities from about 200 to about 2,000 units per year (based on 1976 sales information) but consequently further reduce national NO_x emissions. Medium-bore sales accounted for significant NO_x emissions in 1976 (approximately 12,500 megagrams). It is estimated that approximately 25 percent, or about 500 of these units in high usage applications, accounted for most of the medium/bore NO_x emissions, since most of the remainder of these units were sold as standby generator sets. Though the potential achievable NO_x reduction is significant, this alternative causes the standard to apply to lower power engine models with fewer numbers of cylinders competing with other unregulated engines in different stationary markets. Additionally, considering this large number, and the remoteness and mobility of petroleum applications, this alternative would create serious enforcement difficulties. Consequently, a definition is required that distinguishes large-bore engines competing with medium-bore high power engines used for baseload electrical generation from large-bore engines competing solely with other large-bore engines.

One approach would be to define diesel engines covered by standards of performance as those exceeding 560 cubic inch displacement per cylinder (ie., CID/cyl). IC engines below this size are generally used for different applications than those above it. Considering the sizes and displacements offered by each diesel manufacturer and the applications served by diesel engines, this definition was selected as a reasonable approach for separating large-bore engines that compete with medium-bore engines from large-bore engines that compete solely with each other.

Dual-fuel engines.—The concept of dual-fuel operation was developed to take advantage of both compression ignition performance and inexpensive natural gas. These engines have been used almost exclusively for prime electric power generation. Shortages of natural gas and the 1973 oil embargo have combined to significantly reduce the sales of these engines in recent years. The few large-bore units that were sold (11 in 1976) were all greater than 350 CID/cyl.

Although a greater-than-350-CID/cyl limit would subject nearly all new dual-fuel sources to standards of performance, the criterion chosen to define affected diesel engines (i.e., greater than 560 CID/cyl) has also been selected for dual-fuel engines. The primary reason is that supplies of natural gas are likely to become even more scarce; thus dual-fuel engines will likely operate as diesel engines.

Gas engines.—The primary application of large-bore gas engines during the past five years has been for oil and gas production. The primary uses are to power gas compressors for recovery, gathering, and distribution. About 75 to 80 percent of all gas engine horsepower sold during the past five years was used for these applications. During this time, sales to pipeline transmission applications declined. Pipeline applications combined with standby power, electric generation, and other services (industrial and sewage pumping) accounted for the remaining 20 to 25 percent of horsepower sales. The growth of oil and gas production applications during this period corresponds to the increasing efforts to find new, or to recover marginal, gas reserves and distribute them to the existing pipeline transmission network.

It is estimated that the 400,000 horsepower of large-bore gas engine capacity sold for oil and gas production applications in 1976 emitted 35,000 megagrams of NO_x emissions, or nearly three times more NO_x than was emitted by the 200,000 horsepower of large-bore diesel engine capacity sold for the same application in that year. Thus, large-bore gas engines are primary contributors of NO_x emissions from new stationary IC engines, and standards of performance should be directed particularly at these sources.

If affected engines were defined as those greater than 350 CID/cyl, then all competing manufacturers of large-bore gas engines except one would be affected by the proposed standards of performance. This one manufacturer produces primarily medium-bore engines. Therefore, a 350 CID/cyl limit would give this one manufacturer an unfair competitive advantage over other large-bore engine manufacturers. Consequently, this definition should be lowered, or another definition adopted, to include the manufacturer in question. Either of the following two definitions would subject this manufacturer's gas engine to standards of performance:

- Greater than 240 CID/cyl
- Greater than 350 CID/cyl or greater than or equal to 8-cylinder and greater than 240 CID/cyl

Both measures would essentially include only this manufacturer's gas engines which compete with other manufacturer's large-bore gas engines. The second definition has a slight

advantage over the first since it includes only gas engines produced by all manufacturers that have competitor counterparts of about the same power. Therefore, this second definition of affected gas engines was selected.

Rotary engines.—Rotary or wankel type engines have only recently been introduced as power sources in package stationary applications. These internal combustion engines convert energy in the fuel directly to rotary motion rather than through reciprocating pistons and a crankshaft. These engines consist of a triangular rotor rotating eccentrically inside an epitrochoidal housing.

Until recently the largest rotary engine in production was 90 cubic inches per rotor. Now, however, one manufacturer is producing a rotary engine with a displacement of 2,500 cubic inches per rotor. This engine is being offered as a one rotor model rated at 550 horsepower and a two rotor unit rated at 1,100 horsepower.

The displacement of the rotary engine is defined as the volume contained in the chamber, bordered by one flank of the rotor and the housing, at the instant the inlet port closes. These engines are presently sold as naturally aspirated gaseous fueled units primarily for fuel gathering compressors and power generation on offshore platforms.

NO_x emissions from these large rotary engines are similar to NO_x emissions from naturally aspirated four stroke, gaseous fuel reciprocating engines. Further sales of these engines are estimated to be 50,000 horsepower per year over the next five years. Since these large rotary engines contribute to NO_x emissions, standards of performance for new stationary IC engines should include these sources.

Due to design differences, rotary engines develop more power per cubic inch displacement than reciprocating engines. If the lower cutoff limit for affected rotary engines were 350 CID/rotor—in an attempt to equate displacement per cylinder and also use the same limit as for gaseous fueled engines—then rotary engines of approximately 100 horsepower would be regulated by standards of performance. Thus rotary engine manufacturers would be at a competitive disadvantage with unregulated reciprocating engine manufacturers in this power range. To ensure that the standards of performance do not alter the competitive position of the two types of engines, the lower size limit for affected rotary engines should correspond to an engine whose power output is the same as the smallest affected reciprocating unit.

Based on this criterion of equivalent horsepower, it is estimated that rotary engines greater than 1,500 CID/rotor would compete with reciprocating engines greater than 350 CID/cyc. Therefore, a greater than 1,500 CID/rotor definition of affected rotary engines is selected to subject these engines to standards of performance. The definition applies to rotary engines of all fuel types.

Exemptions.—One and two cylinder reciprocating engines could be covered by the above definitions. These engines, however, account for less than 10 percent of all engine horsepower and therefore are less significant NO_x emitters. Additionally, the engines operate at a small fraction of their power output and probably have lower NO_x emissions than the larger, high rated engines. Therefore, all one and two cylinder reciprocating engines were exempted from standards of performance.

Emergency standby engines also require special consideration. These engines operate less than 200 hours per year under all but very unusual circumstances. Consequently, they add relatively little to regional or national total NO_x emissions. The largest category of emergency standby units is for nuclear power plants, where these engines provide power for the pumps used for cooling the reactors. These engines must attain a set speed in ten seconds and must assume full rated load in 30 seconds. In some cases, application of the demonstrated NO_x control technique limits the responsiveness of these engines in emergency situations. Therefore, all emergency standby engines are exempted from standards of performance.

Selection of Best System of Emission Reduction

Four emission control techniques, or combinations of these techniques, have been identified as demonstrated NO_x emission reduction systems for stationary large-bore IC engines. These techniques are: (1) Retarded ignition or fuel injection, (2) air-to-fuel ratio changes, (3) manifold air cooling, and (4) derating power output (at constant speed). In general, all four techniques are applied by changing an engine operating adjustment.

Fuel injection retard is the most effective NO_x control technique for diesel engines. Similarly, air-to-fuel ratio change is the most effective NO_x control technique for gas engines. Both retard and air-to-fuel ratio changes are effective in reducing NO_x emissions from dual-fuel engines.

Other NO_x emission control techniques exist but are not considered feasible alternatives. Of these other techniques, catalytic reduction of NO_x emissions through the use of systems similar to automobile catalyst systems is probably the first to come to mind. Most large stationary IC engines operate at air-to-fuel ratios that are typically much greater than stoichiometric, and consequently the engine exhaust is characterized by high oxygen (O_2) concentrations. Existing automobile catalytic converters, however, operate near stoichiometric conditions (i.e., low exhaust O_2 concentrations). These automobile catalysts are not effective in reducing NO_x in the presence of high O_2 concentrations.

Consequently, entirely different catalyst systems would be needed to reduce NO_x emissions from large stationary IC engines. Although such catalyst systems are currently under development and have been demonstrated for one very narrow application (i.e., fuel-rich naturally aspirated gas engines), they have not been demonstrated for the broad range of IC engines manufactured, such as turbocharged engines, fuel-lean gas engines, or diesel engines. For these engines the reduction of NO_x by ammonia injection over a precious metal (e.g., platinum) catalyst appears promising with NO_x reductions of approximately 90 percent having been reported; however, the cost of such a system is high.

For a typical 1000 horsepower engine approximately two cubic feet of honeycomb catalyst (platinum based) would be required to ensure proper operation of the system. The cost of the catalyst was estimated at $1.500/cubic foot (in 1973). Assuming that the engine costs $150/hp and that the cost of the catalyst accounts for about one-half the cost of the whole system (container, substrate, and catalyst), the capital investment for this control system represents approximately four percent of the engine purchase price.

The amount of ammonia required for an ammonia/catalyst NO_x reduction system will depend on the NO_x emission rate (g/hp-hr). Based on uncontrolled NO_x emission rates of 9 to 22 g/hp-hr, and the cost of $150/ton for the ammonia, the cost impact of injecting ammonia is approximately 5 to 15 percent of the total annual operating costs ($/hp-hr) for natural gas engines. When this operating cost is combined with the capital cost of the catalytic system discussed above, the total cost

increase is about 25 percent. Therefore, in continuous service applications this system is expensive compared to control techniques such as retard or air-to-fuel changes.

It is also important to note that the consumption of ammonia can be expressed as a quantity of fuel since natural gas is generally used to produce ammonia. Assuming a conservative NO_x emission rate of 20 g/hp-hr, and engine heat rate of 7500 Btu/hp-hr, a heating value of 21,800 Btu/lb for natural gas, and a requirement for approximately 900 lbs of gas per ton of ammonia produced, then the ammonia necessary for the catalytic reduction has the same effect on the supply of natural gas as a two percent increase in fuel consumption. Additional fuel is required to operate the plant which produces the ammonia.

Catalytic reduction, therefore, is currently not a demonstrated NO_x emission control technique which could be used by all IC engines. Consequently, although catalytic reduction of NO_x emissions could be used in a few isolated cases to comply with standards of performance, it could not be used as the basis for developing standards of performance which are applicable to all IC engines.

The data and information presented in the Standards Support and Environmental Impact Statement clearly indicate that the four demonstrated control techniques mentioned above will reduce NO_x emissions from IC engines. Due to inherent differences in the uncontrolled emission characteristics of various engines, it is difficult to draw conclusions from this data and information concerning the ability of these emission control techniques to reduce NO_x emissions from all IC engines to a specific level. In general, engines with high uncontrolled NO_x emissions levels have relatively high controlled NO_x emissions levels and engines with low uncontrolled NO_x emissions levels have relatively low contolled NO_x emissions levels. To eliminate these inherent differences in NO_x emission characteristics among various engines, the data were analyzed in terms of the degree of reduction in NO_x emissions as a function of the degree of application of each emission control technique.

Ignition retard in excess of eight degrees in diesel engines frequently leads to unacceptably high exhaust temperatures, resulting in exhaust value and/or turbocharger turbine damage. Similarly, changes in the air-to-fuel ratio in excess of five percent in gas engines frequently lead to excessive misfiring or detonation which could lead to a serious explosion in the exhaust manifold. Eight degrees of ignition retard in diesel engines and five percent change in air-to-fuel ratios in gas engines yield about a 40 percent reduction in NO_x emissions. Consequently, in light of these limitations to the application of these emission control techniques, it is apparent that a 40 percent reduction in NO_x emissions is the most stringent regulatory option which could be selected as the basis for standards of performance. An alternative of 20 percent NO_x emission reduction was also considered a viable regulatory option which could serve as the basis for standards of performance.

Environmental impacts.—Standards of performance based on alternative I (20 percent reduction) would reduce national NO_x emissions by 72,500 megagrams annually in the fifth year after the standards went into effect. In contrast, standards of performance based on alternative II (40 percent reduction) would reduce national NO_x emissions by about 145,000 megagrams annually in the fifth year after the standards went into effect. Thus, standards of performance based on alternative II would have a much greater impact on national NO_x emissions than standards based on alternative I.

Standards of performance based on either alternative would, with the exception of naturally aspirated gas engines, result in a small increase in carbon monoxide (CO) and hydrocarbon emissions (HC) from most engines. A typical diesel engine with a sales-weighted average uncontrolled CO emission level of approximately 2.9 g/hp-hr would experience an increase in CO emissions of about 0.75 g/hp-hr to comply with standards of performance based on alternative I, and an increase of about 1.5 g/hp-hr to comply with standards of performance based on alternative II. Total hydrocarbon emissions would increase a sales-weighted average uncontrolled emission level of 0.3 g/hp-hr by about 0.06 g/hp-hr to comply with standards based on alternative I, and would increase by about 0.1 g/hp-hr to comply with standards of performance based on alternative II.

Similarly, a typical dual-fuel engine with a sales-weighted average uncontrolled CO emission level of approximately 2.7 g/hp-hr would experience an increase in CO emissions of about 1.2. g/hp-hr and about 2.7 g/hp-hr to comply with standards of performance based on alternatives I and II, respectively. Total HC emissions, however, would increase by about 0.3 g/hp-hr from a sales-weighted average uncontrolled level of approximately 2.8 g/hp-hr to comply with standards of performance based on alternative I. To comply with standards of performance based on alternative II total hydrocarbon emissions would decrease by 0.6 g/hp-hr.

A typical turbocharged or blower scavenged gas engine with a sales-weighted average uncontolled CO emission level of approximately 7.7 g/hp-hr would experience an increase in CO emissions of about 1.9 g/hp-hr to comply with standards of performance based on alternative I and about 3.8 g/hp-hr to comply with standards of performance based on alternative II. Total hydrocarbon emissions would increase a sales-weighted average uncontrolled level of approximately 1.9 g/hp-hr by about 0.2 g/hp-hr to comply with standards of performance based on alternative I. To comply with standards of performance based on alternative II total hydrocarbon emissions would increase by about 0.4 g/hp-hr.

A typical naturally aspirated gas engine with a sales-weighted average uncontrolled CO emission level of approximately 7.7 g/hp-hr would experience an increase in CO emissions of about 3.9 g/hp-hr to comply with standards of performance based on alternative I and about 17 g/hp-hr to comply with standards of perfomance based on alternative II. Total hydrocarbon emissions would increase a sales-weighted average uncontrolled level of approximately 1.8 g/hp-hr by about 0.04 g/hp-hr to comply with standards of performance based on alternative I. To comply with standards of performance based on alternative II total hydrocarbon emissions would increase by about 0.08 g/hp-hr.

As noted earlier, the increase in ambient air CO levels resulting from compliance with NO_x standards of performance based on either alternative would be insignificant compared to the NAAQS of 10 mg/m^3 for CO. Additionally, CO emissions are a local problem as CO readily reacts to form CO_2. Additionally, most naturally aspirated engines are operated in remote or sparcely populated areas, CO emissions will not present a problem.

Currently, national stationary CO emissions are approximately 33 million megagrams per year. Standards of performance based on alternative I would increase these emissions by approximately 63,000 megagrams annually in the fifth year after the standards went into effect. In contrast, standards of performance based on alternative II would increase national CO emissions by about 216,000

megagrams annually in the fifth year after the standards went into effect.

Standards of performance based on alternative I would increase national total HC emissions by about 2,300 megagrams annually in the fifth year after the standards went into effect compared to an increase of about 4,600 megagrams annually associated with alternative II. It is estimated that more than 90 percent of total HC emissions from large-bore gas-fuel engines and 75 percent of total HC emissions from large-bore dual-fuel engines are methane, which is nonreactive and does not lead to oxidant formation. Standards of performance based on alternative I would increase national reactive HC emissions by approximately 108 megagrams annually in the fifth year after the standards went into effect, compared to an increase of approximately 216 megagrams annually associated with alternative II.

Stationary IC engines are sources of NO_x, HC, and CO emissions, with both NO_x and HC contributing to oxidant formation. With regard to regulation of emissions from IC engines, NO_x emissions are of more concern than emissions of HC for two reasons. First, NO_x is emitted in greater quantities from stationary IC engines than HC. Second, as mentioned earlier, a high priority has been assigned to development of standards of perfomance limiting NO_x emissions. A study by Argonne National Laboratory, "Priorities and Procedures for development of Standards of Perfomance for New Stationary Sources of Atmospheric Emissions," concluded that national NO_x emissions from stationary sources would increase by more than 40 percent between 1975 and 1990 in the absence of additional emission controls. The slight increase in HC emissions from IC engines associated with control of NO_x can be offset in most cases from other sources more easily than NO_x emissions can be reduced from other sources. Therefore, the adverse enviromental impact of increased HC emissions because of the reduction in NO_x emissions is considered small.

There would be essentially no water pollution, solid waste, or noise impact of standards of performance based on either alternative I or alternative II.

Thus, as reflected in Table I, the environmental impacts of standards of performance based on either alternative are small and reasonable

TABLE I

ENVIRONMENTAL IMPACTS OF ALTERNATIVES

Pollutant	Base Level[a]	Alternative I	Alternative II
National NO_x Emissions	14.6 x 10^6 megagrams	Reduced by 72,500 megagrams annually in the fifth year after standard goes into effect	Reduced by 145,000 megagrams annually in the fifth year after standard goes into effect
National CO Emissions	33.0 x 10^6 megagrams	Increased by 63,000 megagrams annually in the fifth after standard goes into effect	Increased by 216,000 megagrams annually in the fifth after standard goes into effect
National Total HC Emissions	10.2 x 10^6 megagrams	Total Hydrocarbons Increased by 2,300 megagrams annually in the fifth year after standard goes into effect Reactive Hydrocarbons Increased by 108 megagrams annually in the fifth year after standard goes into effect	Total Hydrocarbons Increased by 4,600 megagrams annually in the fifth year after standard goes into effect Reactive Hydrocarbons Increased by 216 megagrams annually in the fifth year after standard goes into effect
Water Pollution	--	No increase	No increase
Solid Waste	--	No increase	No increase
Noise	--	No adverse impact	No adverse impact

aTotal U.S. emission from stationary sources as per EPA Nationwide Air Pollutant Inventory for 1975

Energy impacts. The potential energy impact of standards of performance based on either alternative is small. Standards of performance based on alternative I would increase the fuel consumption of a typical blower-scavenged or turbocharged gas engine by approximately one percent, whereas standards of performance based on alternative II would increase the fuel consumption by approximately two percent.

Standards of performance based on alternative I would increase the fuel consumption of a typical dual-fuel engine by about one percent. Standards of performance based on alternative II, however, would increase the fuel consumption by three percent. Standards of performance based on alternative I would increase the fuel consumption of a typical naturally aspirated gas engine by approximately six percent. Standards of performance based on alternative II, however, would increase the fuel consumption by approximately eight percent.

Standards of performance based on alternative I would increase the fuel consumption of a typical diesel engine by approximately three percent. Standards of performance based on alternative II, however, would increase the fuel consumption by approximately seven percent.

The potential energy impact in the fifth year after the standards go into effect, based on alternative I, would be equivalent to an increase in fuel consumption of approximately 1.03 million barrels of oil per year compared to the uncontrolled fuel consumption of IC engines affected by the standards of 31 million barrels per year. The potential energy impact in the fifth year after the standard goes into effect, based on alternative II, would be equivalent to approximately 1.5 million barrels of oil per year.

It should be noted that the largest increase represents only 0.02 percent of the 1977 domestic consumption of crude oil and natural gas. The largest increase also represents only 0.03 percent of the projected total oil imported to the U.S. five years after the standards go into effect.

Thus, the energy impacts of standard of performance based on either alternative are small and reasonable.

Economic impact of alternatives. Manufacturers of stationary IC engines would incur additional costs due to standards of performance. These costs, however, would be small. It is estimated that the total cost to the manufacturers for each engine model family, including development, durability tests, and retooling, would be approximately: (1) $125,000 for retard and air-to-fuel change; (2) $150,000 for manifold air temperature reduction; and (3) $25,000 for derate. For each manufacturer therefor, total costs would vary depending on (1) the number of engine model families produced; (2) their degree of advancement in emission testing; (3) the uncontrolled emission levels of their engines; (4) the development and durability testing required to produce engines that can meet proposed standards of performance; and (5) the emission control technique selected for NO_x emission reduction.

The manufacturer's total capital investment requirements for developmental testing of engine models is estimated to be about $4.5 million to comply with standards of performance based on alternative I and about $5 million to comply with standards of performance based on alternative II. These expenditures would be made over a two year period. Analyses of the financial statements and other public financial information of engine manufacturers or their parent companies indicate that the manufacturer's overhead budgets are sufficient to support the development of these controls without adverse impact on their financial position.

Manufacturers would not experience significant differential cost impacts among competing engine model families. Consequently, no significant sales advantages or disadvantages would develop among competing manufacturers as a result of standards of performance based on either alternative. Based on "worst-case" assumptions, the maximum intra-industry sales losses would be about six percent as a result of standards of performance based on either alternative. Thus, the intra-industry impacts would be moderate and not cause any major dislocations within the industry.

The total annualized cost penalities imposed on IC engines by standards of performace would also have very little impact with regard to increasing sales of gas turbines. Standards of performance based on alternative I would result in no loss of sales to gas turbines whereas standards of performance based on alternative II could result in the possible loss of sales for one diesel manufacturer.

It should be noted that this conslusion is based on limited data. It is quite likely, however, that this manufacturer's line of diesel engines, through minor combustion modifications, could reduce its NO_x emissions as discussed in the SSEIS to levels comparable to those of other manufacturers. Further, due to technical limitations, economic considerations, and customer preference, it is unlikely that IC engine users would switch to gas turbines. Thus, the impact on sales would be minimal.

Therefore, the economic impacts on the manufacturers of standards of performance based on either alternative are considered small and reasonable.

The application of NO_x controls will also increase costs to the engine user. The magnitude of this increase will depend upon the amount and type of emission control applied. Fuel penalties are the major factor affecting this increase.

The following four end uses represent the major applications of diesel, dual-fuel, and natural gas engines: (1) Diesel engine, electrical generation; (2) dual-fuel engine, electrical generation; (3) gas engine, oil and gas transmission and (4) gas engine, oil and gas production.

The manufacturers' capital budget requirements to develop and test engine NO_x control techniques would be regarded as an added expense and most likely passed on to the engine users in the form of higher prices. Therefore, users of IC engines would have to expend additional capital to purchase more expensive engines. This capital cost penalty, however, is small. A two percent increase in engine price would be expected on the average as the result of standards of performance based on either alternative. Typical initial costs for uncontrolled diesel and dual-fuel, electrical generation engines, and natural gas oil and gas transmission engines are about $150/hp. Initial costs for gas, gas production engines are about $50/hp.

The total additional capital cost for all users would equal about $9.6 million on a cumulative basis over the first five years to comply with standards of performance based on either alternative.

As mentioned earlier, fuel penalties are the major factor affecting the total annualized cost of high usage engines. The total annualized cost of a typical uncontrolled diesel, electrical generation engine is about 2.5¢/hp-hr. As a result of standards of performance based on alternative I this total annualized cost would increase by about 0.04¢/hp-hr (1.5 percent). As a result of standards of performance based on alternative II this total annualized cost would increse by about 0.11¢/hp-hr (4.5 percent).

The total annualized cost of a typical uncontrolled dual-fuel electrical generation engine is about 2.8¢/hp-hr. As a result of standards of performance

base on alternative II this total annualized cost would increase by about 0.07¢/hp-hr (2.5 percent). As a result of standards of performance based on alternative Ii this total annualized cost would increase by about 0.09¢/hp-hr (3.2 percent).

The total annualized cost of a typical uncontrolled gas, oil and gas transmission engine is about 2.2¢/hp-hr. As a result of standards of performance based on alternative I this total annualized cost would increase by about 0.02¢/hp-hr (1 percent). As a result of standards of performance based on alternative II this total annualized cost would increase by about 0.04¢/hp-hr (2 percent).

The total annualized cost of a typical uncontrolled gas, oil and gas production engine is about 2.2¢/hp-hr. As a result of standards of performance based on alternative I this total annualized cost would increase by about 0.14¢/hp-hr (6.5 percent). As a result of standards of performance based on alternative II this total annualized cost would increase by about 0.16¢/hp-hr (7.5 percent).

Thus, the total annualized cost penalties to the user associated with either alternative are small. Total uncontrolled annualized costs of about $580 million by all large stationary IC engine users would increase by about $25 million to comply with standards of performance based on alternative I and would increase by about $32 million to comply with standards of performance based on alternative II in the fifth year after the standards go into effect.

The economic impacts on users arising from the cost penalties outlined above would be small. In general, these impacts translate into price increases for the end products or services provided by the industrial and commercial users of large stationary IC engines. The electric utility industry would pass on a price increase after five years of 0.02 percent to comply with standards of performance based on either alternative. After five years, delivered natural gas prices would increase 0.02 percent if standards of performance based on alternative I were applied and 0.04 percent if standards of performance based on alternative II were applied.

Even after a full phase-in period of 30 years, during which new controlled engines would replace all existing uncontrolled engines, the electric utility industry would realize a price increase of only 0.1 percent to comply with standards of performance based on either alternative. Similarly, delivered natural gas prices would increase only 0.1 percent if standards of performance based on alternative I were applied and 0.3 percent if standards of performance based on alternative II were applied. Thus, as summarized in Table II, the economic impacts of standards of performance based on either alternative are considered small and reasonable.

TABLE II

ECONOMIC IMPACTS OF ALTERNATIVES

Impact	Uncontrolled Level of Cost	Alternative I	Alternative II
Impact on Manufacturer			
Capital budget requirements	--	$4.5 million over two years; able to generate internally from profits.	$5 million over two years; able to generate internally from profits.
Intra-industry competition	--	Maximum sales loss unlikely to exceed 6% of internal combustion engine sales for any firm.	6% maximum loss for any firm
Competition from gas turbines	--	No losses.	Possible sales loss for one diesel manufacturer.
Impact on End-Use Applications			
Total annualized cost[a]			
Diesel fuel, electrical generation	2.5¢/hp-hr	Base increased by 0.04¢/hp-hr	Increased by 0.11¢/hp-hr
Dual-fuel, electrical generation	2.8¢/hp-hr	Increased by 0.07¢/hp-hr	Increased by 0.09¢/hp-hr
Natural gas fuel, oil and gas transmission	2.2¢/hp-hr	Increased by 0.02¢/hp-hr	Increased by 0.04¢/hp-hr
Natural gas fuel, oil and gas production	2.2¢/hp-hr	Increased by 0.14¢/hp-hr	Increased by 0.16¢/hp-hr
Totals of all new engines after 5 years	$580 million	Increased by $25 million	Increased by $32 million
Capital Cost Penalty[a]			
Diesel fuel, electrical generation or dual fuel, electrical generation or natural gas fuel, oil and gas transmission	$150/hp	Increased by $3.00/hp	Increased by $3.00/hp
Natural gas fuel, oil and gas production	$ 50/hp	Increased by $1.00/hp	Increased by $1.00/hp
Totals etc.	$450 million	$9.6 million on a cumulative basis over first 5 years after standards go into effect.	$9.6 million on a cumulative basis over first 5 years after standards go into effect.
Impact on Product Prices and Users			
Electricity prices	--	U.S. electric bill up 0.02% after 5 years. U.S. electric bill up 0.1% after full phase-in.	U.S. electric bill up 0.02% after 5 years. U.S. electric bill up 0.1% after full phase-in[b].
Gas prices	--	Delivered natural gas prices up 0.02% after 5 years. Delivered natural gas prices up 0.1% after full phasein.	Delivered natural gas prices up 0.04% after 5 years. Delivered natural gas prices up 0.3% full phasein.

Assumed typical 2000 horsepower engine operating 8000 hours per year in all cases

Full phase-in implies replacement of all existing engines

Based on the assessment of the impacts of each alternative, and since alternative II achieves a greater degree of NO_x reduction, it is selected as the best technological system of continuous emission reduction of NO_x from stationary large-bore IC engines, considering the cost of achieving such emission reduction, any nonair quality health and environmental impact, and energy requirements.

Selection of Format for the Proposed Standards

A number of different formats could be used to limit NO_x emissions from large stationary IC engines. Standards could be developed to limit emissions in terms of: (1) Percent reduction; (2) mass emissions per unit of energy (power) output; or (3) concentration of emissions in the exhaust gases discharged to the atmosphere.

Analysis of the effectiveness of the various NO_x emission control techniques clearly shows that the ability to achieve a percent reduction in NO_x emissions is what has been demonstrated. However, a percent reduction format is highly impractical for two reasons. First, a reference uncontrolled NO_x emission level would have to be established for each manufacture's engine, a difficult task since some manufacturers produce as many as 25 models which are sold with several ratings. Second, a reference uncontrolled NO_x emission level would have to be established for any new engines developed after promulgation of the standard. This would be quite simple for engines that employed NO_x control techniques such as ignition retard or air-to-fuel ratio change to comply with standards of performance. Emissions could be measured without the use of these techniques. For engines designed to comply with the standards through the use of combustion chamber modifications, however, this would not be possible. Thus, new engines would receive no credit for the NO_x emission reduction achieved by combustion chamber redesign and this would effectively preclude the use of this approach to comply with the standards.

A mass-per-unit-of-energy-output format, typically referred to as brake-specific emissions (g/hp-hr), relates the total mass of NO_x emissions to the engine's productivity. Although brake-specific mass standards (g/hp-hr) appear meaningful becasue they relate directly to the quantity of emissions discharged into the atmosphere, there are disadvantages in that enforcement of mass standards would be costly and complicated in practice. Exhaust flow and power output would have to be determined in addition to NO_x concentration. Power output can be determined from an engine dynamometer in the laboratory, but dynamometers cannot be used in the field. Power output could be determined by: (1) Inferring the power from engine operating parameters (fuel flow, rpm, manifold pressure, etc.); or (2) inferring engine power from the output of the generator or compressor attached to the engine. In practice, however, these approaches are time consuming and are less accurate than dynamometer measurements.

Another possible format would be to limit the concentration of NO_x emissions in the exhaust gases discharged to the atmosphere. Concentrations would be specified in terms of parts-per-million volume (ppm) of NO_x. The major advantage of this format is its simplicity of enforcement. As compared to the formats discussed previously, only a minimum of data and calculations are required, which decreases testing costs and minimizes errors in determining compliance with an emission standard since measurements are direct.

The primary disadvantages associated with concentration standards are: (1) A standard could be circumvented by dilution of exhaust gases discharged into the atmosphere, which lowers the concentration of pollutant emissions but does not reduce the total pollutant mass emitted; and (2) a concentration standard could penalize high efficiency engines. Both these problems, however, can be overcome through the use of appropriate "correction" factors.

Since the percent reduction format is impractical, and the problems associated with the enforcement of mass standards (mass-per-unit energy output) appear to outweigh the benefits, the concentration format was selected for standards of performance for large stationary IC engines.

As mentioned above, because a concentration standard can be circumvented by dilution of the exhaust gases, measured concentrations must be expressed relative to some fixed dilution level. For combustion processes, this can be accomplished by correcting measured concentrations to a reference concentration of O_2. The O_2 concentration in the exhaust gases is related to the excess (or dilution) air. Typical O_2 concentrations in large-bore IC engines can range from 8 to 16 percent but are normally about 15 percent. Thus, referencing the standard to a typical level of 15 percent O_2 would prevent circumvention by dilution.

As also mentioned above, selection of a concentration format could penalize high efficiency IC engines. These highly efficient engines generally operate at higher temperature and pressures and, as a result, discharge gases with higher NO_x concentrations than less efficient engines, although the brake-specific mass emissions from both engines could be the same. Thus, a concentration standard based on low efficiency engines could effectively require more stringent controls for high efficiency engines. Conversely, a concentration standard based on high efficiency engines could allow such high NO_x concentrations that less efficient engines would require no controls. Consequently, selecting a concentration format for standards of performance requires an efficiency adjustment factor to permit higher NO_x emissions from more efficient engines.

The incentive for manufacturers to increase engine efficiency is to lower engine fuel consumption. Therefore, the objective of an efficiency adjustment factor should be to give an emissions credit for the lower fuel consumption of more efficient IC engines. Since the fuel consumption of IC engines varies linearly with efficiency, a linear adjustment factor is selected to permit increased NO_x emissions from highly efficient IC engines.

The efficiency adjustment factor needs to be referenced to a baseline efficiency. Most large existing stationary IC engines fall in the range of 30 to 40 percent efficiency. Therefore, 35 percent is selected as the baseline efficiency.

The efficiency adjustment factor included in the proposed standards permits a linear increase in NO_x emissions for engine efficiencies above 35 percent. This adjustment would not be used to adjust the emission limit downward for IC engines with efficiencies of less than 35 percent. This efficiency adjustment factor also applies only to the IC engine itself and not the entire system of which the engine may be a part. Since Section 111 of the Clean Air Act requires the use of the best system of emission reduction in all cases, this precludes the application of the efficiency adjustment factor to an entire system. For example, IC engines with waste heat recovery may have a higher overall efficiency than the IC engine alone. Thus, the application of the efficiency adjustment factor to the entire system would permit greater NO_x emissions because of the system's higher overall efficiency, and would not necessarily require the use of the best demonstrated system emission reduction on the IC engine.

Selection of Numerical Emission Limits

Overall approach.—As mentioned earlier it is difficult to select a specific NO_x emission limit which all IC engines could meet primarily through the use of ignition retard or air-to-fuel ratio change. Because of inherent differences among various IC engines with regard to uncontrolled NO_x emission levels, there exists a rather large variation within the data and information included in the Standards Support and Environmental Impact Statement concerning controlled NO_x emission levels. Generally speaking, engines with relatively low uncontrolled NO_x emissions levels achieved low controlled NO_x emissions levels and engines with high uncontrolled NO_x emissions levels achieved relatively high controlled NO_x emissions levels. Consequently, the following alternatives were considered for selecting the numerical concentration emission limits based on a 40 percent reduction in NO_x emissions:

1. Apply the 40 percent reduction to the highest observed uncontrolled NO_x emission level.

2. Apply the 40 percent reduction to a sales-weighted average uncontrolled NO_x emission level.

3 Apply the 40 percent reduction to this sales-weighted average uncontrolled NO_x emission level plus one standard deviation.

The highest observed uncontrolled NO_x emission levels for gas, dual-fuel and diesel engines are as follows: (1) Gas. 29 g/hp-hr (2) dual-fuel, 15 g/hp-hr, and (3) diesel. 19 g/hp-hr.

Sales-weighted uncontrolled NO_x emission levels were determined by applying a sales-weighting to each manufacturer's average uncontrolled NO_x emissions for engines of each fuel type The sales-weighting, based on horsepower sold, gives more weight to those engine models which have the highest sales The sales-weighted average uncontrolled NO_x emission level for each engine fuel type are as follow: (1) Gas 15 g/hp-hr. (2) dual-fuel, 8 g/hp-hr and (3) diesel. 11 g/hp-hr.

The third alternative incorporates a "margin for engine variability" by adding one standard deviation to the sales-weighted average uncontrolled NO_x emission level and then applying the 40 percent reduction. Standard deviations were calculated from the uncontrolled NO_x emission data included in the Standards Support and Environmental Impact Statement, assuming the data had normal distribution. A subsequent statistical evaluation of the data indicated that this assumption was valid: The standard deviations for each engine fuel type are as follows: (1) Gas. 4 g/hp-hr. (2) dual-fuel. 3.2 g/hp-hr. and (3) diesel. 3.7 g/hp-hr.

The standard deviation of the uncontrolled NO_x emission data base is relatively large compared to the sales-weighted average uncontrolled NO_x emission level for each engine type. This indicates that the distribution of uncontrolled NO_x emissions levels is quite broad. In addition, the standard deviation is of the same magnitude as the 40 percent reduction in NO_x emissions that can be achieved. Thus, regardless of which alternative approach is followed to select the numerical NO_x concentration emission limit, a significant portion of the IC engine population may have to achieve more or less than a 40 percent reduction in NO_x emissions to comply with the standards.

It is important to note that the 40 percent reduction in NO_x emissions is based on the application of a single control technique, such as ignition retard, or air-to-fuel ratio change. Other emission control techniques, however, such as manifold air cooling and engine derate, exist, although they are generally not as effective in reducing NO_x emissions. Since emission control techniques are additive to some extent, it is possible in a number of cases to reduce NO_x emissions by greater than 40 percent.

The following factors were examined for each engine type to choose the alternative for selecting the numerical NO_x concentration emission limit: (1) The percentage of engines that would have to reduce NO_x emissions by 40 percent or less to meet the standards; (2) the percentage of engines that would be required to do nothing to meet the standards; and (3) the percentage of engines that would be required to reduce NO_x emissions by more than 40 percent to meet the standards. The normal distribution curve presented in Figure I illustrates the trade-offs among the three alternatives for selecting the numerical NO_x concentration emission limit.

The first alternative is to apply the 40 percent reduction to the highest uncontrolled NO_x emission level within a fuel category. For example, 29 g/hp-hr is the highest uncontrolled NO_x emission level for gas engines. The application of a 40 percent reduction would lead to an emission level of about 17 g/hp-hr. As illustrated in Figure I, if this level were selected as a standard of performance, 99 percent of production gas engines could easily meet the emission limit by reducing emissions by 40 percent or less. However, 69 percent of production engines would not have to reduce NO_x emissions at all. Only one percent of production engines would have to reduce NO_x emissions by more than 40 percent.

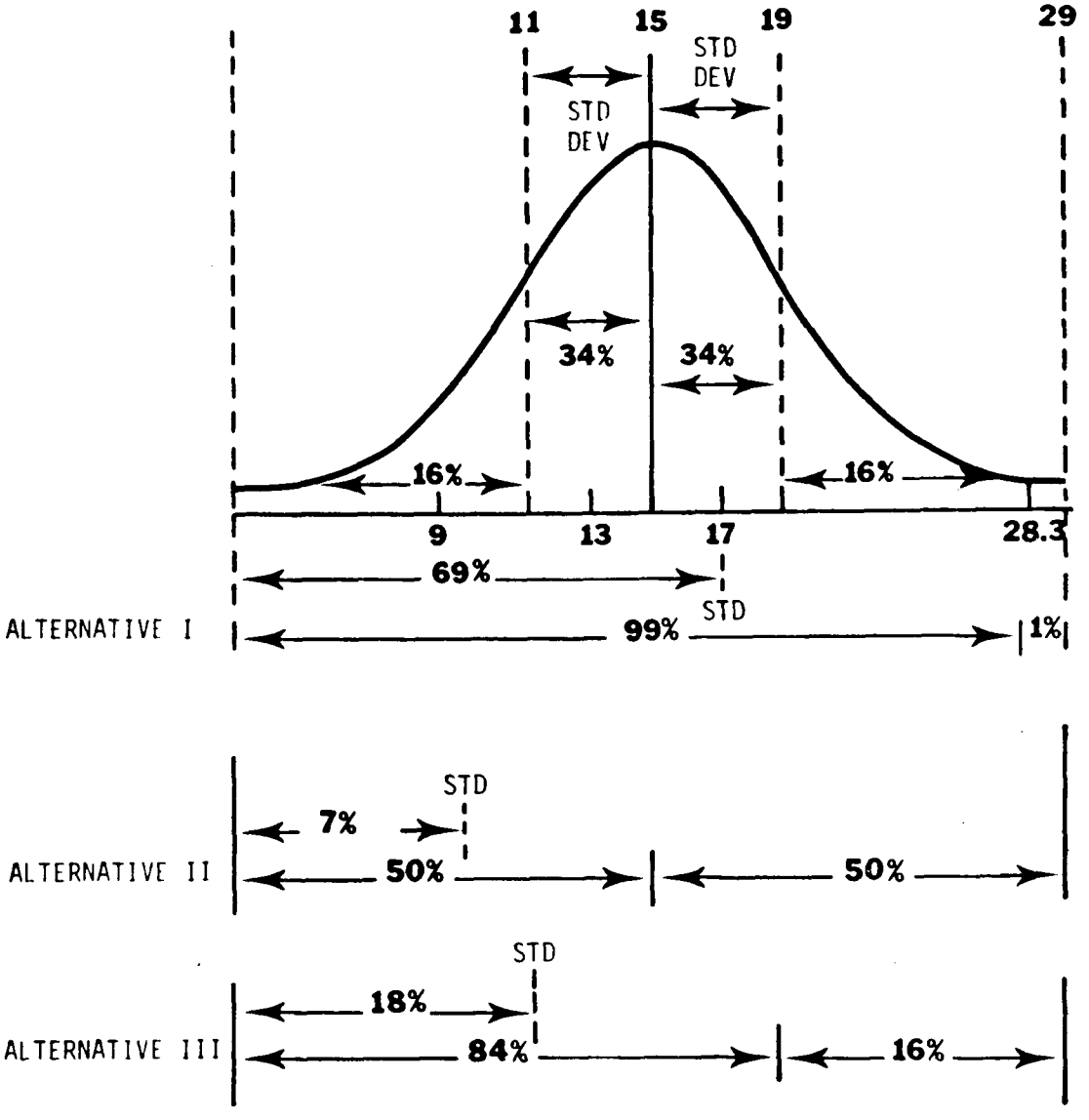

FIGURE 1. Statistical effects of alternative emission limits on gas engines.

The second alternative is to apply 40 percent reduction to the sales-weighted average uncontrolled NO_x emission level. For example, the sales-weighted avergage uncontrolled NO_x level for gas engines is 15 g/hp-hr. The application of a 40 percent reduction would lead to a NO_x emission level of 9 g/hp-hr. As illustrated in Figure I, if this level were selected as a standard of performance, 50 percent of production gas engines could meet the standard with 40 percent or less reduction in NO_x emissions. However, 50 percent of production gas engines would be required to reduce NO_x emissions by greater than 40 percent. Only seven percent of production gas engines would not have to reduce NO_x emissions at all.

The third alternative is to base the standards on a 40 percent reduction in NO_x emissions from the sales-weighted average uncontrolled NO_x emission level plus one standard deviation. For example, the sales-weighted average uncontrolled NO_x emission level for gas production gas engines is 15 g/hp-hr and the standard deviation of the production gas engine data base is 4 g/hp-hr. Thus, the application of a 40 percent reduction to the sum of these two values would lead to an emission level of 11 g/hp-hr. As illustrated in Figure I, if this level were selected as a standard of performance, 84 percent of the production gas engines could easily meet the emission limit by reducing emissions by 40 percent or less. However, 18 percent of the production gas engines would not have to reduce NO_x emission at all. Only 16 percent of the production gas engines would have to reduce NO_x emissions by more than 40 percent.

This same analysis applied to dual-fuel and diesel engines leads to the results summarized in Table III. If standards of performance were based on Alternative I, essentially all engines could achieve the emission limit by reducing NO_x emissions 40 percent or less. A significant reduction in NO_x emissions would not be achieved, however, since 50 to 70 percent of the IC engines would not have to reduce NO_x emissions at all. If the standards of performance were based on Alternatve II, about 50 percent of the IC engines (in all categories) would have to reduce NO_x emissions by greater than 40 percent. Less than 10 percent would not have to reduce NO_x emissions at all. Thus this alternative would achieve a significant reduction in NO_x emissions from new sources. If standards of performance were based on Alternative III, the results would be similar to those achieved with Alternative I. About 85 percent of engines could easily meet the standards by reducing NO_x emissions by less than 40 percent. About 20 to 30 percent of IC engines would not have to reduce NO_x emissions at all, and about 15 percent of IC engines would have to reduce NO_x emissions by more than 40 percent.

In light of the high priority which has been given to standards directed toward reducing NO_x emissions and the significance of IC engines in terms of their contribution to NO_x emissions from stationary sources, the second alternative was chosen for selecting the NO_x emission concentration limit. This approach will achieve the greatest reduction in NO_x emissions from new IC engines.

TABLE III

SUMMARY OF STATISTICAL ANALYSES OF ALTERNATE EMISSION LIMITS

GAS ENGINES

Alternative	I	II	III
Standard	17	9	11
Percent required to apply less than or equal to 40 percent control	99	50	84
Percent required to do nothing	69	7	18
Percent required to apply more than 40 percent control	1	50	16

DUAL-FUEL ENGINES

Alternative	I	II	III
Standard	9	5	7
Percent required to apply less than or equal to 40 percent control	98	54	87
Percent required to do nothing	62	18	48
Percent required to apply more than 40 percent control	2	46	13

DIESEL ENGINES

Alternative	I	II	III
Standard	11	7	9
Percent required to apply less than or equal to 40 percent control	98	56	86
Percent required to do nothing	50	4	29
Percent required to apply more than 40 percent control	2	44	14

Selection of limits.—A concentration (ppm) format was selected for the standards. Consequently, the brake-specific NO_x emission limits corresponding to the second alternative for selecting numerical emission limits (i.e., gas – 9 g/hp-hr; dual-fuel – 5 g/hp-hr; diesel – 7 g/hp-hr) must be converted to concentration limits (corrected to 15 percent O_2 on a dry basis). This may be done by dividing the brake-specific volume of NO_x emissions by the brake-specific total exhaust gas volume. Determining the brake-specific volume of NO_x emissions is straight-forward. Determining the brake-specific total exhaust gas volume is more complex, in that the brake-specific exhaust flow and the exhaust gas molecular weight are unknown. Knowing the fuel heating value and composition, the brake-specific fuel consumption, and assuming 15 percent excess air, however, defines these unknowns. (The complete derivation is explained in detail in the Standards Support and Environmental Impact Statement.) Combining these factors leads to the following conversion factor:

$$NO_x = \frac{\left(\frac{10^6}{46}\right) \times (BSNO_x)}{\left(\frac{16.6 + 3.29\ Z}{12.0 + Z}\right) \times (BSFC)}$$

where:

NO_x = NO_x concentration (ppm) corrected to 15 percent O_2.

$BSNO_x$ = Brake-specific NO_x emissions, g/hp-hr.

BSFC = Brake-specific fuel consumption, g/hp-hr.

Z = Hydrogen/Carbon ratio of the fuel.

For natural gas, a hydrogen-to-carbon (H/C) ratio of 3.5 and a lower heat value (LHV) of 20,000 Btu/lb was assumed. Diesel ASTM-2 has a H/C ratio of 1.8 and a LHV of 18,320 Btu/lb.

Applying this conversion factor to the brake-specific emission limits associated with the second alternative for selecting NO_x emissions limits leads to the NO_x concentration emission limits included in the proposed standards:

Engine:	NO_x emission limit
Gas	700 ppm.
Dual-fuel/Diesel	600 ppm.

These emission limits have been rounded upward to the nearest 100 ppm to include a "margin" to allow for source variability. The standard for diesel engines has also been applied to dual-fuel engines. If a separate emission limit has been selected for dual-fuel engines, the corresponding numerical NO_x concentration emission limit would be 400 ppm. Sales of dual-fuel engines, however, have ranged from 17 to 95 units annually over the past five years, with a general trend of decreasing sales. Dual-fuel engines serve the same applications as diesel engines, and new dual-fuel engines will likely operate primarily as diesel engines because of increasingly limited natural gas supplies. Thus, the combining of dual-fuel engines with diesel engines for standards of performance will have little adverse impact and will simplify enforcement of the standards of performance.

The effect of ambient atmospheric conditions on NO_x emissions from large stationary IC engines can be significant. Therefore, to enforce the standards uniformly, NO_x emissions must be determined relative to a reference set of ambient conditions. All existing ambient correction factors were reviewed that could potentially be applied to large stationary IC engines to correct NO_x emissions to standard conditions.

The correction factors that were selected for both spark ignition (SI) and compression ignition (CI) engines are included in the proposed standards. For the compression ignition engines (i.e., diesel and dual-fuel), a single correction factor for both temperature and humididty was selected. For spark ignition engines (i.e., gas), separate correction factors were selected for humidity and temperature, and measured NO_x emissions are corrected to reference ambient conditions by multiplying these two factors together. No correction factor was selected for changes in ambient pressure because no generalized relationship could be determined from the very limited data that are available. These correction factors represent the general effects of ambient temperature and relative humidity on NO_x emissions, and will be used to adjust measured NO_x emissions during any performance test to determine compliance with the numerical emission limit.

Since the recommended factors may not be applicable to certain engine models, as an alternative to the use of these correction factors, engine manufacturers, owners, or operators may elect to develop their own ambient correction factors. All such correction factors, however, must be substantiated with data and then approved by EPA for use in determining compliance with NO_x emission limits. The ambient correction factor will be applied to all performance tests, not only those in which the use of such factors would reduce measured emission levels.

As discussed in "Standards Support and Environmental Impact Statement: Proposed Standards of Performance for Stationary Gas Turbines," EPA–450/2–77–017a, the contribution to NO_x emissions by the conversion of fuel-bound nitrogen in heavy fuel to NO_x can be significant for stationary gas turbines. The organic NO_x contribution to total gas turbine NO_x emissions is complicated by the fact that the percentage of fuel-bound nitrogen converted to NO_x decreases as the fuel-bound nitrogen level increases. Below a fuel-bound nitrogen level of about 0.05 percent, essentially 100 percent of the fuel-bound nitrogen is converted to NO_x. Above a fuel-bound nitrogen level of about 0.4 percent, only about 40 percent is converted to NO_x.

As discussed in the Standards Support and Environmental Impact Statement, Volume I for Stationary Gas Turbines, assuming a fuel with 0.25 percent weight fuel-bound nitrogen (which allows approximately 50 percent availablility of domestic heavy fuel oil), controlled NO_x emissions would increase by about 50 ppm due to the contribution to NO_x emissions of fuel-bound nitrogen. In gas turbines, this contribution was significant when compared to the proposed emission limit of 75 ppm. However, for large IC engines, the contribution of fuel-bound nitrogen to NO_x emissions is likely to be small (approximately 10 percent). Sales of IC engines firing heavy fuels is insignificant and not expected to increase in the near future. Given that the emission limits have been rounded upward to the nearest 100 ppm and the potential contribution of fuel-bound nitrogen to NO_x emissions is very small, no allowance has been included for the fuel-bound nitrogen content of the fuel in determining compliance with the standards of performance.

Selection of Compliance Time Frame

Manufacturers of large-bore IC engines are generally committed to a particular design approach and, therefore, conduct extensive research, development, and prototype testing before releasing a new engine model for sale. Consequently, these manufacturers will require some period of time to alter or reoptimize and test IC engines to meet standards of performance. The estimated time span between the decision by a manufacturer to control NO_x emissions from an engine model and start of production of the first controlled engine is about 15 months for any of the four demonstrated emission control techniques. With their present facilities, however, testing can typically

be conducted on only two to three engine models at a time. Since most manufacturers produce a number of engine models, additional time is required before standards of performance become effective. In addition, a number of manufacturers produce their most popular engine models at a fairly steady rate of production and satisfy fluctuating demands from inventory. Consequently, additional time in necessary to allow manufacturers to sell their current inventory of uncontrolled IC engines before they must comply with standards of performance.

It is estimated that about 30 months delay in the applicability date of the standard is appropriate to allow manufacturers time to comply with the proposed standards of performance. In addition, in light of the stringency of the standards (i.e., many engine models will have to reduce NO_x emissions by more than 40 percent) this time period provides the flexibility for manufacturers to develop and use combinations of the control techniques upon which the standards are based or other control techniques. Consequently, 30 months from today's date is selected as the delay period for implementation of these standards on large stationary IC engines.

Selection of Monitoring Requirements

To provide a means for enforcement personnel to ensure that an emission control system installed to comply with standards of performance is properly operated and maintained, monitoring requirements are generally included in standards of performance. For stationary IC engines, the most straightforward means of ensuring proper operation and maintenance would be to monitor NO_x emissions released to the atmosphere.

Installed costs, however, for continuous monitors are approximately $25,000. Thus the cost of continuous NO_x emission monitoring is considered unreasonable for IC engines since most large stationary IC engines cost from $50,000 to $3,000,000 (i.e., 1000 hp gas production engine and 20,000 hp electrical generation engine).

A more simple and less costly method of monitoring is measuring various engine operating parameters related to NO_x emissions. Consequently, monitoring of exhaust gas temperature was considered since this parameter could be measured just after the combustion process during which NO_x is formed. However, a thorough investigation of this approach showed no simple correlation between NO_x emission and exhaust gas temperature.

A qualitative estimate of NO_x emissions, however, can be developed by measuring several engine operating parameters simultaneously, such as spark ignition or fuel injector timing, engine speed, and a number of other parameters. These parameters are typically measured at most installations and thus should not impose an additional cost impact. For these reasons, the emission monitoring requirements included in the proposed standards of performance require monitoring various engine operating parameters.

For diesel and dual-fuel engines, the engine parameters to be monitored are: (1) Intake manifold temperature; (2) intake manifold pressure; (3) rack position; (4) fuel injector timing; and (5) engine speed. Gas engines would require monitoring of (1) intake manifold temperature; (2) intake manifold pressure; (3) fuel header pressure; (4) spark timing; and (5) engine speed.

Another parameter that could be monitored for gas engines is the fuel heat value, since it can affect NO_x emissions significantly. Because of the high costs of a fuel heating value monitor, and the fact that many facilities can obtain the lower heating value directly from the gas supplier, monitoring of this parameter would not be required.

The operating ranges for each parameter over which the engine could operate and in which the engine could comply with the NO_x emission limit would be determined during the performance test. Once established, these parameters would be monitored to ensure proper operation and maintenance of the emission control techniques employed to comply with the standards of performance.

For facilities having an operator present every day these operating parameters would be recorded daily. For remote facilities, where an operator is not present every day, these operating parameters would be recorded weekly. The owner/operator would record the parameters and, if these parameters include values outside the operating ranges determined during the performance test, a report would be submitted to the Administrator on a quarterly basis identifying these periods as excess emissions. Each excess emission report would include the operating ranges for each parameter as determined during the performance test, the monitored values for each parameter, and the ambient air conditions.

Selection of Performance Test Metho

A performance test method is requ to determine whether an engine complies with the standards of performance. Reference Method 20, "Determination of Nitrogen Oxides, Sulfur Dioxide, and Oxygen emission from Stationary Gas Turbines," whic was proposed in the October 3, 1977 **Federal Register**, is proposed as the performance test method for IC engir Reference Method 20 has been show provide valid results. Consequently, rather than developing a totally new reference test method, Reference Method 20 would be modified for use IC engines.

The changes and additions to Reference Method 20 required to mal applicable for testing of internal combustion engines include (by secti

1. *Principle and Applicability.* Sulf dioxide measurements are not applicable for internal combustion engine testing.

6.1 Selection of a sampling site anc the minimum number of traverse poi

6.11 Select a sampling site located least five stack diameters downstrea of any turbocharger exhaust, crossov junction, or recirculation take-offs an upstream of an dilution air inlet. Loc the sample site no closer than one m or three stack diameters (whichever less) upstream of the gas discharge t the atmosphere.

6.1.2 A preliminary O_2 traverse is n necessary.

6.1.2.2 Cross-sectional layout and location of traverse points use a minimum of three sample points loca at positions of 16.7, 50 and 83.3 perce of the stack diameter.

6.2.1 Record the data required on t engine operation record on Figure 20. Reference Method 20. In addition, rec (a) the intake manifold pressure; (b) t intake manifold temperature; (c) rack position; (d) engine speed; and (e) injector or spark fuming. (The water steam injection rate is not applicable internal combustion engines.)

NO_x emissions measured by Reference Method 20 will be affected ambient atmospheric conditions. Consequently, measured NO_x emissic would be adjusted during any performance test by the ambient condition correction factors discusse earlier, or by custom correction facto approved for use by EPA.

The performance test may be performed either by the manufacturer at the actual user operating site. If the test is performed at the manufacturer' facility, compliance with that performance test will be sufficient pr

of compliance by the user as long as the engine operating parameters are not varied during user operation from the settings under which testing was done.

Public Hearing

A public hearing will be held to discuss these proposed standards in accordance with section 307(d)(5) of the Clean Air Act. Persons wishing to make oral presentations should contact EPA at the address given in the ADDRESSES Section of this preamble. Oral presentations will be limited to 15 minutes each. Any member of the public may file a written statement with EPA before, during, or within 30 days after the hearing. Written statement should be addressed to Mr. Jack R. Farmer (see ADDRESSES Section).

The docket is an organized and complete file of all the information considered by EPA in the development of this rulemaking. The principal purposes of the docket are (1) to allow interested parties to identify and locate documents so that they can intelligently and effectively participate in the rulemaking process, and (2) to serve as the record for judicial review. The docket requirement is discussed in section 307(d) of the Clean Air Act.

Miscellaneous

As prescribed by Section 111 of the Act, this proposal is accompanied by the Administrator's determination that emissions from stationary IC engines contribute to air pollution which causes or contributes to the endangerment of public health or welfare, and by publication of this determination in this issue of the **Federal Register**. In accordance with section 117 of the Act, publication of these standards was preceded by consultation with appropriate advisory committees, independent experts, and federal department and agencies. The Administrator welcomes comments on all aspects of the proposed regulations, including the designation of stationary IC engines as a significant contributor to air pollution which causes or contributes to the endangerment of public health or welfare, economic and technological issues, monitoring requirements and the proposed test method.

Comments are specifically invited on the severity of the economic and environmental impact of the proposed standards on stationary naturally aspirated carbureted-gas IC engines since some parties have expressed objection to applying the proposed standards to these engines. Comments are also invited on the selection of rotary engines for control by standards of performance. These engines were included because they are expected to be contributors to NO_x emissions from stationary sources and can be controlled by demonstrated NO_x emission control techniques. Any comments submitted to the Administrator on these issues, however, should contain specific information and data pertinent to an evaluation of the magnitude of this impact, its severity, and its consequences.

It should be noted that standards of performance for new sources established under section 111 of the Clean Air Act reflect:

> The degree of emission limitation and the percentage reduction achievable through application of the best technological system of continuous emission reduction which (taking into consideration the cost of achieving such emission reduction, any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated [section 111(a)(1)].

Although there may be emission control technology available that can reduce emissions below those levels required to comply with standards of performance, this technology might not be seclected as the basis of standards of performance because of costs associated with its use. Accordingly, standards of performance should not be viewed as the ultimate in achievable emission control. In fact, the Act may require the imposition of a more stringent emission standard emission in several situations.

For example, applicable costs do not necessarily play as prominent a role in determining the "lowest achievable emission rate" for new or modified sources located in nonattainment areas (i.e., those areas where statutorily mandated health and welfare standards are being violated). In this respect, section 173 of the Act requires that new or modified sources constructed in an area which exceeds the National Ambient Air Quality Standard (NAAQS) must reduce emissions to the level which reflects the "lowest achievable emission rate" (LAER), as defined in section 171(3). The statute defines LAER as that rate of emissions which reflects:

> (A) The most stringent emission limitation which is contained in the implementation plan of any state for such class or category of source, unless the owner or operator of the proposed source demonstrates that such limitations are not achievable or
>
> (B) The most stringent emission limitation which is acheved in practice by such class or category of source, whichever is more stringent.

In no event can the emission rate exceed any applicable new source performance standard.

A similar situation may arise under the prevention-of-significant-deterioration-of-air-quality provisions of the Act. These provisions require that certain sources employ "best available control technology" (BACT) as defined in section 169(3) for all pollutants regulated under the Act. Best available control technology must be determined on a case-by-case basis, taking energy, environmental and economic impacts, and other costs into account. In no event may the application of BACT result in emissions of any pollutants which will exceed the emissions allowed by any applicable standard established pursuant to section 111 (or 112) of the Act.

In all cases, State Implementation Plans (SIP's) approved or promulgated under section 110 of the Act must provide for the attainment and maintenance of NAAQS designed to protect public health and welfare. For this purpose, SIP's must in some cases require greater emission reduction than those required by standards of performance for new sources.

Finally, states are free under section 116 of the Act to establish even more stringent emission limits than those established under section 111 or those necessary to attain or maintain the NAAQS under section 110. Accordingly, new sources may in some cases be subject to limitations more stringent than standards of performance under section 111, and prospective owners and operators of new sources should be aware of this possibility in planning for such facilities.

Under EPA's "new" sunset policy for reporting requirements in regulations, the reporting requirements in this regulation will automatically expire five years from the date of promulgation unless EPA takes affirmative action to extend them.

EPA will review this regulation four years from the date of promulgation. This review will include an assessment of such factors as the need for integration with other programs, the existence of alternative methods, enforceability, and improvements in emissions control technology.

An economic impact assessment has been prepared as required under section 317 of the Act and is included in the Standards Support and Environmental Impact Statement.

Dated: July 11, 1979.

Douglas M. Costle.

Administrator.

It is proposed to amend Part 60 of Chapter I, Title 40 of the Code of Federal Regulations as follows:

1. By adding Subpart FF as follows:

Subpart FF—Standards of Performance for Stationary Internal Combustion Engines

Sec.

60.320 Applicability and designation of affected facility.
60.321 Definitions.
60.322 Standards for nitrogen oxides.
60.323 Monitoring of operations.
60.324 Test methods and procedures.

Authority: Secs. 111 and 301(a) of the Clean Air Act, as amended, (42 U.S.C. 1857c-7, 1857g(a)), and additional authority as noted below.

Subpart FF—Standards of Performance for Stationary Internal Combustion Engines

§ 60.320 Applicability and designation of affected facility.

The provisions of this subpart are applicable to the following affected facilities which commence construction beginning 30 months from today's date:

(a) All gas engines that are either greater than 350 cubic inch displacement per cylinder or equal to or greater than 8 cylinders and greater than 240 cubic inch displacement per cylinder.

(b) All diesel or dual-fuel engines that are greater than 560 cubic inch displacement per cylinder.

(c) All rotary engines that are greater than 1500 cubic inch displacement per rotor.

§ 60.321 Definitions.

As used in this subpart, all terms not defined herein shall have the meaning given them in the Act or in subpart A of this part.

(a) "Stationary internal combustion engine" means any internal combution engine, except gas turbines, that is not self propelled. It may, however, be mounted on a vehicle for portability.

(b) "Emergency standby engine" means any stationary internal combustion engine which operates as a mechanical or electrical power source only when the primary power source for a facility has been rendered inoperable during an emergency situation.

(c) "Reference ambient conditions" means standard air temperature (29.4°C, or 85°F), humidity (17 grams H_2O/kg dry air, or 75 grains H_2O/lb dry air), and pressure (101.3 kilopascals, or 29.92 in. Hg.).

(d) "Peak load" means operation at 100 percent of the manufacturer's design capacity.

(e) "Diesel engine" means any stationary internal combustion engine burning a liquid fuel.

(f) "Gas enine" means any stationary internal combustion engine burning a gaseous fuel.

(g) "Dual-fuel engine" means any stationary internal combustion engine that is burning liquid and gaseous fuel simultaneously.

(h) "Unmanned engine" means any stationary internal combustion engine installed and operating at a location which does not have an operator regularly present at the site for some portion of a 24-hour day.

(i) "Non-remote operation" means any engine installed and operating at a loction which has an operator regularly present at the site for some portion of a 24-hour day.

(j) "Brake-specific fuel consumption" means fuel input heat rate, based on the lower heating value of the fuel, expressed on the basis of power output (i.e., (kJ/w-hr).

(k) "Weekly basis" means at seven day intervals.

(l) "Daily basis" means at 24 hours intervals.

(m) "Rotary engine" means any Wankel type engine where energy from the combustion of fuel is converted directly to rotary motions instead of reciprocating motion.

(n) "Displacement per rotor" means the volume contained in the chamber of a rotary engine between one flank of the rotor and the housing at the instant the inlet port is closed.

§ 60.322 Standards for nitrogen oxides.

(a) On and after the date on which the performance test required to be conducted by § 60.8 is completed, no owner or operator subject to the provisions of this subpart shall cause to be discharged into the atmosphere, except as provided in paragraphs (b) and (c) of this section—

(1) From any gas engine, with a brake-specific fuel consumption at peak load more than or equal to 10.2 kilojoules/watt-hour any gases which contain nitrogen oxides in excess of 700 parts per million volume, corrected to 15 percent oxygen on a dry basis.

(2) From any diesel or dual-fuel engine with a brake-specific fuel consumption at peak load more than or equal to 10.2 kilojoules/watt-hour any gases which contain nitrogen oxides in excess of 600 parts per million volume, corrected to 15 percent oxygen on a dry basis.

(3) From any stationary internal combustion engine with a brake-specific fuel consumption at peak load of less than or equal to 10.2 kilojoules/watt-hour any gases which contain nitrogen oxides in excess of:

(i) $STD = 700 \frac{10.2}{Y}$ for any gas engine,

(ii) $STD = 600 \frac{10.2}{Y}$ for any diesel or dual-fuel engine

where:

STD = allowable NO_x emissions (parts-per-million volume corrected to 15 percent oxygen on a dry basis).

Y = manufacturer's rated brake-specific fuel consumption at peak load (kilojoules per watt-hour) or owner/operator's brake-specific fuel consumption at peak load as determined in the field.

(b) All one and two cylinder reciprocating gas engines are exempt from paragraph (a) of this section.

(c) Emergency standby engines are exempt from paragraph (a) of this section.

§ 60.323 Monitoring of operations.

(a) The owner or operator of any stationary internal combustion engine, subject to the provisions of this subpart must, on a weekly basis for unmanned engines and on a daily basis for manned engines, monitor and record the following parameters. All monitoring systems shall be accurate to within five percent and shall be approved by the Administrator.

(1) For diesel and dual-fuel engines:
(i) Intake manifold temperature
(ii) Intake manifold pressure
(iii) Engine speed
(iv) Diesel rack position (fuel flow)
(v) Injector timing

(2) For gas engines:
(i) Intake manifold temperature
(ii) Intake manifold pressure
(iii) Fuel header pressure
(iv) Engine speed
(v) Spark ignition timing

(b) For the purpose of reports required under § 60.7(c), periods of excess emissions that shall be reported are defined as any daily (for manned engines) or weekly (for unmanned engines) period during which any one of the parameters specified under paragraph (a) of this section falls outside the range identified for that parameter udner § 60.324(a)(3). Each excess emission report shall include the range identified for each operating parameter under § 60.324(a)(4), the monitored value for each operating parameter specified under § 60.323(a),

the ambient air conditions during the period of excess emissions, and any graphs and/or figures developed under § 60.324(a)(4)

(Sec. 114 of the Clean Air Act, as amended (42 U.S.C. 1857c-9))

§ 60.324 Test methods and procedures.

The reference methods in Appendix A to this part, except as provided in § 60.8(b), shall be used to determine compliance with the standards prescribed in § 60.322 as follows:

(a) Reference Method 20 for the concentration of nitrogen oxides and oxygen. The span for the nitrogen oxides analyzer used in this method shall be 1500 ppm.

(1) The following changes and additions (by section) to Reference Method procedures should be followed when determining compliance with § 60.322:

1. *Principle and Applicability.* Sulfur dioxide measurements are not applicable for internal combustion engine testing.

6.1 Selection of a sampling site and the minimum number of traverse points.

6.11 Select a sampling site located at least five stack diameters downstream of any turbocharger exhaust, crossover junction, or recirculation take-offs and upstream of any dilution air inlet. Locate the sample site no closer than one meter or three stack diameters (whichever is less) upstream of the gas discharge to the atmosphere.

6.1.2 a preliminary O_2 traverse is not necessary.

6.2 Cross-sectional layout and location of traverse points. Use a minimum of three sample points located at positions of 16.7, 50 and 83.3 percent of the stack diameter.

6.2.1 Record the data required on the engine operation record on Figure 20.7 of Reference Method 20. In addition, record (a) the intake manifold pressure; (b) the intake manifold temperature; (c) rack position, fuel header pressure or carburetor position; (d) engine speed; and (e) injector or spark timing. (The water or steam injection rate is not applicable to internal combustion engines.)

(2) The nitrogen oxides emission level measured by Reference Method 20 shall be adjusted to reference ambient conditions by the following ambient condition correction factors:

NO_x corrected = (K) NO_x observed

where K is determined as follows:

Fuel	Correction Factor
Diesel and Dual-Fuel	$K = 1/(1 + 0.00235(H - 75) + 0.00220\ (T - 85))$
Gas	$K = (K_H)\ (K_T)$ $K_H = 0.844 + 0.151\ (\frac{H}{100}) + 0.075\ (\frac{H}{100})^2$ $K_T = 1 - (T - 85)(0.0135)$

where:

H = observed humidity, grains H_2O/lb dry air

T = observed inlet air temperature, °F

The adjusted NO_x emission level shall be used to determine compliance with § 60.322.

(3) Manufacturers, owners, or operators may develop custom ambient correction factors in terms of ambient air temperature and/or pressure, and/or humidity to adjust the nitrogen oxide emission level measured by the performance test to reference ambient conditions. These correction factors must be substantiated with data and must be approved by the Administrator before they can be used to determine compliance with § 60.322. Notices of approval of custom ambient condition correction factors will be published in the **Federal Register.**

(4) Testing shall be conducted and ranges identified for each parameter specified under § 60.323(a) over which the numerical emission limits included under § 60.322 are not exceeded. This will be accomplished by measuring NO_x emissions, using Reference Method 20, and these parameters at four points over the normal load range of the internal combustion engine, including the minimum and maximum points in the range if the stationary internal combustion engine will be operated over a range of load conditions.

(b) ASTM D-2382 shall be used to determine the lower heating value of liquid fuels and ASTM D-1826 shall be used to determine the lower heating value of gaseous fuels.

(Sec. 114 of the Clean Air Act, as amended (42 U.S.C. 1857c-9))

[FR Doc. 79-22224 Filed 7-20-79, 8:45 am]

[FRL 1099-6]

Air Pollution Prevention and Control; Addition to the List of Categories of Stationary Sources

Section 111 of the Clean Air Act (42 U.S.C. 1857c-6) directs the Administrator of the Environmental Protection Agency to publish, and from time to time revise, a list of categories of stationary sources which he determines may contribute significantly to air pollution which causes or contributes to the endangerment of public health or welfare. Within 120 days after the inclusion of a category of stationary sources in such list, the Administrator is required to propose regulations establishing standards of performance for new and modified sources within such category. At present standards of performance for 27 categories of sources have been promulgated.

The Administrator, after evaluating available information, has determined that stationary internal combustion engines are an additional category of stationary sources which meets the above requirements. The basis for this determination is discussed in the preamble to the proposed regulation that is published elsewhere in this issue of the **Federal Register**. Evaluation of other stationary source categories is in progress, and the list will be revised from time to time as the Administrator deems appropriate. Stationary internal combustion engines are included on the proposed NSPS priority list (published August 31, 1978) required by section 111(f)(1), but since the priority list is not final, stationary internal combustion engines are also being listed as indicated below at this time. Once the priority list is promulgated, all source categories on the promulgated list are considered listed under section 111(b)(1)(A), and separate listings such as this will not be made for those source categories.

Accordingly, notice is given that the Administrator, pursuant to section 111(b)(1)(A) of the Act, and after consultation with appropriate advisory committees, experts and Federal departments and agencies in accordance with section 117(f) of the Act, effective July 23, 1979 amends the list of categories of stationary sources to read as follows:

List of Categories of Stationary Sources and Corresponding Affected Facilities

* * * * *

Source Category

* * * * *

Affected Facilities

Internal combustion engines

Proposed standards of performance applicable to the above source category appear elsewhere in this issue of the **Federal Register.**

Dated: July 11, 1979.

Douglas M. Costle,

Administrator./

[FR Doc. 79-22225 Filed 7-20-79; 8:45 am]

[40 CFR Part 60]

[FRL 1321-5]

Standards of Performance for New Stationary Sources; Stationary Internal Combustion Engines

AGENCY: Environmental Protection Agency (EPA).

ACTION: Extension of Comment Period.

SUMMARY: The deadline for submittal of comments on the proposed standards of performance for stationary internal combustion engines, which were proposed on July 23, 1979 (44 FR 43152), is being extended from September 21, 1979, to October 22, 1979.

DATES: Comments must be received on or before October 22, 1979.

ADDRESSES: Comments should be submitted to Mr. David R. Patrick, Chief, Standards Development Branch (MD-13), Emission Standards and Engineering Division, Environmental Protection Agency, Research Triangle Park, North Carolina 27711.

FOR FURTHER INFORMATION CONTACT: Mr. Don R. Goodwin, Director, Emission Standards and Engineering Division (MD-13), Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5271.

SUPPLEMENTARY INFORMATION: On July 23, 1979 (44 FR 43152), the Environmental Protection Agency proposed standards of performance for the control of emissions from stationary internal combustion engines. The notice of proposal requested public comments on the standards by September 21, 1979. Due to a delay in the shipping of the Standards Support Document, sufficient copies of the document have not been available to all interested parties in time to allow their meaningful review and comment by September 21, 1979. EPA has received a request from the industry to extend the comment period by 30 days through October 22, 1979. An extension of this length is justified since the shipping delay has resulted in approximately a three-week delay in processing requests for the document.

Additionally, page 9-75 of the Standards Support Document was inadvertently omitted. Persons wishing to obtain copies of this page should contact Mr. Doug Bell, Emission Standards and Engineering Division, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5477.

Dated: September 12, 1979.

David G. Hawkins,

Assistant Administrator for Air, Noise, and Radiation.

[FR Doc. 79-28927 Filed 9-17-79; 8:45 am]

ENVIRONMENTAL PROTECTION AGENCY

■

STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

ORGANIC SOLVENT CLEANERS

SUBPART JJ

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 60

[FRL 1375-3]

Standards of Performance for New Stationary Sources Organic Solvent Cleaners

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule and notice of public hearing.

SUMMARY: The proposed standards would limit emissionsof volatile organic compounds (VOC) and trichloroethylene 1,1,1-trichloroethane, perchloroethylene, methylene chloride, and trichlorotrifluoroethane from new, modified, and reconstructed organic solvent cleaners (degreasers) in which solvents are used to clean (degrease) metal, plastic, fiberglass, or any other type of material. The proposed standards would specify several equipment designs and work practices for controlling emissions from cold cleaners, open top vapor degreasers, and conveyorized degreasers. When carbon adsorber control systems are used, a performance standard would also apply. To determine the emissions from carbon adsorbers, a new test method, Reference Method 23, is proposed to measure the concentration of the above mentioned halogenated compounds, and Reference Method 25 which was proposed on October 5, 1979 (44 FR 57792) would be used to measure emissions of VOC.

The proposed standards implement the Clean Air Act and are based on the Administrator's determination that organic solvent cleaners contribute significantly to air pollution. The intent is to require new, modified, and reconstructed organic solvent cleaners to use the best demonstrated system of continuous emission reduction, considering costs, nonair quality health, and environmental and energy impacts.

It is also proposed that standards be developed under section 111(d) of the Clean Air Act, as amended, for the control of emissions from existing facilities of the five halogenated organic solvents listed above. EPA is not committed to developing section 111(d) standards unless, after review of public comments, standards for one or more of these five solvents are promulgated for new, modified, or reconstructed facilities. If such standards were promulgated, EPA would develop a guideline document that would require States to develop emission control regulations for existing organic solvent cleaners which use any of the five halogenated solvents to which the promulgated regulations would apply.

A public hearing will be held to provide interested persons an opportunity for oral presentation of data, views, or arguments concerning the proposed standards.

DATES: *Comments.* Comments must be received on or before August 25, 1980.

Public Hearing. The public hearing will be held on July 24, 1980, beginning at 9:00 a.m.

Request to Speak at Hearing. Persons wishing to present oral testimony should contact EPA by July 17, 1980.

ADDRESSES: *Comments.* Comments should be submitted (in duplicate if possible) to the Central Docket Section (A-130), U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, D.C. 20460, Attention: Docket No. OAQPS-78-12.

Public Hearing. The public hearing will be held at Research Triangle Park, North Carolina, in the EPA Environmental Research Center auditorium (Room B-102). Persons wishing to present oral testimony should notify Deanna Tilley, Standards Development Branch (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number: (919) 541-5421.

Background Information Document. The Background Information Document (BID) for the proposed standards may be obtained from the U.S. EPA Library (MD-35), Research Triangle Park, North Carolina 27711, telephone number (919) 541-2777. Please refer to *Organic Solvent Cleaners—Background Information for Proposed Standards* (EPA-450/2-78-045a).

Docket. Docket number OAQPS-78-12, containing supporting information used by EPA in development of the proposed standards, is available for public inspection between 8:00 a.m. and 4:00 p.m., Monday through Friday, at EPA's Central Docket Section, Room 2903B, Waterside Mall, 401 M Street, S.W., Washington, D.C. 20460.

FOR FURTHER INFORMATION CONTACT: Mr. John D. Crenshaw, Standards Development Branch, Emission Standards and Engineering Division (MD-13), Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5421.

SUPPLEMENTARY INFORMATION:

Proposed Standards

The proposed standards would limit the emissions of organic solvents from new, modified, and reconstructed degreasers in which solvents are used to clean and degrease metal, plastic, fiberglass, or any other type of material. Three types of degreasers would be regulated: cold cleaners, open top vapor degreasers, and conveyorized degreasers. The proposed regulations consist of a combination of design, equipment, work practice, and operational standards that allow for the best emission control and enforceability. Each type of degreaser would be required to have specific features for effectively reducing emissions. Pollution control devices for degreasers would include covers, raised freeboards, refrigerated freeboard devices and carbon adsorption systems. Work practices and operational procedures would also be required for each type of degreaser. These practices and procedures would assure the maximum effectiveness of a specific piece of control equipment, and would require use of techniques that reduce solvent emissions.

An inspection and maintenance program would also be required to prevent and correct solvent losses from leaks and equipment malfunctions. An operator training program is a proposed requirement because proper equipment operation and work practices play a significant role in effective control of solvent emissions from degreasers. Finally, owners and operators would be required to keep records on the amount and type of solvent purchased for a period of two years.

Summary of Environmental, Economic, and Energy Impacts

Environmental Impact. The proposed standards would reduce emissions of organic solvents (i.e., volatile organic compounds, trichloroethylene, 1,1,1-trichloroethane, perchloroethylene, methylene chloride, and trichlorotrifluoroethane) from all degreasing units for which construction was commenced after (date of proposal). Affected facilities that come on-line between 1980 and 1985 would emit an estimated 332,000 megagrams (366,000 tons) of organic solvents in 1985, if the degreaser units are uncontrolled. With implementation of the proposed regulations, controlled emissions from these facilities would be 120,000 megagrams (132,000 tons) in 1985, which constitutes a reduction of 64 percent.

The only potentially adverse impact on water quality of the proposed regulation would derive from the solvent dissolved in the steam condensate from regeneration (solvent desorption) of carbon adsorbers. Because the solubility of solvent in the condensate is very small, the amount of dissolved solvent is

slightly greater than one-tenth of one percent (0.1%) of the amount which would be discharged into the air if the proposed controls were not implemented. In a typical system, the carbon adsorber has a solvent capacity of 95 kilograms (210 pounds), and requires 3 kilograms (6.6 pounds) of steam to desorb each kilogram of solvent. Although desorption generates approximately 283 liters (10 cubic feet) of steam condensate per cycle, most solvent would be recovered by a water separator. Only 74 grams (0.16 pound) of solvent per day is expected to be lost in the waste stream from a typical carbon adsorber. The environmental impact of the disposal of this small amount of condensate is insignificant. Alternatives are under consideration by EPA for controlling the solvent in the effluent from desorption of a carbon adsorber. EPA may establish regulations pertaining to these effluents in the future.

The only solid waste impact due to implementation of the proposed standards would be disposal of the spent carbon from the carbon adsorbers used as air pollution control devices on certain types of degreasers. With replacement of spent carbon every 10 years, disposal of spent carbon from carbon adsorbers on affected facilities would amount to 243 megagrams (268 tons) nationwide starting in 1989 and would increase to 271 megagrams (299 tons) in 1995. Therefore, the solid waste impact from spent carbon would be minimal.

Economic Impact. The costs of compliance with the proposed standards are based on control equipment currently in use and commercially available. Economic analysis indicates that, under most conditions, the capital and annualized costs for the control equipment can be fully recovered by credits for the recovered solvent. Consequently, no adverse economic impact is anticipated to result from implementation of the proposed standards. The economic impact, may, in fact, be positive in the sense that net credits lead to lower production costs in most, if not all, industries. Methods to reduce solvent consumption and save money generally have not been accomplished in the past since degreasing costs generally average less than four-tenths of one percent of industry output.

Energy Impact. Energy consuming emission control devices for degreasing operations would include (1) refreigerated freeboard devices, (2) carbon adsorption systems, and (3) distillation equipment. Operation of these control devices in 1985 is estimated to require about 0.27 million kWh per day (equivalent to 440 barrels of oil per day); however, the proposed standards would result in the prevention or capture of degreaser emissions. Based upon the amount of energy that would have been required to manufacture replacement solvent, use of the required control devices on new organic solvent cleaners would conserve an estimated 3800 barrels of oil per day. Thus, the proposed standards in 1985 would result in a net conservation of energy equivalent to an estimated 3350 barrels of oil per day.

Rationale—Selection of Source for Control

Organic solvent cleaners (degreasers) have been identified as significant sources of air pollutant emissions which cause or contribute to the endangerment of the public health or welfare. Degreasing is not an industry but is an integral part of many manufacturing, repair, and maintenance operations. Volatile organic compounds, as well as 1,1,1-trichloroethane, trichlorotrifluoroethane, methylene chloride, trichlorethylene, and perchloroethylene constitute the emissions from organic solvent cleaners. There were an estimated 725,000 megagrams (800,000 tons) of organic solvents emitted from organic solvent cleaning operations in 1975. This represents about 4 percent of the total national volatile organic emissions from stationary sources, making organic solvent cleaners the fifth largest stationary source category for organic emissions. There are over 1,500,000 organic solvent cleaners currently in operation. If the current growth rate of 4.1 percent per year continues as expected, over 300,000 new organic solvent cleaners would be subject to these standards of performance by 1985.

Degreasing emissions include losses due to evaporation from the solvent bath, convection, carryout, leaks, and waste solvent disposal. Thus, the emissions from a degreaser are fugitive in nature. Many of the degreasers currently in use are operated without proper control emissions to the atmosphere. Emissions from degreasers may be controlled by the use of various equipment options (including a cover, extended freeboard, refrigerated freeboard device, and carbon adsorber) and specific work practices (involving parts handling, proper use and maintenance of equipment, preventing drafts, and controlling the rate of the degreasing operation).

Based on the large number of sources and their wide geographic distribution across the United States, the current sales and projected growth rate in the "industry" and the possible reduction in adverse environmental and health impacts which can be achieved, organic solvent cleaners have been selected for control through the development of standards of performance.

Selection of Affected Facilities

Organic solvent cleaning is not a specific industry but is an integral part of many manufacturing, repair, and maintenance operations. Practically every business that works metal or has maintenance or repair operations does some type of degreasing. Degreasing operations are often concentrated in urban areas where there are a large number of manufacturing facilities.

The solvents used in degreasing operations include halogenated hydrocarbons, petroleum distillates, ketones, ethers, and alcohols. These solvents are emitted as fugitive emissions from each of the three types of degreasers which would be regulated: (1) a cold cleaner, in which the article to be cleaned is immersed, sprayed or otherwise washed in a solvent at or about room temperature; (2) an open top vapor degreaser, in which the article is suspended in solvent vapor over a pool of boiling solvent and the solvent vapors condense on the article and dissolve or wash soil and grease from it; and (3) a conveyorized degreaser, in which articles are conveyed on a chain, belt or other conveying system either through a spray or pool of cold solvent, or through the vapor of a boiling solvent. In order to achieve significant reduction in volatile organic compound emissions from degreasing operations, all types of new, modified, or reconstructed degreasers would subject to control.

The mode of disposal of waste solvent can also contribute significantly to solvent emissions. In the past, disposal has generally been handled by the owners of organic solvent cleaners. If waste solvent disposal in 1985 were to follow the pattern of waste solvent disposal in 1974, about 43 percent of the waste solvent from new sources would be reclaimed, incinerated, landfilled and the remaining 57 percent could be an immediate source of air or water emissions.

A number of alternatives for regulating waste disposal have been considered. These include requiring incineration or reclamation, and establishment of standards under the Resource Conservation and Recovery Act (RCRA). Because of the impact on these small sources of requiring reclamation or incineration, regulation here is not now planned. Rather, the

Administrator is deferring at this time on waste disposal requirements and is pursuing this matter under RCRA. The section on waste disposal is being reserved, however, pending completion of the evaluation and resolution of the issues.

Selection of Pollutants and Regulatory Approach

Among the solvents used in degreasing operations, approximately 40 percent are non-halogenated hydrocarbons and 60 percent are halogenated hydrocarbons. Most of these solvents are also reactive volatile organic compounds (VOC), defined by this proposal as organic compounds which participate in atmospheric photochemical reactions or which may be measured by the applicable reference method specified under any subpart of 40 CFR Part 60. The proposed standards of performance apply to reactive VOC (ozone precursors) used as cleaning solvents and to five halogenated compounds for which there is a reasonable anticipation of public health endangerment.

Reactive Volatile Organic Compounds (VOC).

The proposed standards require control of any VOC demonstrated to be precursors to the formation of ozone and other photochemical oxidants in the atmosphere. While not all compounds are equally reactive, analysis of available data indicates that very few VOC are of such low photochemical reactivity that they can be ignored in oxidant control programs. EPA's "Recommended Policy on Control of Volatile Organic Compounds" (42 FR 35314; July 8, 1977) affirmed that many compounds which produced negligible oxidant concentrations during initial smog chamber tests were found to contribute appreciably to ozone levels when exposed to multiday irradiations in urban atmospheres. In those geographical areas where industrial and automotive emissions are subjected to long hours of sunlight, or where air stagnation occurs frequently, such low reactivity compounds may become significant source of photochemical oxidant.

EPA is developing standards of performance under section 111(b) for a number of categories of sources which emit these volatile organic compounds, which are ozone precursors. Ozone air pollution endangers the public health and welfare, as reflected in the Administrator's promulgation of a National Ambient Air Quality Standard for ozone (44 FR 8202; February 8, 1979). Emissions of ozone precursors from these source categories cause or contribute significantly to ozone air pollution. Trichloroethylene and, to a lesser extent, perchloroethylene react to form ozone and therefore would be subject to new source performance standards for reactive VOC.

The Administrator is also concerned about certain other possible health effects of perchloroethylene and trichloroethylene, apart from their role in ozone formation, and he believes that regulation of existing emission sources is necessary. Both substances have been found to induce a high incidence of hepatocellular carcinomas (liver tumors) in mice and have shown positive results in bacterial mutagencity assays (a screening technique for potential carcinogens). The Agency's initial evaluation of this information is that it presents "substantial evidence" (41 FR 21402; May 25, 1976) that both substances are human carcinogens. Consistent with EPA's proposed rules for regulating airborne carcinogens (44 FR 58642; October 10, 1979), if these initial evaluations are sustained after consideration of comments by EPA's Science Advisory Board, it is likely that perchloroethylene and trichloroethylene will be classified as high-probability carcinogens and, in light of the significant emissions of each, regulated as hazardous air pollutants under section 112 of the Act. This regulation would include both new and existing emission sources.

It is also possible that the Administrator will ultimately conclude that one or both of these chemicals is a moderate-probability carcinogen rather than a high-probability carcinogen. As the proposed airborne carcinogen rules explain, under the circumstances presented here, EPA could then "designate" the substance for regulation of existing organic solvent cleaners by the States under section 111(d) of the Clean Air Act. The Act provides for the designation of such substances for regulation under section 111(d) if the substances themselves have not been listed previously under section 108 or section 112. Because the evidence is clearly sufficient for the Administrator to conclude that both substances are at least moderate-probability carcinogens and that their emission by organic solvent cleaners causes air pollution which endangers public health and welfare, he is proposing designation of these two substances under section 111(d) at this time. Although a final determination by the Agency of the evidence of carcinogenicity would normally precede the selection of a regulatory alternative, the Administrator is proposing designation of perchloroethylene and trichloroethylene today for two reasons. First, this will put existing sources within the industry on notice that perchloroethylene and trichloroethylene would not be unregulated substitutes for the other three solvents for which designation is proposed today. Second, in the event that the Administrator ultimately concludes that perchloroethylene and trichloroethylene are moderate-probability rather than high-probability carcinogens, it will enable the section 111(d) process to proceed without delay as part of a coordinated regulatory program for the organic solvent cleaning industry. The Administrator intends to make a final carcinogenicity assessment for these two chemicals before promulgating today's proposals.

Negligibly Reactive Halogenated Compounds.

In addition to reactive halogenated compounds, the proposed new source regulations would apply to three additional halogenated solvents: 1,1,1-trichlorethane, methylene chloride, and trichlorotrifluoroethane. Since these chemicals are acknowledged by EPA to be negligibly reactive, they are not ozone precursors and must be designated under section 111(d) of the Act. As described above, the designation for the purpose of obtaining coverage under new source standards also requires the development under section 111(d) of standards for existing sources.

Both methylene chloride and 1,1,1-trichlorethane have scored positive as well as negative results in short-term mutagenicity and cell transformation tests. The weight of evidence has led the EPA Carcinogen Assessing Assessment Group to conclude in preliminary assessments that both chemicals exhibit suggestive evidence of human carcinogenicity. Under EPA's proposed airborne carcinogen policy, this finding would establish 1,1,1-trichlorethane and methylene chloride as candidates for regulation under section 111 as air pollutants "reasonably anticipated to endanger public health or welfare." In addition, trichlorotrifluoroethane and 1,1,1-trichlorethane have been implicated in the depletion of the stratospheric ozone layer, a region of the upper atmosphere which shields the earth from harmful wavelengths of ultraviolet radiation that increase skin cancer risks in humans.

The judgments of whether and to what extent 1,1,1-trichlorethane and methylene chloride are human carcinogens, and 1,1,1-trichlorethane and trichlorotrifluoroethane deplete the

ozone layer, are issues of considerable debate. While the scientific literature has been previously reviewed and summarized in the docket prepared for this rulemaking, more detailed health assessments are currently in preparation by EPA's Office of Research and Development. These assessments will be completed and submitted for external review, including review by the Science Advisory Board, prior to the promulgation of the regulations and the proposal of EPA guidance to States in developing existing source control measures. The extent to which the preliminary findings are affirmed by the review process may affect the final rulemaking for new as well as existing sources.

While the measure of concern is less for these latter three solvents than for perchloroethylene and trichloroethylene, the Administrator has chosen to proceed with the designation of 1,1,1-trichlorethane, methylene chloride, the trichlorotrifluoroethane at this time because emissions from these sources and the associated health risks can be reduced at a very low cost. This decision reflects EPA's concern that continued growth in uncontrolled emissions of 1,1,1-trichlorethane, methylene chloride, and trichlorotrifluoroethane from solvent cleaners may endanger public health, and is reinforced by projections that, were these chemicals exempted from regulation, the resulting substitution of exempt for non-exempt solvents could result in large increases in the emissions of these pollutants.

The designation of 1,1,1-trichlorethane, methylene chloride, and trichlorotrifluoroethane incorporates these chemicals under today's proposed new source standards and invokes section 111(d) which requires States to develop controls for existing sources. As described in detail below, the new source standards do not place unreasonable economic costs on the industry. While the impact of similar controls on existing sources could be more significant due to the technological problems associated with retrofit, this factor would be an important consideration in determining the appropriate control level for existing sources. In view of the substantial reduction in emissions which can be achieved at low cost, and the potential for substitution between these five compounds, the Administrator is persuaded that the present approach represents a prudent policy to protect public health. It should be emphasized that the health assessments discussed here are not final. The Administrator is aware of other relevant information that may become available. All applicable information will be carefully evaluated prior to making the final regulatory decision.

Summaries of the health basis for designating perchloroethylene, trichloroethylene, 1,1,1-trichloroethane, methylene chloride, and trichlorotrifluorethane are available in the public rulemaking docket described at the beginning of this notice.

Selection of Format for the Proposed Standards

Under the Clean Air Act, as amended, there are two regulatory alternatives available for establishing standards of performance for new stationary sources. Section 111(b) provides for establishing emission limitations or percentage reductions in emissions. However, when such standards are not feasible to prescribe or enforce, section 111(h) of the Clean Air Act provides that EPA may instead promulgate a design, equipment, work practice, or operational standard, or combination thereof. In either event, the standards prescribed would require new, modified, and reconstructed organic solvent cleaners to use the best demonstrated system of continuous emission reduction considering costs, nonair quality health and environmental impacts, and energy impacts. The emissions from organic solvent cleaners are unconfined (fugitive). Although techniques have been developed to measure the solvent lost from degreasing equipment (such as mounting entire organic solvent cleaners on scales), these methods are impractical for enforcement of regulations due to the length of time needed to accurately determine the solvent losses and because of the disruption this would cause in degreaser operations. For this reason, an equipment and work practice standard has been selected since it is not feasible to enforce emission limitations or percentage reductions in emissions for organic solvent cleaning operations.

Selection of the Best System of Emission Reduction

Emissions of volatile organic compounds from degreasers would be reduced significantly by the use of various pollution control devices, singly or in combination, as would be appropriate for each method of degreasing. These controls would include: cover, drain rack, raised freeboard, refrigerated freeboard device, downtime port covers, hanging flaps, and drying tunnel or lip exhaust in conjunction with a carbon adsorber. Degreaser emissions would be reduced further through the implementation of prescribed work practices. These work practices would include: closing the cover when work is not being lowered into or removed from the degreaser, storing solvent in covered containers, not exposing open degreasers to steady drafts with velocities exceeding 40m/min (131 ft/min), and not overloading the degreaser.

The best system of emission control for each type of degreaser was selected on the basis of EPA tests of the effectiveness of various controls used on degreasers operating under different conditions and using different solvents. These are described as follows:

Cold Cleaners.—The emission control system selected for cold cleaners (CC) would consist of both control equipment and a series of work practices. These controls used in combination would reduce solvent emissions from cold cleaners by about 80 percent. The equipment requirements would include a cover, a drain rack, and a visible fill line. The cover would be designed to be readily opened and closed at any time. External drain racks would lead the drainage back to the tank. If the CC is equipped with a parts basket, internal hooks to permit suspension of the basket above the solvent could be substituted for the drain rack. One of the work practices would require that the solvent level not exceed the visible internal maximum fill line. The proposed standards would require that the freeboard ratio for CC would be at least 0.7 if the solvent vapor pressure is greater than 4.3 kPa (33 mm Hg or 0.6 psi) measured at 38° C (100° F). The purpose for this is to prevent excessive volatilization, i.e. vaporization. Higher freeboard ratios impede excess vaporization of highly volatile solvents under normal operating conditions. However, many solvents used in cold cleaning operations do not volatilize as rapidly as others. For solvents with a vapor pressure of less than or equal to 4.3 kPa measured at 38° C (100° F), the proposed standards would require a freeboard ratio of 0.5.

The economic analysis for this emission control system for cold cleaners was based on a typical unit. The uncontrolled cold cleaner was assumed to be uncovered all the time, whereas the controlled unit had a cover that was used all but 2 hours per working day (20 loads cleaned per day). Based on these assumptions, the cover would reduce emissions by 349 kilograms (769 pounds) per year at a savings of $69.80. The drain rack would reduce emissions by 36 kilograms (79 pounds) per year with a savings of $7.92.

Remote Reservoir Cold Cleaner.—The emission control system selected for remote reservoir cold cleaners (RRCC) is less stringent than that proposed for conventional cold cleaners. During non-use periods, the solvent is enclosed in a reservoir and not subject to evaporation loss to the atmosphere. While parts are being cleaned, solvent is pumpted through a sink-like work area which drains back into the enclosed contaier. Because the reservoir is remote from the work area, this type of organic solvent cleaner is not subject to the evaporation losses suffered by conventional cold cleaners. Therefore, the proposed standards for remote reservoir cold cleaners would not require closable covers, provided the solvent used has a vapor pressure of less than or equal to 4.3 kPa (33 mm Hg or 0.6 psi) measured at 38° C (100° F), but would require covers if the solvent volatility was greater than 4.3 kPa.

Open Top Vapor Degreaser.—The emission control systems would be required for all new, modified, or reconstructed open top vapor degreasers (OTVD) consists of covers, raised freebacks, and refrigerated freeboard devices or carbon adsorption systems. EPA and industry tests have shown that covers are the most effective control device in reducing solvent emissions during nonoperating conditions. Raised freeboards have also been show to be effective at reducing these emissions. By raising the freeboard ratio from 0.5 to 0.75, solvent emissions are generally reduced 25–30 percent during idling conditions. Emission reductions are less during actual operating conditions due to the transference of loads through vapor/air interface. Freeboard ratios larger than 0.75 may yield greater emission reductions, however, higher freeboards tend to icrease the difficulty of transferring loads into and out of the degreaser. The demonstrated ability of covers and raised freeboards to reduce solvent emissions, and the minimal cost of these two control devices have been the primary reasons for requiring the use of covers during nonoperating periods and freeboards ratios of at least 0.75 for all new, modified, and reconstructed open top vapor degreasers.

Emission tests have also shown that refrigerated freeboard devices and lip exhausts connected to carbon adsorbers are more effective at reducing solvent emissions than raised freeboards. During operating conditions, emission reductions as high as 65 percent have been demonstrated with the use of carbon adsorbers, while refrigerated freeboard devices have been demonstrated to reduce solvent emissions by at least 40 percent. A raised freeboard ratio of 1.0 has also shown promise (55 percent reduction), but its effectiveness under cross-draft conditions has not been adequately evaluated. It is expected that the cold air blanket produced by a refrigerated freeboard device would provide greater control of cross-draft induced vapor losses. For these reasons, all new, modified, and reconstructed OTVD with vapor/air interface areas greater than one square meter would be required to use refrigerated freeboard devices, or have lip exhausts connected to carbon adsorbers.

Reference Method 23, "Determination of Halogenated Organics from Stationary Sources," would be the required test method to measure emissions of the regulated halogenated compounds from carbon adsorbers. The principle of the method is an integrated bag sample of stack gas that is subjected to gas chromatographic analysis, using flame ionization detection. The range of this method is 0.1 to 200 ppm. The emission limitation proposed by these standards of performance would be 25 ppm of any regulated halogenated organic compound measured over the length of the carbon adsorber cycle, or for three hours, whichever is less. The Administrator specifically requests comments on this proposed test method and emission limitation.

A cut-off size of one square meter was determined to be the most effective for OTVD, taking into consideration the absolute reduction in solvent emissions and economic analyses. Although the capital expenditures for refrigerated freeboard devices are greater than for raised freeboards, solvent savings would completely offset the added capital expenditures, provided the degreasers were operated properly. However, for small OTVD (less than 1 m^2 in open top area), refrigerated freeboard devices would not be a cost-effective alternative. Taking into consideration the small reduction in solvent emissions and economics, small open top vapor degreasers would not be required to have refrigerated freeboard devices.

EPA realizes that refrigerated freeboard devices with sub-zero (0°C) refrigerant temperatures are patented. If any degreaser manufacturer is unable to demonstrate alternative methods of control, and certifies that the licensing terms for sub-zero refrigerated freeboard devices are unreasonable, relief under section 308 of the Clean Air Act, as amended can be sought.

Although the proposed standards require specific control technologies, they do not preclude the use of other control options which are demonstrated to be equally effective in reducing solvent emissions. After proposal of these regulations, any person may request an equivalency determination. EPA expects to approve other methods of continuous emission reduction when they have been demonstrated to be as effective in reducing emissions as refrigerated freeboard devices. The Administrator will also welcome any additional data and information concerning the control efficiencies of raised freeboards and refrigerated freeboard devices. Tests are currently being conducted to investigate the effectiveness of refrigerated freeboard devices and increased freeboard ratios under cross-draft conditions. Preliminary results of these tests have shown varying test results for different solvents. Because of possible variation in test outcomes, additional tests are planned. Tests are also being conducted to evaluate the effectiveness of automated covers which close after the workload enters the degreaser. These test results and any additional information and data submitted to EPA during the public comment period will be used to further evaluate the appropriateness of the proposed emission control options. Expansion or deletion of these options will be evaluated prior to promulgation. All information obtained during the course of this investigation and received during the public comment period would be placed in the docket for public review and considered by EPA before taking final action to promulgate standards for new, modified, and reconstructed degreasers.

Conveyorized Degreasers.—There are two major types of conveyorized degreasers: conveyorized vapor degreaser (CVD) and conveyorized cold cleaners (CCC). Conveyorized vapor degreasers use the vapors of boiling solvent to clean and degrease surfaces, while conveyorized cold cleaners use non-boiling solvent in the liquid phase to clean surfaces. The emission control system selected for conveyorized degreasers consists of both control equipment and a series of work practices. Using these controls in combination will reduce solvent emissions from conveyorized degreasers by 60 percent.

The two major emission control requirements for CVD are carbon adsorbers or refrigerated freeboard devices, provided the CVD is greater than 2 square meters (21.6 ft^2) in vapor/air interface area. This cutoff size was determined to be the most effective, taking into consideration the absolute

reduction in solvent emission and economic analyses. For larger crossrod and monorail CVD, carbon adsorbers produce greater emission reductions at higher savings than do refrigerated freeboard devices. For owners or operators of small crossrod and monorail degreasers, the capital costs of a carbon adsorber could be prohibitive. Because of this, a refrigerated freeboard device may be used instead of a carbon adsorber. As with OTVD, the type of conveyorized vapor degreaser, the type of work being processed, and ambient conditions would determine which emission control system should be used.

For conveyorized cold cleaners, the major emission control requirement would be a carbon adsorber, provided the CCC is greater than 2 square meters (21.6 ft^2) in solvent/air interface area. Like CVD, this cutoff was determined to be the most effective, taking into consideration the absolute reduction in solvent emissions and economic analyses. Refrigerated freeboard devices would not be an option for CCC since they are only effective in reducing emissions of warm solvent vapors.

Equivalent Systems of Emission Reduction

These standards of performance do not preclude the use of other degreaser emission control equipment or procedures of operation which can be demonstrated to be equivalent, in terms of reducing solvent emissions, to those prescribed in the proposed regulation. For determination of equivalency, any person may write the Administrator of EPA and request approval of a test plan for demonstrating equivalency. The test plan must propose the use of specific equipment, test procedures, a date, and a U.S. location at which the person making the request wishes to demonstrate equivalency. In order to determine equivalency, the Administrator must find a substantial likelihood that the control technology used in normal operations would produce equivalent emission reductions as the standards would require, at approximately the same or less economic, energy, or environmental cost. An alternate equipment design would not be considered equivalent to the proposed requirements if it placed a greater burden upon the personnel operating the degreaser to manually operate the emission capture device (e.g., use of an automated cover could potentially be found equivalent to use of refrigerated freeboard devices, but a manually operated cover would not qualify). Automated operation of the emission control system is required because manual operation would be burdensome due to the frequency with which work enters and exits open top vapor degreasers (cycle times of only 6 minutes are not unusual) and because enforcement of these standards would primarily depend upon equipment certifications. Although work practices could not be substituted for equipment design requirements, alternatives to the work practices contained in the proposed standards could also be included in an equivalency determination.

Selection of Enforcement Methods

More than 325,000 new degreasers are expected to be in operation by 1985. The large number of degreasers precludes the inspection of all units on a periodic basis. Therefore, enforcement must be achieved through a combination of degreaser manufacturer certifications and EPA random inspections. Because EPA cannot inspect all degreasers that will be in operation, adherence to the work practices will basically depend upon voluntary compliance. Although the work practices are important, the equipment design requirements will be the primary mechanism for ensuring the control of organic solvent emissions from degreasing operations. A random inspection program would be designed to inspect all degreaser design types produced, but would cover only a sample of shops using degreasing equipment. To facilitate this program, the primary reporting burden would be place upon the manufacturers of degreasing equipment.

Under section 111(a)(5) of the Clean Air Act, as amended, manufacturers of degreasers would be considered owners until the degreasers are sold. Thus, the original manufacturer of a newly constructed degreaser would be responsible for making the proposed reports. Section 114(a)(1) of the Act specifies that the Administrator can require owners or operators to report information to EPA as may be reasonably required. Manufacturers of cold cleaners, remote reservoir cold cleaners, open top vapor degreasers, and conveyorized degreasers would be required to notify the Administrator of the date construction began on a new degreaser, certain equipment features, and the name, date and location to whom the ownership of the degreaser was transferred. This information would be reported once for each degreaser constructed, modified, or reconstructed and the reports would be submitted each quarter. If any manufacturer or other owner or operator feels that the information to be submitted is proprietary in nature, a request for confidential treatment can be submitted with the report. On September 1, 1976, EPA promulgated regulations (40 CFR part 2) which govern the treatment of confidential business information, including that obtained under section 114 of the Clean Air Act.

Under certain circumstances, the operator of the degreaser rather than the original manufacturer would be responsible for making the report. This would occur when a modification or reconstruction to an existing degreaser was made by any person other than the original manufacturer or when any affected degreaser is resold.

Certification would be supplemented by an EPA inspection program of representative types of models of degreasers from owners and operators selected at random. This program would determine compliance with the design requirements for all new degreasing equipment, and would determine compliance with the work practice and operational requirements by a random sample of degreasing operations. Inspection would include a visual check of the operation and an examination of the methods of waste solvent disposal.

This method of enforcement has been selected as the best option considering the savings in time and money for effective enforcement. As mentioned previously, the large number of new sources expected within the next five years prohibits inspection of each unit. Effort has been made to reduce the proposed reporting and recordkeeping burdens to the minimum needed to administer an effective enforcement program. EPA also considered requiring each degreaser operator to report directly to EPA upon installation of a new degreaser and to periodically report work practice methods in use. However, the reporting requirements would have caused an excessive burden to be placed on each degreaser operator and would have caused the generation of a large number of reports. For these reasons, the proposed reporting requirements are minimized to include a one-time report per degreaser of a few basic items. In addition, spot checks of representative types and models of degreasers in operation were selected as the best available option. Operators of degreasing equipment would only be required to keep records of solvent usage and disposition and would not be required to make written reports. These records can be discarded after a two year period. To further reduce the impact of these requirements, operators of small cold cleaners (less than 1 m^2), such as are commonly used in gasoline service stations, would be exempt from any recordkeeping or reporting except

for maintaining a simple record of the disposition of waste solvent.

Public Hearing

A public hearing will be held to discuss these proposed standards in accordance with section 307(d)(5) of the Clean Air Act. Persons wishing to make oral presentations should contact EPA at the address given in the ADDRESSES Section of this preamble. Oral presentations will be limited to 15 minutes each. Any member of the public may file a written statement with EPA before, during, or within 30 days after the hearing. Written statements should be addressed to the Central Docket Section (A-130), U.S. Environmental Protection Agency, 401 M Street, SW., Washington, D.C. 20460, Attention: Docket No. OAQPS-78-12.

A verbatim transcript of the hearing and written statements will be available for public inspection and copying during normal working hours at EPA's Central Docket Section, Room 2903B, Waterside Mall, 401 M Street, SW., Washington, D.C. 20460.

Docket

The docket is an organized and complete file of all the information submitted to or otherwise considered by EPA in the development of this proposed rulemaking. The principal purposes of the docket are: (1) to allow interested parties to readily identify and locate documents so that they can intelligently and effectively participate in the rulemaking process, and (2) to serve as the record in case of judicial review [section 307(d)(7)].

Miscellaneous

As prescribed by section 111 of the Clean Air Act, as amended, establishment of standards of performance for organic solvent cleaners was preceded by the Administrator's determination (40 CFR 60.16, 44 FR 49222, dated August 21, 1979) that these sources contribute significantly to air pollution which may reasonably be anticipated to endanger public health or welfare. In accordance with section 117 of the Act, publication of this proposal was preceded by consultation with appropriate advisory committees, independent experts, and Federal departments and agencies. The Administrator will welcome comments on all aspects of the proposed regulation, including economic and technological issues on the proposed test methods.

It should be noted that standards of performance for new sources established under section 111 of the Clean Air Act reflect:

> . . . application of the best technological system of contunuous emission reduction which (taking into consideration the cost of achieving such emission reduction, any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated [section 111(a)(1)].

Although there may be emission control technology available that can reduce emissions below those levels required to comply with standards of performance, this technology might not be selected as the basis of standards of performance due to costs associated with its use. Accordingly, standards of performance should not be viewed as the ultimate in achievable emission control. In fact, the Act requires (or has the potential for requiring) the imposition of a more stringent emission standard in several situations.

For example, applicable costs do not necessarily play as prominent a role in determining the "lowest achievable emission rate" for new or modified sources locating in nonattainment areas, i.e., those areas where statutorily-mandated health and welfare standards are being violated. In this respect, section 173 of the Act requires that new or modified sources constructed in an area which exceeds the National Ambient Air Quality Standard (NAAQS) must reduce emissions to the level which reflects the "lowest achievable emission rate" (LAER), as defined in section 171(3) for such category of source. The statute defines LAER as that rate of emissions based on the following, whichever is more stringent:

> (A) the most stringent emission limitation which is contained in the implementation plan of any State for such class or category of source, unless the owner or operator of the proposed source demonstrates that such limitations are not achievable, or
>
> (B) the most stringent emission limitation which is achieved in practice by such class or category of source.

In no event can the emission rate exceed any applicable new source performance standard [section 171(3)].

A similar situation may arise under the prevention of significant deterioration of air quality provisions of the Act (Part C). These provisions require that certain sources [referred to in section 169(1)] employ "best available control technology" (BACT) as defined in section 169(3) for all pollutants regulated under the Act. Best available control technology must be determined on a case-by-case basis, taking energy, environmental and economic impacts and other costs into account. In no event may the application of BACT result in emissions of any pollutants which will exceed the emissions allowed by any applicable standard established pursuant to section 111 (or 112) of the Act.

In all events, State implementation plans (SIP's) approved or promulgated under section 110 of the Act must provide for the attainment and maintenance of NAAQS designed to protect public health and welfare. For this purpose SIP's must in some cases require greater emission reduction than those required by standards of performance for new sources.

Finally, States are free under section 116 of the Act to establish even more stringent emission limits than those established under section 111 or those necessary to attain or maintain the NAAQS under section 110. Accordingly, new sources may in some cases be subject to limitations more stringent than standards of performance under section 111, and prospective owners and operators of new sources should be aware of this possibility in planning for such facilities.

In order to prevent duplicative regulatory reuirements, and in order to avoid conflicts in standard setting, EPA has been in contact with representatives of the Interagency Regulatory Liaison Group (IRLG). This group, composed of members from EPA, the Occupational Safety and Health Administration (OSHA), the Food and Drug Administration (FDA), and the Consumer Product Safety Commission (CPSC) was formed in August, 1977, to ensure that the agencies work closely together in areas of common interest and responsibility. In particular, EPA has been in contact with OSHA to ensure that the requirements for the proposed standard do not conflict with OSHA's requirements for ventilation of open surface tank operations (29 CFR 1910.94).

Under EPA's sunset policy for reporting requirements in regulations, the reporting requirements in this regulation will automatically expire five years from the date of promulgation unless EPA takes affirmative action to extend them. To accomplish this, a provision automatically terminating the reporting requirements at that time will be included in the text of the final regulations.

EPA will review this regulation four years from the date of promulgation as required by the Clean Air Act. This review will include an assessment of such factors as the need for integration with other programs, the existence of alternative methods, enforceability, and improvements in emission control technology.

Section 317 of the Clean Air Act requires the Administrator to prepare an

economic impact assessment for any new source standard of performance promulgated under section 111(b) of the Act. An economic impact assessment was prepared for the proposed regulations and for other regulatory alternatives. All aspects of the assessment were considered in the formulation of the proposed standards to insure that the proposed standards would represent the best system of emission reduction considering costs. The economic impact assessment is included in the Background Information Document.

Dated: April 17, 1980.

Douglas M. Costle,

Administrator.

It is proposed to amend Part 60 of Chapter I, Title 40 of the Code of Federal Regulations as follows:

1. By adding alphabetically a definition of the term "volatile organic compound" to § 60.2 of Subpart A—General Provisions as follows:

§ 60.2 Definitions

* * * * *

"Volatile organic compound" means any organic compound which participates in atmospheric photochemical reactions or is measured by the applicable reference methods specified under any subpart.

2. By adding Subpart JJ as follows:

Subpart JJ—Standards of Performance for Organic Solvent Cleaners

Sec.

60.360 Application and designation of affected facility.
60.361 Definitions.
60.362 Standards for volatile organic compounds, trichloroethylene, 1,1,1-trichloroethane, perchloroethylene, methylene chloride, and trichlorotrifluoroethane.
60.363 Equivalent method of control.
60.364 Reporting and Recordkeeping.
60.365 Waste disposal. (reserved).
60.366 Test method.

Authority: Sec. 111, 301(a) of the Clean Air Act as amended [42 U.S.C. 7411, 7601(a)], and additional authority as noted below.

Subpart JJ—Standards of Performance for Organic Solvent Cleaners

§ 60.360 Applicability and designation of affected facility.

The provisions of this subpart are applicable to all organic solvent cleaners for which construction was commenced after (date of proposal) which are used for organic solvent cleaning (degreasing) of any materials.

§ 60.361 Definitions.

All terms used in this subpart, but not specifically defined in this Section shall have the meaning given them in the Act and in Subpart A of this part.

"Adsorption cycle" means a solvent recovery process which begins when solvent laden air is directed through an activated carbon bed, resulting in the capture of solvent vapors. An adsorption cycle shall be considered complete when the activated carbon bed becomes saturated with solvent, resulting in breakthrough of solvent vapors.

"Carbon adsorber" means a device in which an organic compound is brought into contact with activated carbon and is retained.

"Certification" means a written statement signed by the owner or operator of the affected facility.

"Cold cleaner" means any device or piece of equipment which contains and uses an organic solvent in the liquid phase to clean surfaces.

"Conveyorized cold cleaner" means any conveyorizer degreaser which uses an organic solvent in the liquid phase to clean surfaces.

"Conveyorized degreaser" means any device which uses an integral, continuous, mechanical system for moving materials or parts to be cleaned into and out of an organic solvent liquid or vapor cleaning zone.

"Conveyorized vapor degreaser" means any conveyorizer degreaser which uses an organic solvent in the vapor phase to clean surfaces.

"Drain rack" means any basket, tray, or sink located in, on, or exterior to a degreaser, which permits excess or condensed solvent to drain from the parts after degreasing and to return to the solvent bath.

"Drying tunnel" means an enclosed extension of the exit from a conveyorized degreaser.

"Equivalent method of control" means any method that can be demonstrated to the Administrator to provide at least the same degree of emission control as the specified control.

"Extended freeboard" means an addition to the sides of a degreaser to increase the freeboard height.

"Fill line" means a permanent mark in a degreaser tank that indicates the maximum operating liquid level recommended by the manufacturer.

"Freeboard height" means, for a cold cleaner, the distance from the liquid solvent level in the degreaser tank to the lip of the tank. For an open top vapor degreaser it is the distance from the solvent vapor level in the tank during idling to the lip of the tank. For a conveyorized cold cleaner it is the distance from the liquid solvent level to the bottom of the entrance or exit opening, whichever is lower. For a conveyorized vapor degreaser, it is the distance from the vapor level to the bottom of the entrance or exit opening, whichever is lower.

"Freeboard ratio" means a ratio of the freeboard height to the smaller interior dimension (length, width, or diameter) of the degreaser.

"Lip exhaust" means a device installed around the lip of a degreaser that draws in air and solvent vapor emissions and ducts them away from the degreaser area.

"Open top vapor degreaser" means any open top device or piece of equipment that contains and uses an organic solvent, at the boiling point of the solvent, and solvent vapor to clean equipment surfaces.

"Organic solvent" means any liquid substance which contains carbon and has the power to dissolve, causing solution.

"Organic solvent cleaner" or "degreaser" means any cold cleaner, remote reservoir cold cleaner, open top vapor degreaser, and conveyorized degreaser equipment and their ancillary components.

"Organic solvent cleaning" or "degreasing" means those processes using organic solvents to clean and remove soils from the surfaces of materials being processed.

"Refrigerated freeboard device" means a device which is mounted above the water jacket and the primary condenser coils, consisting of secondary coils which carry a refrigerant to provide a chilled air blanket above the solvent vapor to reduce emissions from the degreaser bath. The chilled air blanket temperature, measured at the centroid of the degreaser at the coldest point, shall be no greater than 30 percent of the solvent's boiling point (°F).

"Remote reservoir cold cleaner" means any device in which liquid solvent is pumped through a sink-like work area which drains back into an enclosed container while parts are being cleaned and in which the solvent in the enclosed container is not subject to evaporation losses to the atmosphere during non-use periods.

§ 60.362 Standards for volatile organic compounds, trichloroethylene, 1,1,1-trichloroethane, perchloroethylene, methylene chloride, and trichlorotrifluoroethane.

(a) Except as provided in paragraph (d) of this section, an owner or operator shall operate a cold cleaner, or a remote reservoir cold cleaner only if it has a cover that may be readily opened and

closed. A fusible link shall not interfere with cover operation.

(b) An owner or operator shall operate a cold cleaner only if it conforms to the following design requirements:

(1) A drain rack. If an external drain rack is used, it must allow the drained solvent to return to the solvent bath in the cold cleaner. If the cold cleaner is equipped with a parts basket, internal hooks to permit suspension of the basket above the solvent may be substituted for the drain rack.

(2) A freeboard ratio of at least 0.5. If the solvent used has a volatility greater than 4.3 kPa (33 mm Hg or 0.6 psi), measured at 38°C (100°F), the freeboard ration shall be at least 0.7.

(3) A visible fill line.

(c) Except as provided in paragraph (d) of this section, an owner or operator shall not operate a cold cleaner without meeting the following work and operational practices:

(1) The solvent level shall not exceed the fill line.

(2) When a flexible hose or flushing device is used, the pressure of solvent delivered by the pump may not exceed 69 kPa (10 psi), measured at the pump outlet, and the pumped solvent shall be delivered in a continuous stream and not a droplet spray. Flushing shall be performed only within the confines of the cold cleaner.

(3) When an air- or pump-agitated solvent bath is used, the agitator shall be operated so as to produce a rolling motion of the solvent but not observable splashing against tank walls or parts being cleaned.

(4) The cover shall be closed when the cold cleaner is not in use and when parts are being cleaned by solvent agitation.

(5) When the cover is open, the cold cleaner may not be exposed to drafts greater than 40 m/min (131 ft/min), as measured between 1 and 2 meters upwind and at the same elevation as the tank lip.

(6) Solvent cleaned parts shall be drained for 15 seconds or until dripping has stopped, whichever is longer. Parts having cavities or blind holes shall be tipped or rotated while draining.

(7) Waste solvent, still, and sump bottoms shall be collected and stored in closed containers. The closed containers may contain a device that would allow pressure relief, but would not allow liquid solvent to drain from the container prior to disposal.

(8) Each owner shall provide a permanent label for each cold cleaner which states the required work and operating practices. If the freeboard ratio on a cold cleaner is less than 0.7, the label shall state the types of solvents which may be used in the cold cleaner. Such solvents include xylenes, mineral spirits, stoddard solvents, or other solvents with a volatility less than or equal to 4.3 kPa. The label shall be placed near the front of the degreaser in full view of the degreaser operator and written in English, and any other language that may be necessary for comprehension by personnel operating the degreaser. The label must be kept visible and legible at all times. The plant owner or operator shall ensure that each person who operates a cold cleaner understands the instructions on the label.

(9) Spills during solvent transfer shall be wiped up immediately. The wipe rags shall be stored in covered containers.

(d)(1) An owner or operator who operates a remote reservoir cold cleaner which uses solvent with a volatility of less than or equal to 4.3 kPa (0.6 psi or 33 mm Hg) measured at 38°C (100°F), and which has a drain area less than 100 cm^2 (15.5 in^2) shall be subject to the provisions of paragraph (c)(2), (c)(5), (c)(6), (c)(7), (c)(8), and (c)(9).

(2) An owner or operator who operates a remote reservoir cold cleaner which uses solvent with a volatility greater than 4.3 kPa (0.6 psi or 33 mm Hg) measured at 38° C (100° F), or has a drain area greater than or equal to 100 cm^2 (15.5 in^2) shall be subject to the provisions of paragraphs (d)(1), (c)(4), and (a).

(e) An owner or operator shall operate an open top vapor degreaser only if it conforms to the following design requirements:

(1) Each open top vapor degreaser shall be equipped with a cover that may be readily opened or closed. If the open top vapor degreaser is equipped with a lip exhaust, the cover shall be located below the lip exhaust.

(2) Each open top vapor degreaser shall have a freeboard ratio of at least 0.75.

(3) Each open top vapor degreaser shall be equipped with the following devices:

(i) A device which shuts off sump heat if sump liquid solvent level drops down to the height of sump heater coils, and

(ii) A vapor level control device which shuts off sump heat if the vapor level rises above the height of the primary condenser.

(4) Each open top vapor degreaser greater than 1.0 square meter (10.8 ft^2) shall be equipped with one or more of the following equipment controls:

(i) A refrigerated freeboard device, or

(ii) A lip exhaust connected to a carbon adsorber. The concentration of organic solvent in the exhaust from this device shall not exceed 25 ppm of any regulated halogenated organic compound as measured by Method 23 for the length of the carbon adsorber cycle or three hours, whichever is less. If other volatile organic compounds are used, then the emissions shall not exceed an average of 25 ppm as carbon, measured by Method 25 for the length of the carbon adsorber cycle or three hours, whichever is less.

(f) An owner or operator shall not operate an open top vapor degreaser without meeting the following required work and operational practices:

(1) The cover shall be closed when parts are not being degreased.

(2) When the cover is open, the open top vapor degreaser shall not be exposed to drafts greater than 40 m/min (131 ft/min), as measured between 1 and 2 meters upwind and at the same elevation as the tank lip.

(3) For any open top vapor degreaser equipped with a lip exhaust, the exhaust shall be turned off when the degreaser is covered.

(4) Parts being degreased shall not occupy more than 50 percent of the vapor-air interface area.

(5) The vertical speed of a powered hoist, if one is used, shall not be more than 3.3 m/min (10.8 ft/min) when lowering and raising the parts.

(6) Spraying operations shall be done within the vapor layer.

(7) Work shall not be lifted from the vapor layer until condensation or dripping has stopped. Parts having cavities or blind holes shall be tipped or rotated before being raised from the vapor layer.

(8) During start up, the primary condenser and the refrigerated freeboard device, if one is used, shall be turned on before the sump heater. During shutdown, the sump heater shall be turned off, and the solvent vapor layer allowed to collapse before the condenser water and refrigerated freeboard device are turned off.

(9) Porous or absorbent material shall not be degreased in an open top vapor degreaser.

(10) A routine inspection and maintenance program shall be implemented to reduce or prevent solvent losses from dripping drain taps, cracked gaskets and malfunctioning equipment. Leaks must be repaired as soon as they are discovered.

(11) Waste solvent, still, and sump bottoms shall be collected and stored in closed containers. The closed containers may contain a device that would allow pressure relief, but would not allow liquid solvent to drain from the container prior to disposal.

(12) Each owner shall provide a permanent label for each open top vapor degreaser which states the required work and operating practices. The label shall be placed near the front of the degreaser in full view of the degreaser operator and written in English, and in any other language that may be necessary for comprehension by personnel operating the degreaser. The label must be kept visible and legible at all times. The plant owner or operator shall ensure that each person who operates a degreaser understands the instructions on the label.

(13) When sumps are drained, solvent shall be transferred using threaded or other leakproof couplings.

(14) The carbon absorber bed shall not be bypassed during desorption.

(g) An owner or operator subject to the provisions of this subpart shall operate a conveyorized degreaser only if it conforms to the following design requirements:

(1) Each conveyorized degreaser shall have a freeboard ratio of at least 0.75.

(2) Each conveyorized degreaser shall be equipped with a drying tunnel, a rotating (tumbling) basked, hanging flaps, or other device to prevent cleaned parts from carrying out solvent liquid or vapor. When a drying tunnel is used, the air which moves through the tunnel to enhance drying shall be exhausted to a carbon adsorber. The concentration of organic solvent in the exhaust from this device may not exceed 25 ppm of any regulated halogenated organic compound as measured by Method 23 for the length of the carbon adsorber cycle or three hours, whichever is less. If other volatile organic compounds are used, then the emissions shall not exceed an average of 25 ppm as carbon, measured by Method 25 for the length of the carbon adsorber cycle or three hours, whichever is less.

(3) Each conveyorized degreaser shall be equipped with downtime port covers at the entrance and exit openings.

(4) Each conveyorized cold cleaner with a solvent-air interface area of 2.0m² (21.6 ft₂) or greater shall be equipped with a carbon adsorber. The concentration of organic solvent in the exhaust from this device may not exceed 25 ppm of any regulated halogenated organic compound as measured by Method 23 for the length of the carbon adsorber cycle or three hours, whichever is less. If other volatile organic compounds are used, then the emissions shall not exceed an average of 25 ppm as carbon, measured by Method 25 for the length of the carbon adsorber cycle or three hours, whichever is less.

(5) Each conveyorized vapor degreaser with a solvent-air interface of 2.0m² (21.6 ft²) or greater shall be equipped with one or more of the following equipment controls:

(i) A refrigerated freeboard device, or

(ii) A carbon adsorber. The concentration of organic solvent in the exhaust from this device shall not exceed 25 ppm of any regulated halogenated organic compound as measured by Method 23 for the length of the carbon adsorber cycle or three hours, whichever is less. If other volatile organic compounds are used, then the emissions shall not exceed an average of 25 ppm as carbon, measured by Method 25 for the length of the carbon adsorber cycle or three hours, whichever is less.

(6) Each conveyorized vapor degreaser shall be equipped with the following devices:

(i) A device which shuts off sump heat if sump liquid level drops down to the height of sump heater coils, and

(ii) A vapor level control device which shuts off sump heat if the vapor level rises above the height of the primary condenser coils.

(7) Each owner shall provide a permanent label for each conveyorized degreaser which states the required work and operating practices. The label shall be placed near the front of the degreaser in full view of the degreaser operator and written in English and in any other language that may be necessary for comprehension by personnel operating the degreaser. The label must be kept visible and legible at all times. The plant owner or operator shall ensure that each person who operates a degreaser understands the instructions on the label.

(8) Waste solvent, still, and sump bottoms shall be collected and stored in closed containers. The closed containers may contain a device that would allow pressure relief, but would not allow liquid solvent to drain from the container prior to disposal.

(9) The carbon adsorber bed shall not be bypassed during desorption.

§ 60.363 Equivalent methods of control.

Upon written application, the Administrator may approve the use of equipment or procedures after they have been demonstrated to his satisfaction to be equivalent, in terms of reducing solvent emissions to the atmosphere, to those prescribed for compliance within a specified paragraph of this subpart. The application must contain a complete description of the proposed testing procedure and the date, time, and location scheduled for the equivalency demonstration.

§ 60.364 Reporting and recordkeeping.

(a) The owner or operator of any degreaser affected by this subpart shall furnish the Administrator with a single report for each degreaser. These reports shall be submitted each quarter for all degreasers which were newly constructed, modified, or reconstructed and which were placed in operation or for which ownership was transferred in the previous quarter. Each report shall contain written notification (certification) of the following:

(1) Date construction, modification, or reconstruction of each degreaser was commenced.

(2) Make and model of degreaser (including the serial number if applicable).

(3) Name, date, and location to whom the ownership of the degreaser was transferred.

(4) Dimensions of the solvent-air interface area and the freeboard ratio.

(5) Specify whether a refrigerated freeboard device or carbon adsorber has been installed (if applicable) and certify that the required controls (design parameters), under section 60.362, are part of the degreaser for which this notification is required.

(6) The name, title, and signature of the individual making the certification.

(b) Each owner or operator of an affected facility subject to the provisions of this subpart, except as provided in paragraph (c) of this section, shall maintain records for a period of 2 years of the following:

(1) The amount and date of each purchase of new solvent.

(2) The name and/or type of solvent purchased.

(3) The amount, date, and method of disposal for spent solvent, sump bottoms, and/or still bottoms, as applicable.

(c) Each owner or operator of a cold cleaner with a solvent-air interface area of less than 1.0 m² (10.8 ft²) is not subject to the requirements of paragraph (b) of this section, but is required to maintain for a period of 2 years a record of the method of waste solvent disposal.

(d) The reporting and recordkeeping requirements under this section will automatically expire 5 years from the date of promulgation of this regulation unless affirmative action to extend them is taken by EPA. (Section 114 of the Clean Air Act as amended (42 U.S.C. 7414))

§ 60.365 Waste disposal [Reserved]

§ 60.366 Test method.

(a) Reference Method 23 or 25 of Appendix A, as applicable, shall be used to determine compliance with the

requirements under § 60.382 when carbon adsorbers are used. The results shall be reported as ppm of organics (Method 23) or ppm or carbon (Method 25). Each performance test shall consist of 3 separate samples, and the arithmetic mean of the 3 samples shall be used to determine compliance.

(Section 114 of the Clean Air Act as amended (U.S.C. 7414))

3. Appendix A to part 60 is amended by adding reference method 23 as follows:

Appendix A—Reference Methods

* * * * *

Method 23. Determination of Halogenated Organics From Stationary Sources

Introduction

Performance of this method should not be attempted by persons unfamiliar with the operation of a gas chromatograph, nor by those who are unfamiliar with source sampling because knowledge beyond the scope of this presentation is required. Care must be exercised to prevent exposure of sampling personnel to hazardous emissions.

1. *Applicability and Principle*

1.1 Applicability. This method applies to the measurement of halogenated organics such as carbon tetracholoride, ethylene dichloride, perchloroethylene, trichloroethylene, Methylene chloride, 1,1,1-trichloroethane, and trichlorotrifluoroethane in stack gases from sources as specifiedd in the regulations. It does not apply when the halogenated organics are contained in particulate matter.

1.2 Principle. An integrated bag sample of stack gas containing one or more halogenated organics is subjected to gas chromatographic (GC) analysis, using a flame ionization detector (FID).

2. *Range and Sensitivity.* The range of this method is 0.1 to 200 ppm. The upper limit may be extended by extending the calibration range or by diluting the sample.

3. *Interferences.* The chromatograph column with the corresponding operating parameters herein described normally provides an adequate resolution of halogenated organics; however, resolution interferences may be encountered in some sources. Therefore, the chromatograph operator shall select the column best suited to his particular analysis problem, subject to the approval of the Administrator. Approval is automatic provided that confirming data are produced through an adequate supplemental analytical technique, e.g. analysis with a different column or GC/mass spectroscopy. This confirming data must be available for review by the Administrator.

4. *Apparatus.*

4.1 Sampling (see Figure 23-1). The sampling train consists of the following components:

4.1.1 Probe. Stainless steel, Pyrex* glass, or Teflon* tubing (as stack temperature permits), each equipped with a glass wool plug to remove particulate matter.

4.1.2 Sample Line. Teflon, 6.4-mm outside diameter, of sufficient length to connect probe to bag. Use a new unused piece for each series of bag samples that constitutes an emission test, and discard upon completion of the test.

4.1.3 Quick Connects. Stainless steel, male (2) and female (2), with ball checks (one pair without), located as shown in Figure 23-1.

4.1.4 Tedlar or Aluminized Mylar Bags. 100-liter capacity, to contain sample.

4.1.5 Bag Containers. Rigid leakproof containers for sample bags, with covering to protect contents from sunlight.

4.1.6 Needle Valve. To adjust sample flow rate.

4.1.7 Pump. Leak-free, with minimum of 2-liters/min capacity.

4.1.8 Charcoal Tube. To prevent admission of halogenated organics to the atmosphere in the vicinity of samplers.

4.1.9 Flow Meter. For observing sample flow rate; capable of measuring a flow range from 0.10 to 1.00 liter/min.

4.1.10 Connecting Tubing. Teflon, 6.4-mm outside diameter, to assemble sampling train (Figure 23-1).

4.2 Sample Recovery. Teflon tubing, 6.4-mm outside diameter, to connect bag to gas chromatograph sample loop is required for sample recovery. Use a new unused piece for each series of bag samples that constitutes an emission test and discard upon conclusion of analysis of those bags.

4.3. Analysis. The following equipment is needed:

4.3.1 Gas Chromatograph. With FID, potentiometric strip chart recorder, and 1.0- to 2.0-ml sampling loop in automatic sample valve. The chromatographic system shall be capable of producing a response to 0.1 ppm of the halogenated organic compound that is at least as great as the average noise level. (Response is measured from the average value of the baseline to the maximum of the waveform, while standard operating conditions are in use.)

4.3.2 Chromatographic Column. Stainless steel, 3.05 m by 3.2 mm, containing 20 percent SP-2100/0.1 percent Carbowax 1500 on 100/120 Supelcoport. The analyst may use other columns provided that the precision and accuracy of the analysis of standards are not impaired and he has available for review information conforming that there is adequate resolution of the halogenated organic compound peak. (Adequate resolution is defined as an area overlap of not more than 10 percent of the halogenated organic compound peak by an interferent peak. Calculation of area overlap is explained in Appendix E, Supplement A: "Determination of Adequate Chromatographic Peak Resolution."

4.3.3 Flow Meters (2). Rotameter type, 0- to-100-ml/min capacity.

4.3.4 Gas Regulators. For required gas cylinders.

4.3.5 Thermometer. Accurate to 1°C, to measure temperature of heated sample loop at time of sample injection.

4.3.6 Barometer. Accurate to 5 mm Hg, to measure atmospheric pressure around gas chromatograph during sample analysis.

4.3.7 Pump. Leak-free, with a minimum of 100-ml/min capacity.

4.3.8 Recorder. Strip chart type, optionally equipped with either disc or electronic integrator.

4.3.9 Planimeter. Optional, in place of disc or electronic integrator (4.3.8), to measure chromatograph peak areas.

4.4 Calibration. Sections 4.4.2 through 4.4.6 are for the optional procedure in Section 7.1.

4.4.1 Tubing. Teflon, 6.4-mm outside diameter, separate pieces marked for each calibration concentration.

4.4.2 Tedlar or Aluminized Mylar Bags. 50-liter capacity, with valve; separate bag marked for each calibration concentration.

4.4.3 Syringe. 25-μl, gas tight, individually calibrated, to dispense liquid halogenated organic solvent.

4.4.4 Syringe. 50-μl, gas tight, individually calibrated to dispense liquid halogenated organic solvent.

4.4.5 Dry Gas Meter, with Temperature and Pressure Gauges. Accurate to ±2 percent, to meter nitrogen in preparation of standard gas mixtures, calibrated at the flow rate used to prepare standards.

4.4.6 Midget Impinger/Hot Plate Assembly. To vaporize solvent.

5. *Reagents.* It is necessary that all reagents be of chromatographic grade.

5.1 Analysis. The following are needed for analysis:

5.1.1 Helium Gas or Nitrogen Gas. Zero grade, for chromatographic carrier gas.

5.1.2 Hydrogen Gas. Zero grade.

5.1.3 Oxygen Gas or Air. Zero grade, as required by the detector.

5.2 Calibration. Use one of the following options: either 5.2.1 and 5.2.2, or 5.2.3.

5.2.1 Halogenated Organic Compound, 99 Mol Percent Pure. Certified by the manufacturer to contain a minimum of 99 Mol percent of the particular halogenated organic compound; for use in the preparation of standard gas mixtures as described in Section 7.1.

5.2.2 Nitrogen Gas. Zero grade, for preparation of standard gas mixtures as described in Section 7.1.

5.2.3 Cylinder Standards (3). Gas mixture standards (200, 100, and 50 ppm of the halogenated organic compound of interest, in nitrogen). The tester may use these cylinder standards to directly prepare a chromatograph calibration curve as described in Section 7.2.2, if the following conditions are met: (a) The manufacturer certifies the gas composition with an accuracy of ±3 percent or better (see Section 5.2.3.1). (b) The manufacturer recommends a maximum shelf life over which the gas concentration does not change by greater than ±5 percent from the certified value. (c) The manufacturer affixes the date of gas cylinder preparation, certified concentration of the halogenated organic compound, and recommended maximum shelf life to the cylinder before shipment from the gas manufacturer to the buyer.

5.2.3.1 Cylinder Standards Certification. The manufacturer shall certify the concentration of the halogenated organic compound in nitrogen in each cylinder by (a) directly analyzing each cylinder and (b)

*Mention of trade names or specific products does not constitute endorsement by the Environmental Protection Agency.

calibrating his analytical procedure on the day of cylinder analysis. To calibrate his analytical procedure, the manufacturer shall use, as a minimum, a three-point calibration curve. It is recommended that the manufacturer maintain (1) a high-concentration calibration standard (between 200 and 400 ppm) to prepare his calibration curve by an appropriate dilution technique and (2) a low-concentration calibration standard (between 50 and 100 ppm) to verify the dilution technique used. If the difference between the apparent concentration read from the calibration curve and the true concentration assigned to the low-concentration calibration standard exceeds 5 percent of the true concentration, the manufacturer shall determine the source of error and correct it, then repeat the three-point calibration.

5.2.3.2 Verification of Manufacturer's Calibration Standards. Before using, the manufacturer shall verify each calibration standard by (a) comparing it to gas mixtures prepared (with 99 Mol percent of the halogenated organic compounds) in accordance with the procedure described in Section 7.1 or by (b) having it analyzed by the National Bureau of Standards, if such analysis is available. The agreement between the initially determined concentration value and the verification concentration value must be within ±5 percent. The manufacturer must reverify all calibration standards on a time interval consistent with the shelf life of the cylinder standards sold.

5.2.4 Audit Cylinder Standards (2). Gas mixture standards with concentrations known only to the person supervising the analysis samples. The audit cylinder standards shall be identically prepared as those in Section 5.2.3 (the halogenated organic compounds of interest, in nitrogen). The concentrations of the audit cylinders should be: one low-concentration cylinder in the range of 25 to 50 ppm, and one high-concentration cylinder in the range of 200 to 300 ppm. When available, the tester may obtain audit cylinders by contacting: Environmental Protection Agency, Environmental Monitoring and Support Laboratory, Quality Assurance Branch (MD-77), Research Triangle Park, North Carolina 27711. If audit cylinders are not available at the Environmental Protection Agency, the tester must secure an alternative source.

6. *Procedure*

6.1 Sampling. Assemble the sampling train as shown in Figure 23-1. Perform a bag leak check according to Section 7.3.2. Join the quick connects as illustrated, and determine that all connections between the bag and the probe are tight. Place the end of the probe at the centroid of the stack and start the pump with the needle valve adjusted to yield a flow that will more than half fill the bag in the specified sample period. After allowing sufficient time to purge the line several times, connect the vacuum line to the bag and evacuate the bag until the rotameter indicates no flow. At all times, direct the gas exiting the rotameter away from sampling personnel.

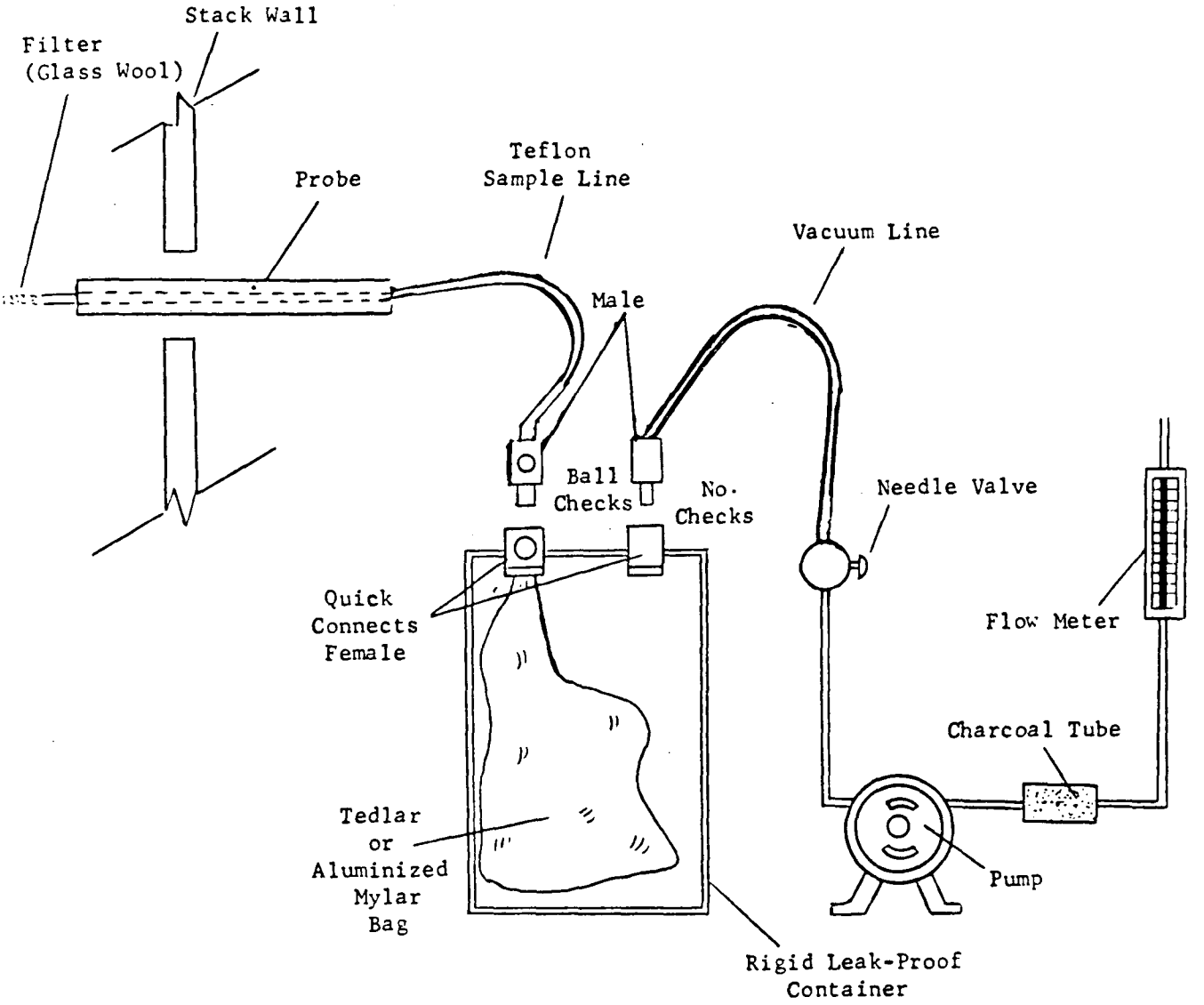

Figure 23-1. Integrated-bag sampling train. (Mention of trade names or specific products does not constitute endorsement by the Environmental Protection Agency.)

Then reposition the sample and vacuum lines and begin the actual sampling, keeping the rate constant. At the end of the sample period, shut off the pump, disconnect the sample line from the bag, and disconnect the vacuum line from the bag container. Protect bag container from sunlight.

6.2 Sample Storage. Keep the sample bags out of direct sunlight and protect from heat. Perform the analysis within 1 day of sample collection for methylene chloride, ethylene dichloride, and trichlorotrifluoroethane, and within 2 days for perchloroethylene, trichloroethylene, 1,1,1-trichloroethane, and carbon tetrachloride.

6.3 Sample Recovery. With a new piece of Teflon tubing identified for that bag, connect a bag inlet valve to the gas chromatograph sample valve. Switch the valve to receive gas from the bag through the sample loop. Arrange the equipment so the sample gas passes from the sample valve to a 0-to-100-ml/min rotameter with flow control valve followed by a charcoal tube and a 0-to1-in. H_2O pressure gauge. The tester may maintain the sample flow either by a vacuum pump or container pressurization if the collection bag remains in the rigid container. After sample loop purging is ceased, allow the pressure guage to return to zero before activating the gas sampling valve.

6.4 Analysis. Set the colum temperature to 100°C and the detector temperature to 225°C. When optimum hydrogen and oxygen flow rates have been determined, verify and maintain these flow rates during all chromatograph operations. Using zero helium or nitrogen as the carrier gas, establish a flow rate in the range consistent with the manufacturer's requirements for satisfactory detector operation. A flow rate of approximately 20 ml/min should produce adequate separations. Observe the base line periodically and determine that the noise level has stabilized and that base-line drift has ceased. Purge the sample loop for 30 sec at the rate of 100 ml/min, then activate the sample valve. Record the injection time (the position of the pen on the chart at the time of sample injection), the sample number, the sample loop temperature, the column temperature, carrier gas flow rate, chart speed, and the attenuator setting. Record the barometric pressure. From the chart, note the peak having the retention time corresponding to the halogenated organic compound, as determined in Section 7.2.1. Measure the halogenated organic compound peak area, A_m, by use of a disc integrator, electronic integrator, or a planimeter. Record A_m and the retention time. Repeat the injection at least two times or until two consective values for the total area of the peak do not vary more than 5 percent. Use the average value for these two total areas to compute the bag concentration.

6.5 Determination of Bag Water Vapor Content. Measure the ambient temperature and barometric pressure near the bag. From a water saturation vapor pressure table, determine and record the water vapor content of the bag as a decimal figure. (Assume the relative humidity to be 100 percent unless a lesser value is known.)

7. Preparation of Standard Gas Mixtures, Calibration, and Quality Assurance.

7.1 Preparation of Standard Gas Mixtures. (Optional procedure—delete if cylinder standards are used.) Assemble the apparatus shown in Figure 23–2. Check that all fittings are tight. Evacuate a 50-liter Tedlar or aluminized Mylar bag that has passed a leak check (described in Section 7.3.2) and meter in about 50 liters of nitrogen. Measure the barometric pressure, the relative pressure at the dry gas meter, and the temperature at the dry gas meter. Refer to Table 23–1. While the bag is filling, use the 50-μl syringe to inject through the septum on top of the impinger, the quantity required to yield a concentration of 200 ppm. In a like manner, use the 25-μl syringe to prepare bags having approximately 100- and 50-ppm concentrations. To calculate the specific concentrations, refer to Section 8.1. (Tedlar bag gas mixture standards or methylene chloride, ethylene dichloride, and trichlorotrifluoroethane may be used for 1 day, trichloroethylene and 1,1,1-trichloroethane for 2 days, and perchloroethylene and carbon tetrachloride for 10 days from the date of preparation. (Caution: If the new gas mixture standard is a lower concentration than the previous gas mixture standard, contamination may be a problem when a bag is reused.)

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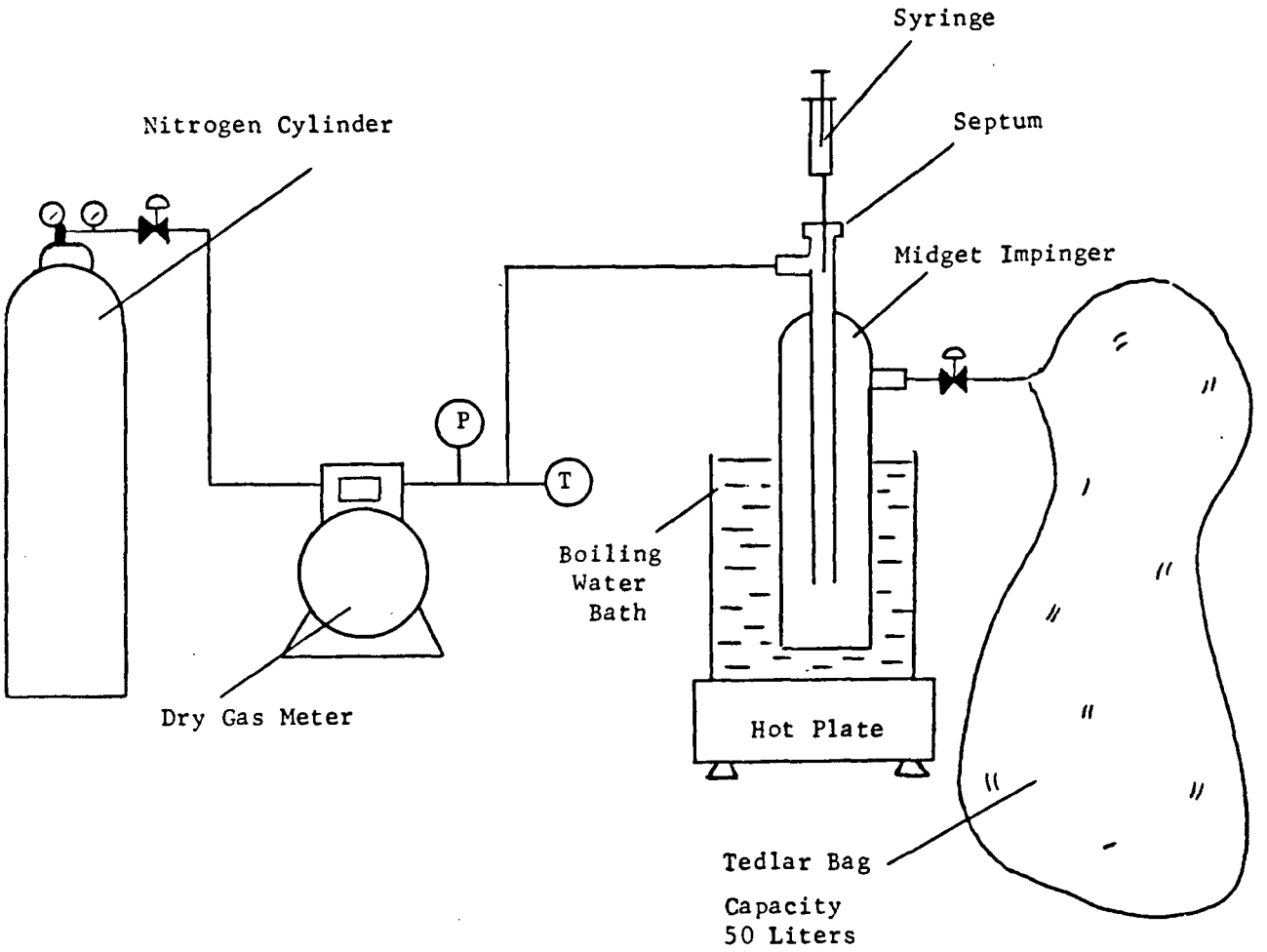

Figure 23-2. Preparation of Standards. (optional)

TABLE 23-1. INJECTION VALUES FOR PREPARATION OF STANDARDS (Optional, See Section 7.1)

Compound	Molecular Weight g/g-mole	Density at 293°K g/ml	µl/50 liters of N_2 required for approximate concentration of: 200 ppm	100 ppm	50 ppm
Perchloroethylene C_2Cl_4	165.85	1.6230	42.5	21.2	10.6
Trichloroethylene C_2HCl_3	131.40	1.4649	37.3	18.6	9.3
1,1,1-Trichloroethane $C_2H_3Cl_3$	133.42	1.4384	38.6	19.3	9.6
Methylene Chloride CH_2Cl_2	84.94	1.3255	26.6	13.3	6.7
Trichlorotrifluoroethane $C_2Cl_3F_3$	187.38	1.5790	49.3	24.7	12.3
Carbon Tetrachloride CCl_4	153.84	1.5940	40.1	20.1	10.0
Ethylene Dichloride $C_2H_4Cl_2$	98.96	1.2569	32.7	16.4	8.2

7.2 Calibration.

7.2.1 Determination of Halogenated Organic Compound Retention Time. (This section can be performed simultaneously with Section 7.2.2.) Establish chromatograph conditions identical with those in Section 6.4. above. Determine proper attenuator position. Flush the sampling loop with zero helium or nitrogen and activate the sample valve. Record the injection time, the sample loop temperature, the column temperature, the carrier gas flow rate, the chart speed, and the attenuator setting. Record peaks and detector responses that occur in the absence of the halogenated organic. Maintain conditions (with the equipment plumbing arranged identically to Section 6.3), flush the sample loop for 30 sec. at the rate of 100 ml/min with one of the halogenated organic compound calibration mixtures, and activate the sample valve. Record the injection time. Select the peak that corresponds to the halogenated organic compound. Measure the distance on the chart from the injection time to the time at which the peak maximum occurs. This distance divided by the chart speed is defined as the halogenated organic compound peak retention time. Since it is possible that there will be other organics present in the sample, it is very important that positive identification of the Halogenated organic compound peak be made.

7.2.2 Preparation of Chromatograph Calibration Curve. Make a gas chromatographic measurement of each Standard gas mixture (described in Section 5.2.3 or 7.1) using conditions identical with those listed in Sections 6.3 and 6.4. Flush the sampling loop for 30 sec at the rate of 100 ml/min with one of the standard gas mixtures and activate the sample valve. Record C_c, the concentration of halogenated organic injected, the attenuator setting, chart speed, peak area, sample loop temperature, column temperature, carrier gas flow rate, and retention time. Record the laboratory pressure. Calculate A_c, the peak area multipled by the attenuator setting. Repeat until two consecutive injection areas are within 5 percent, then plot the average of those two values versus C_c. When the other standard gas mixtures have been similarly analyzed and plotted, draw a straight line through the points derived by the least squares method. Perform calibration daily, or before and after each set of bag samples, whichever is more frequent.

7.3 Quality Assurance.

7.3.1 Analysis Audit. Immediately after the preparation of the calibration curve and prior to the sample analyses, perform the analysis audit described in Appendix E, Supplement B: "Procedure for Field Auditing GC Analysis."

7.3.2 Bag Leak Checks. While performance of this section is required subsequent to bag use, it is also advised that it be performed prior to bag use. After each use, make sure a bag did not develop leaks by connecting a water manometer and pressurizing the bag to 5 to 10 cm H_2O (2 to 4 in. H_2O). Allow to stand for 10 min. Any displacement in the water manometer indicates a leak. Also, check the rigid container for leaks in this manner. (Note: An alternative leak check method is to pressurize the bag to 5 to 10 cm H_2O (2 to 4 in. H_2O) and allow to stand overnight. A deflated bag indicates a leak.) For each sample bag in its rigid container, place a rotameter in line between the bag and the pump inlet. Evacuate the bag. Failure of the rotameter to register zero flow when the bag appears to be empty indicates a leak.

8. *Calculations.*

8.1 Optional Procedure Standards Concentrations. Calculate each halogenated organic standard concentration (C_c in ppm) prepared in accordance with Section 7.1 as follows:

BILLING CODE 6560-01-M

$$C_c = \frac{\frac{BD}{M}(24.055 \times 10^3)}{V_m Y \frac{293}{T_m} \frac{P_m}{760}} = 6.240 \times 10^4 \frac{BD\ T_m}{M\ V_m\ Y\ P_m}$$

Eq. 23-1

Where:

B = Volume of halogenated organic injected, µl.

D = Density of compound at 293°K, g/ml.

M = Molecular weight of compound, g/g-mole.

V_m = Gas volume measured by dry gas meter, liters.

Y = Dry gas meter calibration factor, dimensionless.

P_m = Absolute pressure of dry gas meter, mm Hg.

T_m = Absolute temperature of dry gas meter, °K.

24.055 = Ideal gas molal volume at 293° K and 760 mm Hg, liters/g-mole.

10^3 = Conversion factor. [(ppm)(ml)]/µl.

8.2 Sample Concentrations. From the calibration curve described in Section 7.2.2 above, select the value of C_c that corresponds to A_c. Calculate C_s, the concentration of halogenated organic in the sample (in ppm), as follows:

$$C_s = \frac{C_c P_r T_i}{P_i T_r (1-S_{wb})}$$ Eq. 23-2

Where:

C_c = Concentration of the halogenated organic indicated by the gas chromatograph, ppm.

P_r = Reference pressure, the laboratory pressure recorded during calibration, mm Hg.

T_i = Sample loop temperature at the time of analysis, °K.

P_i = Laboratory pressure at time of analysis, mm Hg.

T_r = Reference temperature, the sample loop temperature recorded during calibration, °K.

S_{wb} = Water vapor content of the bag sample, volume fraction.

9. *References.*

1. Feairheller, W. H., A. M. Kemmer, B. J. Warner, and D. Q. Douglas. Measurement of Gaseous Organic Compound Emissions by Gas Chromatography. EPA Contract No. 68-02-1404, Task 33 and 68-02-2818, Work Assignment 3. January 1978. Revised by EPA August 1978.

2. Supelico, Inc. Separation of Hydrocarbons. Bulletin 747. Belleforte, Pennsylvania. 1974.

3. Communication from Joseph E. Knoll. Percholoroethylene Analysis by Gas Chromatography. March 8, 1978.

4. Communication from Joseph E. Knoll. Test Method for Halogenated Hydrocarbons. December 20, 1978.

* * * * *

(Sections 111(b), 111(d), 114, and 301(a) of the Clean Air Act as amended (42 U.S.C. 7411, 7414, and 7601(a)))

[FR Doc. 80-13084 Filed 6-10-80; 8:45 am]

40 CFR Part 60

[FRL 1588-7]

Standards for Performance for New Stationary Sources; Organic Solvent Cleaners

AGENCY: Environmental Protection Agency (EPA).

ACTION: Extention of public comment period and correction to proposed rule.

SUMMARY: On June 11, 1980, the Environmental Protection Agency proposed in the **Federal Register** (45 FR 39765) standards of performance for new, modified or reconstructed organic solvent cleaners. In this action, EPA also proposed to add Reference Method 23 to Appendix A of 40 CFR Part 60. Today's notice makes corrections to the proposed reference method, and extends the public comment period for the proposed rule from August 25, 1980, to October 24, 1980.

DATE: Written comments to be included in the record should be postmarked no later than October 24, 1980.

ADDRESSES: Comments should be submitted (in duplicate if possible) to: Central Docket Section, U.S. Environmental Protection Agency, West Tower Lobby, Gallery 1, 401 M Street, S.W., Washington, D.C. 20460, Attention: Docket No. OAQPS-78-12.

FOR FURTHER INFORMATION CONTACT: Mr. John D. Crenshaw, Standards Development Branch, Emission Standards and Engineering Division (MD-13), Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5421.

SUPPLEMENTARY INFORMATION: In response to requests from several manufacturers of equipment and chemicals that would be affected by the proposed rule, the public comment period will be extended for 60 days from August 25, 1980, to October 24, 1980. These requests expressed the need to review more completely the large amount of information that is being developed, and to prepare written comments on the associated health, technological and policy related issues.

Make the following corrections: On page 39776 in the **Federal Register**, replace the last sentence in paragraph 4.3.2 Chromatographic Column as follows: "Calculation of area overlap is explained in Appendix C of 40 CFR part 61, Supplement A, 'Determination of Adequate Chromatographic Peak Resolution.'" On page 39783 in the **Federal Register**, replace paragraph 7.3.1 Analysis Audit as follows: "Immediately after the preparation of the calibration curve and prior to the sample analyses, perform the analysis audit described in Appendix C of 40 CFR Part 61, Supplement B: 'Procedures for Field Auditing GC Analysis'" (45 FR 26660).

Persons interested in this rule making are also reminded that a Subcommittee of the Agency's Science Advisory Board will be meeting to review the Agency's assessments of carcinogenicity and human exposure for a number of pollutants, including four to be regulated by this proposed rule: Methyl chloroform, methylene chloride, perchloroethylene and trichloroethylene. The Subcommittee on Airborne Carcinogens will meet to review these assessments on September 4-5 at EPA Headquarters, 401 M Street, S.W., Washington, D.C. For further details, see the full notice of the meeting at 45 FR 50652 (July 30, 1980).

Dated: August 20, 1980.

Edward Tuerk,

Acting Assistant Adminsitrator for Air, Noise, and Radiation.

[FR Doc. 80-26042 Filed 8-22-80; 8:45 am]

40 CFR Part 60

[Docket No. OAQPS-79-12; AH-FRL 1655-6]

Standards of Performance for New Stationary Sources; Organic Solvent Cleaners; Extension of Comment Period

AGENCY: Environmental Protection Agency (EPA).

ACTION: Extension of public comment period.

SUMMARY: On June 11, 1980, the Environmental Protection Agency proposed in the **Federal Register** (45 FR 39766) standards of performance for new, modified or reconstructed organic solvent cleaners. On August 25, 1980 (45 FR 56373), the public comment period was extended for the proposed rule from August 25, 1980, to October 24, 1980. Today's action further extends the comment period.

DATE: Written submissions on this proposal will be received until close to business on December 8, 1980.

ADDRESS: Information should be submitted (in duplicate, if possible) to: Central Docket Section, U.S. Environmental Protection Agency, West Tower Lobby, Gallery 1, 401 M Street, SW, Washington, D.C. 20460. Attention: Docket No. OAQPS-78-12.

FOR FURTHER INFORMATION CONTACT: Mr. Robert Schell, Pollutant Assessment Branch, Strategies and Air Standards Division (MD-12), Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5345.

SUPPLEMENTARY INFORMATION: Several requests have been received to extend the comment period to allow submittal of additional technical and health related information. Although the Agency had not originally intended to further extend the comment period, some confusion exists as to whether in fact these requests would be granted or not. Because of this confusion and its potential impact on the submittal of relevant information, the comment period is hereby extended to December 8, 1980.

Dated: October 30, 1980.

Edward F. Tuerk,

Acting Assistant Administrator for Air, Noise, and Radiation.

Federal Register / Vol. 46, No. 76

Tuesday, April 21, 1981

Proposed Rules

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 60

[AD-FRL-1799-3]

Standards of Performance for New Stationary Sources; Organic Solvent Cleaners

AGENCY: Environmental Protection Agency (EPA).

ACTION: Amendment of proposed rule.

SUMMARY: On June 11, 1980, the Environmental Protection Agency (EPA) proposed standards of performance for organic solvent cleaners (degreasers) (45 FR 39765). The proposed standards would limit emissions of volatile organic compounds (VOC) and trichloroethylene, perchloroethylene, methylene chloride, 1,1,1-trichloroethane, and trichlorotrifluoroethane from new, modified, and reconstructed organic solvent cleaners by specifying a combination of equipment requirements and operational procedures. The affected facilities are cold cleaners, open top vapor degreasers, and conveyorized degreasers. Today's action proposes to defer the applicability date of the proposed standards. The effect of today's action is to exempt from coverage any sources constructed or modified on or before the new applicability date is established. The new date will be fixed later, by publication of a notice in the **Federal Register.**

DATES: Comments on the amendment to the proposed rule must be received on or before May 21, 1981.

ADDRESS: Comments should be submitted (in duplicate if possible) to: Central Docket Section (A-130), U.S. Environmental Protection Agency, 401 M Street SW., Washington, D.C. 20460, Attention: Docket No. OAQPS-78-12.

Docket. Docket No. OAQPS-78-12, containing supporting information used in developing the proposed standards, is available for public inspection and copying between 8:00 a.m. and 4:00 p.m., Monday through Friday, at EPA's Central Docket Section, West Tower Lobby, Gallery 1, Waterside Mall, 401 M Street SW., Washington, D.C. 20460. A reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: Mr. John D. Crenshaw, Standards Development Branch, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5421.

SUPPLEMENTARY INFORMATION: EPA proposed new source performance standards for organic solvent cleaners on June 11, 1980 (45 FR 39765). Under the provisions of Section 111 of the Clean Air Act, these standards, when finally promulgated, would have applied to any organic solvent cleaner manufactured after June 11, 1980.

At proposal, the Agency concluded that the cost impacts of the proposed standards were reasonable. Based on the public comments received, however, we now believe that there are a number of types of degreasers which are specifically designed to minimize solvent loss and emissions, but which could not comply with the proposed design and equipment standards at reasonable cost. Manufacturers of such degreasers would therefore be unable to sell them at competitive prices. We are now analyzing these types of degreasers to determine what constitutes best demonstrated technology for them and what standard should be applied to them. Information about this problem has been supplied by several

manufacturers and is available in the docket for public review and comment.

We expect this analysis to take several months. Because the analysis is not yet complete, we are not yet able to specify which types of degreasers can comply with the proposed standards at reasonable cost and which cannot. In the interim, however, many prudent purchasers of degreasers are willing to buy only degreasers conforming to the proposed standards. As a result, manufacturers of degreasers which cannot comply with the proposed standards at reasonable cost face now the competitive barrier they would have faced if the standards were promulgated as proposed, despite the Agency's conclusion that application of the proposed standards to at least some of those products will not be required by the final standards.

Ordinarily, if EPA were to conclude that the proposed standards would impose unreasonable costs and that the standards therefore should be substantially changed, it would alleviate this situation promptly by proceeding to repropose or promulgate the standard with appropriate changes. Here, however, we believe that the proposed standards would impose unreasonable cost for some degreasers, but are unable to relieve the interim effects of the proposal until technical analysis is complete. Under these circumstances, we believe that the action most consistent with the congressional intent is to defer the applicability date beyond the date of proposal. See, *Commonwealth of Pennsylvania* v. *EPA*, 618 F. 2d 991, 1000 n. 1. (3rd Cir. 1980).

This action, therefore, amends § 60.360 of the proposed rule to delete June 11, 1980, (the date of the proposal) as the applicability date. The promulgated standard will apply to degreasers constructed or modified after some later applicability date. The Agency will give notice of that later applicability date in the **Federal Register**, and the applicability date will be no earlier than the date of publication of such notice.

Under Executive Order 12291, EPA is required to judge whether a regulation is a "major rule" and therefore subject to certain requirements of the Order. The Agency has determined that this regulation would result in none of the adverse economic effects set forth in Section 1 of the Order as grounds for finding a regulation to be a "major rule." In fact, this action would impose no additional regulatory requirements, but instead would defer the effective date of the standard in order to avoid adverse economic impacts on manufacturers of certain types of organic solvent cleaners. The Agency has therefore concluded that this regulation is not a "major rule" under Executive Order 12291.

Pursuant to the provisions of 5 United States Code section 605(b) I hereby certify that the proposed rule, if promulgated, will not have a significant economic impact on a substantial number of small entities. This proposed extension of the date of applicability will not impose any new requirements on small entities.

Dated: April 13, 1981.

Walter C. Barber, Jr.,

Acting Administrator.

[FR Doc. 81-11896 Filed 4-20-81; 8:45 am]

ENVIRONMENTAL PROTECTION AGENCY

■

STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

AUTOMOBILE AND LIGHT-DUTY TRUCK SURFACE COATING OPERATIONS

SUBPART MM

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 50, 51, 60, 85 and 86

[AMS-FRL 1803-5]

National Primary and Secondary Ambient Air Quality Standards

Requirements for Preparation, Adoption, and Submittal of Implementation Plans

Standards of Performance for New Stationary Sources

Control of Air Pollution from Motor Vehicles and Motor Vehicle Engines

Control of Air Pollution From New Motor Vehicles and New Motor Vehicle Engines: Certification and Test Procedures

AGENCY: Environmental Protection Agency.

ACTION: Notice of intent.

SUMMARY: This notice describes a number of actions the Environmental Protection Agency intends to implement in an effort to reduce the regulatory burden on the motor vehicle industry.

FOR FURTHER INFORMATION CONTACT: Gregory J. Dana, Mobile Source Air Pollution, Control (ANR-455), Environmental Protection Agency, 401 M Street SW., Washington, D.C. 20460, Telephone: (202) 755-0596.

SUPPLEMENTARY INFORMATION: In light of the serious financial problems facing the motor vehicle industry, the Environmental Protection Agency (EPA) has reviewed its regulations to identify administrative changes which could reduce the regulatory burden on the industry without significantly affecting air quality. The purpose of this notice is to describe the immediate and long-term actions EPA intends to take to reduce regulatory pressures on the industry.

Rulemaking or other administrative proceedings will be necessary to implement many of these actions. Where rulemaking and other actions are necessary, EPA intends to initiate them by the dates specified for items described below.

EPA estimates that these actions will result in savings to the motor vehicle industry of $817 million and a consumer cost savings of $4.3 billion over the next five years.

Following are descriptions of the actions EPA intends to take:

* * * * * *

17. *Explore deferring standards for paint shops.*

EPA will discuss with the states changes in their State Implementation Plans (SIPs) which, subject to their willingness to submit revisions of plans, would have the effect of not requiring electrostatic deposition of undercoat in the next two years. Additionally, SIP requirements in those states which now require electrostatic high transfer efficiency in topcoat application would be deferred until 1984.

EPA is also reviewing the recently-promulgated [1] new source performance standard (NSPS) for auto body painting to consider the effects of increased use of clear coat.

EPA will discuss changes in SIPs with the states by May 1981, with timing of subsequent changes dependent on the states. EPA plans to complete its review of the NSPS for auto body painting by July 1981.

18. *Provide sufficient leadtime for compliance with emission regulations.*

EPA will assure, in future rulemakings, that there is sufficient leadtime for compliance with automobile emission regulations, as measured from the date of promulgation of regulations.

Dated: April 6, 1981.

Walter C. Barber, Jr.,

Acting Administrator.

[FR Doc. 81-11082 Filed 4-10-81; 8:45 am]

[1] See rule published on December 24, 1980 at 45 FR 85410.

ENVIRONMENTAL PROTECTION AGENCY

■

STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

PERCHLOROETHYLENE DRY CLEANERS

SUBPART OO

40 CFR Part 60

[AD-FRL-1546-2]

Standards of Performance for New Stationary Sources; Perchloroethylene Dry Cleaners

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule and notice of public hearing.

SUMMARY: The proposed standards would limit emissions of volatile organic compounds (VOC) from new, modified, and reconstructed perchloroethylene (perc) dry cleaners. The standards would require the installation of carbon adsorbers or equivalent control devices on affected perc dryers and dry-to-dry machines and would require good operating and maintenance procedures on all affected dry cleaning equipment.

The proposed standards implement Section 111 of the Clean Air Act and are based on the Administrator's determination that perc dry cleaners contribute significantly to air pollution that may reasonably be anticipated to endanger public health or welfare. The intent is to require new, modified, and reconstructed perc dry cleaners to use the best demonstrated system of continuous emission reduction, considering costs and nonair-quality health, environmental, and energy impacts.

A public hearing will be held to provide interested persons an opportunity for oral presentation of data, views, or arguments concerning the proposed standards.

DATES: *Comments.* Comments must be received on or before January 26, 1981.

Public Hearing. A public hearing will be held on January 8, 1981 (about 30 days after proposal) beginning at 9:00 a.m.

Request to Speak at Hearing. Persons wishing to present oral testimony must contact EPA by January 2, 1981.

ADDRESSES: *Comments.* Comments should be submitted (in duplicate if possible) to: Central Docket Section (A-130), Attention: Docket Number A-79-30, U.S. Environmental Protection Agency, 401 M Street S.W., Washington, D.C. 20460.

Public Hearing. The public hearing will be held at Env. Research Ctr. Auditorium RTP, NC 27711. Persons wishing to present oral testimony should notify Ms. Deanna Tilley, Standards Development Branch (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5477.

Background Information Document. The Background Information Document (BID) for the proposed standards may be obtained from the U.S. EPA Library (MD-35), Research Triangle Park, North Carolina 27711, telephone number (919) 541-2777. Please refer to *Perchloroethylene Dry Cleaners—Background Information for Proposed Standards, EPA-450/3-79-029a.*

Docket. Docket No. A-79-30, containing supporting information used by EPA in developing the proposed

standards, is available for public inspection and copying between 8:00 a.m. and 4:00 p.m., Monday through Friday, at EPA's Central Docket Section, West Tower Lobby, Gallery 1, Waterside Mall, 401 M Street, S.W., Washington, D.C. 20460. A reasonable fee may be charged for photocopying.

FOR FURTHER INFORMATION CONTACT: Mr. John Crenshaw, Standards Development Branch, Emission Standards and Engineering Division (MD–13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541–5421.

SUPPLEMENTARY INFORMATION:

Proposed Standards

The proposed standards would limit emissions of VOC from the two segments of the perchloroethylene dry cleaning industry: new, modified, and reconstructed professional dry cleaners and new, modified, and reconstructed coin-operated dry cleaners. Professional dry cleaners (both commercial and industrial) are distinguished from coin-operated dry cleaners in that professional equipment is not coin-operated and is not accessible to the customer. Coin-operated equipment is usually operated by the customer.

The proposed regulations consist of a combination of equipment, work practice, and operational standards that allow the best emission control. Professional dry cleaners using perchloroethylene would be required to install and operate a carbon adsorber or equivalent control device. Professional and coin-operated dry cleaners using perchloroethylene would be required to use good operating and maintenance procedures to prevent liquid and vapor leaks of perc from the affected facility. In addition, the treatment of waste solvent would be required to reduce the perc content before disposal. An inspection and maintenance program would also be required to prevent and correct solvent losses from leaks and equipment malfunctions.

Background

The dry cleaning industry is composed of approximately 30,000 small businesses and is generally located in the same area as the population it serves. Dry cleaners may use either perce, petroleum solvents, or trichlorotrifluoroethane to clean such articles as suits, dresses, or uniforms. At present the coin-operated segment of the industry shows a zero growth rate whereas the professional perc segment is growing at about the same rate as the general population, 0.9 percent.

The proposed standards affect only new, modified, or reconstructed dry cleaners using perc. Perc emissions contribute to ambient levels of ozone because perc participates in atmospheric ozone formation. Many areas of the country have ambient levels of ozone above the national ambient air quality standard. To assist States in controlling emissions from existing sources, EPA has published several Control Techniques Guideline (CTG) documents. Among these is a CTG for the perc dry cleaning industry (Control of Volatile Organic Emissions from Perchloroethylene Dry Cleaning Systems, EPA–450/2–78–050). The purpose of the CTG is to recommend reasonably available control technology (RACT). The information developed for the perc CTG also serves as part of the basis for this proposed new source performance standard.

Initial work on controlling air emissions from the dry cleaning industry encompassed all three of the principal dry cleaning solvents. Draft standards were presented at a meeting of the National Air Pollution Control Technical Advisory Commitee (NAPCTAC) meeting on August 28, 1976. In respone to numerous industry comments on that presentation, further work was begun with the intention of writing a separate standard for each of the three solvents.

A draft standard for perc dry cleaners that would have established an emission limitation for dryer exhausts was presented to NAPCTAC in August 1979. Industry comments received on that draft standard, particularly those concerning the excessive economic impact of a performance test for the contorl device, resulted in the draft standard's being changed to an equipment standard.

By 1984, projected nationwide perc dry cleaner emissions from new and existing sources without the new source performance standard would be about 55,000 megagrams per year based on the industry's revenue data reported to the Bureau of Census. Data on the amount of perc sold to the industry indicates that the total perc emissions may be three times higher than the estimate given above. The impact analysis presented below uses the lower emission estimate to calculate the costs and emission reduction that would result from implementation of this standard. Selecting the lower emission estimate is a more conservative assumption to evaluate cost impacts because the smaller emission value minimizes the credit for solvent recovered by the control equipment. Using the lower estimate also results in a more conservative estimate of the emission reduction attributable to the standard. Because an understanding of baseline emissions is important in estimating the impacts of this rule, the Administrator solicits comments on the national perc consumption estimate used and requests additional data of clarify the apparent discrepancy between the data bases.

The regulation of perchloroethylene at this time is based principally upon its role as an ozone precursor and, as such, this action has not been coordinated with EPA's Toxic Substance Priority Commitee (TSPC). Although the potentially hazardous effects of perchloroethylene provide strong support for this action, the Agency's investigations on the possible listing of perchloroethylene as a hazardous air pollutant are being considered separately from this action. These investigations and recommendations will be coordinated with the TSPC.

Summary of Environmental, Energy, and Economic Impacts

The proposed standards would reduce perc emissions from typical coin-operated facilities by about 25 percent and would reduce emissions from typical professional dry cleaners by about 50 percent. Affected facilities that are projected to come on line between 1980 and 1989 are expected to emit 18,000 megagrams of perc in 1989, if they are uncontrolled. If the proposed regulation is implemented, controlled emissions from these facilities are expected to equal 9,800 megagrams in 1989. Thus the proposed standards would reduce perc emissions by about 8,200 megagrams per year by 1989. This figure represents a reduction of 46 percent from the estimate of uncontrolled emissions.

Also affecting nationwide emissions estimates would be any emission reduction attributable to State or local regulations. Revised State Implementation Plans (SIP's) that may incorporate the RACT recommendations in the CTG for perc dry cleaners were due to be submitted to the Administrator by July 1, 1980. Revised SIP's for perc dry cleaning are only required in those areas that are in violation of the National Ambient Air Quality Standards (NAAQS) for photochemical oxidants and that cannot demonstrate compliance with the NAAQS without applying RACT by July 1982. The previous emission estimates do not attribute any emission reduction that may occur due to State SIP's because the magnitude of their impact will not be known until after proposal of this standard.

The water quality impact associated with this standard is considered small. The only potentially adverse impact of the proposed regulation on water quality would be caused by solvent in the steam condensate from the regeneration (solvent desorption) of carbon adsorbers. The effluent water stream from this process may contain up to 100 parts per million (ppm) perc by weight. It is estimated that the total perc to be sewered nationally by perc dry cleaners with carbon adsorbers in 1984 will be 1.5 to 4 megagrams and will increase to 3 to 9 megagrams in 1989. Therefore, no single body of water would receive more than an insignificant amount of perc because this effluent would be dispersed across the entire country. The increase in perc effluent represents an increase of about 15 percent over the amount of perc that would be disposed of by perc dry cleaners without a new source standard.

The solid-waste impact of the proposed regulations is considered insignificant. The proposed standard would not increase the quantity of filter and still wastes generated because the standard would require some removal of perc from these wastes before their disposal; however, activated carbon used in carbon adsobers must eventually be replaced. This would create new solid wastes, although the replacement should occur only at 15-year intervals. Therefore, the first solid waste impact of the proposed standards would not occur until 1995 and would amount to less than 120 megagrams of spent carbon for that year. The amount of solid waste is expected to grow at the same rate as the dry cleaning industry, 0.9 percent.

The total increased electricity usage resulting from the proposed regulations for all affected facilities in 1984 is about 13.9 gigawatt hours per year (GWh/yr). This increased usage, which results from the use of fans on carbon adsorbers, is equivalent to about 23,000 barrels of fuel oil per year for electrical generation. Thus the proposed regulations result in a nominal (less than 1 percent) increase in electricity usage for the industry.

An increase in fuel usage (normally natural gas or fuel oil) is required to produce steam to desorb the carbon. For new sources in 1984, the increase will be about 51.0 terajoules per year (TJ/yr) (48,000 $\times$ 10^6 Btu/yr). This figure represents an increase of less than 1 percent in the total fuel usage by the industry and is equal to about 8,200 barrels of fuel oil per year.

Coin-Operated Dry Cleaners

Under the proposed regulations, coin-operated dry cleaners would not be required to install any additional equipment. The equipment cost for a new coin-operated dry cleaner would increase from about $9,000 to about $18,000 if emission controls like those required on professional dry cleaners were required on coin-operated facilities. Because of this cost increase and the attendant increase in operating costs, the proposed rule does not require carbon adsorbers for coin-operated dry cleaners. Therefore, only proper operation and maintenance of the affected facility and proper treatment of waste materials are required for these facilities. Costs for these procedures are negligible.

Professional Dry Cleaners

The proposed regulations for professional dry cleaners (both commercial and industrial) require the use of a carbon adsorber or equivalent control device to control emissions from dryer or dry-to-dry machine exhausts. In addition, there are maintenance and operating practices and waste content requirements similar to those required for coin-operated dry cleaners. Capitol costs for control equipment are expected to range from $4,000 to $12,000. Calculated annualized costs range from about $600 per year for a small commercial dry cleaner to a savings of over $13,000 per year for an industrial dry cleaner; however, because the lower solvent consumption figures were used to estimate these annualized costs in order to give the "worst-case costs," actual annualized costs may be lower than projected. Reclaimed solvent accounts for the savings achievable with these control techniques, and this saving increases with increased throughput. The cost imposed on small dry cleaners is, however, relatively minor and is not expected to affect industry investment or structure.

The annualized cost for the standards after 5 years is expected to be about $1 million for approximately 3,300 new, modified, and reconstructed professional perc dry cleaners. This industry, however, is highly competitive. Thus new facilities would be unlikely to charge higher prices when competing with existing dry cleaners. Therefore, no retail price increase is expected from the regulations. Rather, the profitablility of new sources would be decreased slightly, by a maximum of about 0.9 percent.

Rationale

Selection of Source

Section 111 of the Act requires establishment of standards of performance for new, modified, or reconstructed stationary sources that cause or contribute significantly to air pollution that may reasonably be anticipated to endanger public health or welfare. EPA has determined that sources that emit perc contribute to the formation of ozone, a criteria pollutant for which national ambient air quality standards have been established under the authority of Section 109 of the Act. Though perc has a relatively low chemical reactivity rate in the ozone formation process, the Agency's policy for ozone precursors (44 FR 35314) affirmed that many of the volatile organic compounds (VOC) previously designated as having low reactivity were moderately or highly reactive under conditions characteristic of urban atmospheres. Most dry cleaners are located in or near urban areas. Also, compounds that have low reactivity can form appreciable amounts of ozone under multiday stagnation conditions such as those that occur during summer in many areas. The potential for ozone air pollution from emissions of perc may reasonably be anticipated to endanger the public health and welfare; therefore, perc emissions from dry cleaners are proposed for regulation under Section 111 of the Act.

The Priority List of sources for new source performance standards (NSPS) (44 FR 49222) identified various sources of emissions on a nationwide basis in terms of the potential improvement in emission reduction that could result from the imposition of NSPS. The sources on the list are ranked based on decreasing order of potential emission reduction. When all three primary dry cleaning solvents were considered, dry cleaners ranked 5th of 59 sources on the list. If listed separately, it is estimated that perc dry cleaners would rank between 8th and 12th on the list.

Though other dry cleaning solvents are currently in use, the proposed standard applies only to perc because sufficient data for the establishment of standards for other dry cleaning solvents are not yet availabe. A standard for petroleum dry cleaning is under development. The third dry cleaning solvent, trichlorotrifluoroethane, will be considered for regulation in the future.

Selection of Pollutants and Affected Facilities

Perc dry cleaning facilities emit only one air pollutant, perchloroethylene. The largest sources of perc emissions in perc dry cleaning facilities are dryers or dry-to-dry machines. The affected facilities are defined as perc dry cleaning dryers or dry-to-dry-machines, washers, filters, muck cookers, and stills.

In the dry cleaning industry, the replacement rate of worn-out equipment is greater than the expected growth rate of new facilities. Selection of dryers and dry-to-dry machines as affected facilities is made to ensure that replacement of existing dryers or dry-to-dry machines with new equipment would require the facility to meet control requirements. Designation of the dry cleaning system as the affected facility would have exempted replacement dryers and dry-to-dry machines from the standard unless an increase in resulting emissions or a capital expenditure of 50 percent of the system replacement cost accompanied the replacement.

Selection of Basis of Proposed Standards

Two principal control options were apparent for reducing perc emissions from dry cleaning plants:

1. Replace perc with a nonphotochemically reactive solvent.
2. Require the use of a carbon adsorber or other control devices to control perc emissions from dryers or dry-to-dry machines, the identification and repair of all leaks, and the reduction of perc content in waste materials.

The only readily available alternative solvents are petroleum solvents and trichlorotriflouoroethane. Petroleum solvents are photochemically reactive, so their use in place of perc would not reduce ozone formation. Furthermore, few dry cleaners are expected to be able to use petroleum solvents instead of perc, primarily because petroleum solvents are flammable and are, therefore, controlled by fire codes and insurance regulations. Existing perc dry cleaning equipment is not designed to utilize flammable solvents. Trichlorotrifluoroethane also has its disadvantages; for example, it does not have the same cleaning characteristics as perc and, according to industry spokespersons, may be unsuitable for heavily soiled articles. Trichlorotrifluoroethane equipment is more expensive than perc equipment and the solvent itself is three to four times as expensive as perc. Many of the projected new plants in the commercial sector would not be constructed if the only solvent available were trichlorotrifluoroethane.

Switching to trichlorotrifloroethane would, however, result in a 100-percent reduction in perc emissions for the dry cleaning systems affected. New source standards eliminating perc emissions would reduce national VOC emissions by approximately 8,000 megagrams by 1984. However, there would be an accompanying increase in trichlorotrifloroethane emissions of about 3,100 megagrams for this option. Trichlorotrifloroethane has been implicated in the depletion of the stratospheric ozone layer, a region of the upper atmosphere that shields the earth from harmful ultraviolet radiation that increases skin cancer risk in humans. In view of this potential impact, it would be inappropriate for EPA to require perc dry cleaners to switch to trichlorotrifloroethane solvents.

New source standards based on the second control option would reduce national VOC emissions by about 4,000 megagrams annually by 1984 without an accompanying increase in trichlorotrifloroethane emissions. There would be three types of emission points covered by this option: (1) dryer or dry-to-dry machine exhausts, (2) leaks, and (3) waste materials. Dryer or dry-to-dry machine emissions would be directed to the control device. Perceptible leaks would be identified and repaired. Filter and distillation wastes would be treated to minimize the perc content before disposal.

Carbon adsorption has been commercially accepted as a dryer exhaust control technology for use in the professional dry cleaning sector of the industry, but not in the coin-operated sector. Fewer than 5 percent of the existing coin-operated machines use this control technique. Carbon adsorption is not considered economically reasonable for the majority of coin-operated dry cleaners because of the additional cost for boiler facilities to produce the steam necessary to desorb the carbon bed. For this reason, a coin-operated dry cleaner would only be require to control leaks and waste materials. This control would require good operation, maintenance, and inspection practices.

Selection of Format of Proposed Standards

Two basic approaches appeared applicable to establishing the format for the standard. The first focused on the emission points and led to separate standards for each specific emission source. The second approach focused on solvent consumption and led to a mass emission limitation format that would place a limit on the total consumption of perc per unit of articles cleaned. This format is similar to the industry technique of computing solvent "mileage" in pounds of articles cleaned per drum of solvent.

The first approach would require different formats for each of the three types of emission points: (1) equipment exhausts and vents, (2) leaks, and (3) waste materials. This approach is the same as that in the control techniques guideline (CTG) on perc dry cleaning and was chosen as the format for the proposed standards, based on the considerations discussed below.

Under Section 111(h) of the Clean Air Act, the Administrator may promulgate a design, equipment, work practice, or operational standard if he

> * * * determines that (A) a pollutant or pollutants cannot be emitted through a conveyance designed and constructed to emit or capture such pollutant, or that any requirement for, or use of, such a conveyance would be inconsistent with any Federal, State, or local law, or (B) the application of measurement methodology to a particular class of sources is not practicable due to technological or economic limitations.

Either concentration limitations, mass emissions standards, or equipment standards could be used to limit emissions from dryer or dry-to-dry machine exhausts at professional dry cleaners. An equipment standard reduces the impact on the profitability of small dry cleaners because this format for the standard does not require an expensive performance test but does require the use of a carbon adsorber or equivalent control device. The annualized cost to a small commercial dry cleaner would be approximately $800 for an equipment standard and $1,000 for a concentration limit or mass emission standard, assuming no more than one performance test would be required over the life of the adsorber. The use of performance tests is not feasible because the economic impact of even a single performance test is considered to be too great for small dry cleaning plants. Foe these reasons, an equipment standard requiring the use of carbon adsorbers was chosen to limit emissions from these sources.

As much as 25 percent of the emissions from a controlled facility can be attributed to leaks. Possible formats for a standard to control these leaks are a work practice standard or a maximum emission limit standard. Because the control of these emissions requires maintenance, a logical format for a standard is a work practice standard, specifying an inspection program to locate leaks and limiting the time period for performing the required maintenance. The maximum emission limit format for a leak standard would require the enclosure of the leak source to quantify the emission rate. Because this procedure is time consuming and the application of measurement methodology is not practicable due to economic limitations, the work practice standard was chosen as the preferred format.

Possible formats for a standard limiting perc emissions from waste

materials are the establishment of work practices that reduce perc content in waste materials before disposal or the establishment of a limit on the concentration of perc in the waste. Perc dry cleaners generate three different types of waste materials: (1) regenerable filter wastes, (2) residue from solvent stills, and (3) used cartridge filters. The possible formats for a standard have been evaluated separately for each of these waste materials.

Regenerable filter wastes are typically heated in a muck cooker to drive off perc. The perc is recovered by condensation. A concentration limit on the waste material after cooking would require good operation of the muck cooker to minimize the perc content in the muck before disposal. This concentration can be determined by a simple, inexpensive test.

Residue from solvent stills presents a case similar to that of the regenerable filters. Contaminated solvent is boiled at a temperature that volatilizes the solvent without volatilizing the contaminating greases or oils. The solvent vapor is then condensed and recovered. A concentration limit has the same advantages for controlling emissions from solvent stills as it has for controlling emissions from regenerable filter material.

Cartridge filters present a different case, however. These filters cannot normally be heated to recover perc because most of these filters are designed to be disposable and, therefore, are not designed for ease of solvent reclamation. Instead they are drained of excess solvent in their housings and are then disposed of. Performance tests for a concentration format would require the drying of used cartridges to a constant weight. This process can take 2 weeks or longer and cannot usually be performed without the use of laboratory facilities for the entire time which is expensive, making performance testing economically unfeasible. A work practice format would specify a minimum drain time for cartridge filters. This format has the advantage of not requiring a lengthy performance test while maintaining the same control level. Therefore, a work practice standard was chosen for cartridge filters.

Equivalent Systems of Emission Reduction

These standards of performance do not preclude the use of other emission control equipment or procedures of operation that can be demonstrated to be equivalent, in terms of reducing VOC emissions, to those prescribed in the proposed regulation. For determination of equivalency, any person may submit test data and request the Administrator's approval of alternative equipment. The submittal must describe the equipment, test procedures, date and location of the test, and test results. Upon request, the Administrator will also review proposed test procedures for technical feasibility.

Equivalency for dryer or dry-to-dry machine exhaust control equipment can be demonstrated by any person including users or manufacturers of equipment. In order to determine equivalency, the Administrator must find a substantial likelihood that the control technology used in normal operations would produce equivalent emission reductions as the standards would require, at approximately the same or less energy or adverse environmental impact.

To permit the use of alternative systems for carbon adsorption, the Administrator must find either (1) that the control device reduces dryer or dry-to-dry machine emissions by a minimum of 95 percent, averaged over the drying cycle, or (2) that a dry cleaning system employing the control device can achieve an average solvent loss rate of 5 kilograms, or less, per 100 kilograms of articles cleaned. These limits were chosen based on test data from carbon-adsorber-equipped facilities where both types of tests were performed. Although there is no exact correspondence between dryer emission control and average solvent loss, the latter demonstration of equivalency is allowed because control efficiency measurements of multipass control systems are substantially more difficult than such measurements for single-pass systems (e.g., carbon adsorbers).

Some of the other control devices available for perc dry cleaners are multipass control systems, such as refrigerated condensers and direct contact condensers. These units are typically installed to eliminate the exhaust to the atmosphere from the dryer (or dry-to-dry machine) with a closed-loop arrangement. Test data from one solvent mileage test indicate that refrigeration units on dry-to-dry machines may achieve emission rates comparable to a well-operated carbon-adsorber-equipped facility, and industry sources have reported equally promising results for the direct contact condenser.

Selection of Numerical Emission Limits, Equipment Standards, and Work Practice Standards

1. *Equipment Exhausts and Vents*

The standard is based on the predominant type of carbon adsorber in use by the industry today. Activated carbon in those systems typically adsorbs about 1 kilogram of perc for each 5 kilograms of carbon before regeneration. Test data and industry sources also indicate that a well-operated, well-maintained dry cleaning machine ducts about 1 kilogram of perc to the carbon adsorber for each 30 kilograms of articles cleaned. The proposed standard, therefore, requires the carbon bed to be desorbed before it reaches its capacity, as indicated by the throughput of articles cleaned. The maximum throughput allowed by the standard before desorption is 6 kilograms of articles cleaned per kilogram of carbon in the adsorber. This number is based on the above data which indicate that to capture each kilogram of perc no more than 30 kilograms of articles can be cleaned for each 5 kilograms of carbon in the adsorber.

To prevent ineffective desorbing techniques, a requirement for desorbing the bed with a minimum of 170 kilopascals (kPa) (10 pounds per sq. inch (psig)) steam is included in the regulation. This requirement is based on current industry practice. Additionally, carbon adsorbers must be designed to accommodate the unrestricted air flow from the dry cleaning equipment to prevent back pressure on the dry cleaning machine and possible vapor leaks. Also, the air flow must achieve a minimum rate to dry the bed after the desorbing process to ensure proper operation after desorption.

2. *Leaks*

The control of leaks depends on finding the leaks and repairing them. Inspections to find leaks can be performed daily, weekly, monthly, or at other intervals. Daily inspections were judged too burdensome for the many small dry cleaners who would be affected. Weekly inspections could be made during days of lower consumer demand without affecting production. Longer intervals would not allow for timely discovery of leaks. Therefore, weekly inspections are required.

After leaks are found, repairs are required. Emissions from leaks can be reduced by minimizing the length of time before repair. Immediate repair could be burdensome to dry cleaners because of lost production during periods of peak demand. Also, in some cases, required parts may not be on hand. To lessen the impact of the standard, 3 days have been allowed for the leak to be repaired or for required parts to be ordered.

3. *Waste Materials*

The proposed standard would set limits on the amount of perc contained in waste products generated at a dry cleaning facility. These waste products may include residue from regenerable filters, cartridge filters, and solvent stills.

The processing of waste materials to minimize the perc content before disposal is the objective of the proposed standards. Stills can be operated, according to test data, to reduce the perc content to 60 kilograms per 100 kilograms of wet waste material. Industry representatives have agreed that these levels can be achieved by increased distillation times which result in the optimum operation of the still to reduce the perc content without significantly increasing the operating cost of the still. Care must be taken, however, to prevent grease and oils from being evaporated along with the perc. More stringent control levels are not viable for typical dry cleaners because of the likelihood that these contaminates would appear in the reclaimed perc.

Similarly, the proper operation of a muck cooker at test dry cleaners has been demonstrated to reduce the perc content to 25 kilograms per 100 kilograms of wet waste material through the use of improved operating procedures. This technique has been endorsed by industry trade organizations in recommendations to their members. Control levels below 25 kilograms per 100 kilograms of wet waste material are too stringent for typical dry cleaners because of the length of cooking time required. The proposed standard would require the 25-kilograms-per-100-kilograms level to be met.

Cartridge filters are usually drained in their housings or other sealed containers before disposal. the proposed standard would require a minimum of 24 hours of drain time. This time is based on manufacturers' recommendations. Normally, draining would occur over a weekend with the filter's being replaced on the following Monday morning. Therefore, no loss of production time would occur. Another option would have required cartridge filters to be dried in housings vented to carbon adsorbers. This option was not chosen because it could preclude development of other control devices that might be equivalent to carbon adsorbers.

Selection of Monitoring Requirements

The principal monitoring technique that can be used is inspection for leaks. Inspection by the owner or operator for leaks is routine maintenance necessary for the most efficient operation of the dry cleaner. Leaks would be required to be repaired within 3 days; otherwise, a copy of a purchase order showing required parts to be on order must be in evidence. This procedure would minimize perc losses from perceptible leaks by limiting the time for such leaks to be repaired. No other monitoring requirements are included because sufficiently accurate continuous monitors were not found.

For determining compliance witha the liquid leak standard, any liquid leak large enough to drip or run off would be considered "perceptible" and would have to be repaired. This inspection would be visual. Perceptible vapor leaks are more difficult to quantify, but would consist of vapor leaks that are obvious from the odor of perc in the general area or by observation of gas flow by feel, application of bubble solution, or similar means.

Determination of the perc content of waste materials would be accomplished by using ASTM D322-67, with modifications to account for the fact that perc is heavier than water and to give a weight percent rather than a volume percent.

No reports to the Administrator or records are required for several reasons. First, when a carbon adsorber is installed, it is to the economic advantage of the owner or operator to use it. Second, this industry is primarily made up of small businesses upon which recordkeeping would be burdensome. Finally, it is in the spirit of regulatory reform to minimize the burden of regulations when possible and when consistent with achieving a given environmental goal.

Public Hearing

A public hearing will be held to discuss the proposed standards in accordance with Section 307(d)(5) of the Clean Air Act. Persons wishing to make oral presentations whould contact EPA at the address given in the Addresses section of this preamble. Oral presentations will be limited to 15 minutes each. Any member of the public may file a written statement with EPA before, during, or within 30 days after the hearing. Written statements should be addressed to the Central Docket Section address given in the Addresses section of this preamble.

A verbatim transcript of the hearing and written statements will be available for public inspection and copying during normal working hours at EPA's Central Docket Section in Washington, D.C. (see ADDRESSES section of this preamble).

Docket

The docket is an organized and complete file of all the information submitted to, or otherwise considered by, EPA in the development of this proposed rulemaking. The principal purposes of the docket are (1) to allow interested parties to readily identify and locate documents so that they can intelligently and effectively participate in the rulemaking process, and (2) to serve as the record in case of judicial review.

Miscellaneous

As prescribed by Section 111, establishment of standards of performance for perc dry cleaners was preceded by the Administrator's determination (40 CFR 60.16, 44 FR 49222) that these sources contribute significantly to air pollution that may reasonably be anticipated to endanger public health or welfare in accordance with Section 117 of the Act, publication of this proposal was preceded by consultation with appropriate advisory committees, independent experts, and Federal departments and agencies. The Administrator will welcome comments on all aspects of the proposed regulation, including economic and technological issues.

Standards of performance for new sources established under Section III of the Clean Air Act reflect:

> application of the best technological system of continuous emission reduction which (taking into consideration the cost of achieveing such emission reduction, any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated. [Section 111(a)(1)]

Although there may be emission control technology available that can reduce emissions below those levels required to comply with standards of performance, such technology might not be selected as the basis of standards of performance because of costs associated with its use. Accordingly, these standards of performance should not be viewed as the ultimate in achievable emissions control. In fact, the Act requires (or has the potential for requiring) the imposition of a more stringent emission standard in several situations.

For example, applicable costs do not necessarily play as prominent a role in determining the lowest achievable emission rate (LAER) for new or modified sources locating in nonattainment areas (i.e., thse areas where statutorily mandated health and welfare standards are being violated). In this respect, Section 173 of the Act requires that new or modified sources

constructed in an area where ambient pollutant concentrations exceed the NAAQS must reduce emissions to the level that reflects the LAER, as defined in Section 171(3), for that source category. The statute defines LAER as that rate of emissions based on the following, whichever is more stringent:

(A) The most stringent emission limitation [that] is contained in the implementation plan of any state for such class or category of source unless owner or operator of the proposed source demonstrates that such limitations are not achievable,

(B) The most stringent emission limitation [that] is achieved in practice by such class or category of source.

In no event can the emission rate exceed any applicable new source performance standard [Section 171(3)].

A similar situation may arise under the prevention of significant deterioration of air quality provisions of the Act (Part C). These provisions require that certain sources (referred to in Section 169(1)) employ best available control technology (BACT) (as defined in Section 169(3)) for all pollutants regulated under the Act. Best available control technology must be determined on a case-by-case basis, taking energy, environmental, and economic impacts and other costs into account. In no event may the application of BACT result in emissions of any pollutants that would exceed the emissions allowed by any applicable standard established pursuant to Section 111 (or 112) of the Act.

In all events, State Implementation Plans (SIP's) approved or promulgated under Section 110 of the Act must provide for the attainment and maintenance of NAAQS designed to protect public health and welfare. For this purpose, SIP's must, in some cases, require greater emission reductions than those required by standards of performance for new sources.

Finally, States are free under Section 116 of the Act to establish even more stringent emission limits than those established under Section 111 or those necessary to attain or maintain the NAAQS under Section 110. Accordingly, new sources may in some cases be subject to limitations more stringent than standards of performance under Section 111, and prospective owners and operators of new sources should be aware of this possibility in planning for such facilities.

Ths regulation will be reviewed 4 years from the date of promulgation as required by the Clean Air Act. This review will include an assessment of such factors as the need for integration with other programs, the existence of alternative methods, enforceability, improvements in emission control technology, and reporting requirements. The reporting requirements in this regulation will be reviewed as required under EPA's sunset policy for reporting requirements in regulations.

Section 317 of the Clean Air Act requires the Administrator to prepare an economic impact assessment for any new source standard of performance promulgated under Section 111(b) of the Act. An economic impact assessment was prepared for the proposed regulations and for other regulatory alternatives. All aspects of the assessment were considered in the formulation of the proposed standards to ensure that the proposed standards would represent the best system of emission reduction considering costs. The economic impact assessment is included in the Background Information Document.

Dated: November 18, 1980.

Douglas M. Costle,

Administrator.

PART 60—STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

It is proposed that 40 CFR Part 60 be amended by adding a new subpart as follows:

1. Add Subpart OO to the Table of Sections as follows:

Subpart OO—Standards of Performance for Perchloroethylene Dry Cleaners

Sec.

60.410 Applicability and designation of affected facility.
60.411 Definitions.
60.412 Standards for volatile organic compounds.
60.413 Equivalent equipment and procedures.
60.414 Test methods and procedures.

Authority: Sec. 111, 301(a) of the Clean Air Act as amended (42 U.S.C. 7411, 7601(a)), and additional authority as noted below.

2. Add Subpart OO as follows:

Subpart OO—Standards of Performance for Perchloroethylene Dry Cleaners

§ 60.410 Applicability and designation of affected facility.

(a) The provisions of this subpart are applicable to the following affected facilities: perchloroethylene dry cleaning dryers, dry-to-dry machines, washers, filters, muck cookers and stills.

(b) Any facility under paragraph (a) of this section that commences construction or modification after ———— (date of proposal) is subject to the requirements of this part.

§ 60.411 Definitions.

As used in this subpart, all terms not defined herein shall have the same meaning given them in the Act and in subpart A of this part.

"Carbon adsorber" means a bed of activated carbon into which perchloroethylene vapors are introduced and trapped for subsequent desorption.

"Cartridge filter" means a discreet solvent filter unit designed to be replaced periodically.

"Coin-operated dry cleaner" means a perchloroethylene dry cleaner activated by the customer. Such dry cleaners are typically coin-operated.

"Desorption" means regeneration of an activated carbon bed by removal of the adsorbed solvent, usually with steam.

"Dryer" means a machine used to remove perchloroethylene from articles of clothing or other textile or leather goods, after washing and extraction of excess perchloroethylene.

"Dry-to-dry machine" means a perchloroethylene dry cleaning machine in which washing, extraction, and drying are all achieved in the same single unit.

"Dry cleaning system" means an affected dryer or dry-to-dry machine and its ancillary washers, filters, muck cookers, stills, interconnecting piping and ducts, and solvent tanks which must be present in order to complete the dry cleaning process.

"Muck cooker" means a device for heating regenerable filter material to drive off perchloroethylene vapors for reclaiming.

"Perchloroethylene dry cleaners" means the dry cleaning dryers or dry-to-dry machines and their ancillary equipment.

"Perceptible leaks" means any perchloroethylene vapor or liquid leaks that are obvious from (1) the odor of perchloroethylene, (2) observation of gas flow by feel or application of bubble solution, or (3) visual observation, such as pools or droplets of liquid.

"Professional" means any perchloroethylene dry cleaner not activated by the customer and includes, but is not limited to, commercial and industrial perchloroethylene dry cleaners.

"Regenerable filter material" means the residue from a filter using loose diatomaceous earth.

"Still residue" means the mixture of perchloroethylene, oils, and other material that must be periodically removed from a solvent still.

"Stills" are defined as devices used to volatilize and recover perchloroethylene from contaminated solvent removed from the cleaned articles.

"Wet waste material" means the undiluted filter material from a regenerable filter or the undiluted residue from a solvent still.

§ 60.412 Standards for volatile organic compounds.

(a) Each owner or operator of a perchloroethylene dryer or dry-to-dry machine used by a professional dry cleaner shall install, operate, and maintain a carbon adsorption unit for the control of volatile organic compound emissions from the dryer or dry-to-dry machine. The carbon adsorber must be designed and operated to meet the following requirements:

(1) Desorption before cleaning 6 kilograms of articles per kg of activated carbon, based on dryer or dry-to-dry machine rated capacity,

(2) Desorption with a minimum steam pressure of 170 kPa,

(3) A rated air flow capacity at least equal to the unrestricted exhaust rate of the dry-to-dry machine or, if applicable, at least equal to the sum of the unrestricted exhaust rates of the washer and dryer, and a minimum air flow capacity of 0.3 cubic meter per second,

(4) no bypass to the atmosphere during desorption.

(b) No owner or operator of a regenerable filter subject to the provisions of this subpart shall dispose of regenerable filter material unless the perchloroethylene content of the regenerable filter material has been reduced to 25 kilograms of perchlorethylene, or less, per 100 kilograms of wet waste material.

(c) No owner or operator of a still subject to the provisions of this subpart shall dispose of still residue unless the perchloroethylene content of the still residue has been reduced to 60 kilograms of perchloroethylene, or less, per 100 kilograms of wet waste material.

(d) No owner or operator of cartridge filters subject to the provisions of this subpart shall dispose of used cartridge filters unless the cartridge filter has been drained in its housing, or other sealed container, for a minimum of 24 hours, or has been dried in an enclosure vented to a carbon adsorber.

(e) The owner or operator of an affected facility subject to the provisions of this subpart shall repair perceptible leaks within 3 working days or, if repair parts are necessary, a purchase order for those parts must be initiated within 3 working days.

§ 60.413 Equivalent equipment and procedures.

(a) Upon written application from any person, the Administrator may approve the use of equipment or procedures that have been demonstrated to his satisfaction to be equivalent, in terms of reducing VOC emissions to the atmosphere, to those prescribed for compliance within a specified paragraph of this subpart. The application must contain a complete description of the testing procedure and the date, time, and location of the test, and a description of the test results.

(b) For the purpose of determining equivalency of control equipment required by § 60.412(a), the Administrator will evaluate the application to determine the adequate demonstration of either:

(1) 95 percent control of dryer emissions, averaged over the drying cycle, or

(2) An average solvent loss rate of 5 kg, or less, per 100 kg of articles dried, for the dry cleaning system, averaged over a minimum of 20 consecutive work days and based on machine capacity.

(c) If the the Administrator's judgment an application for equivalence may be approvable, the Administrator will publish a notice of preliminary determination in the **Federal Register** and provide the opportunity for public hearing. After notice and opportunity for public hearing, the Administrator will determine the equivalence of the alternative means of emission limitation and will publish the final determination in the **Federal Register.**

§ 60.414 Test methods and procedures.

(a) Each owner or operator of an affected facility subject to the provisions of this subpart shall make a weekly inspection of the affected facility to determine compliance with § 60.412(e).

(b) ASTM Method D322–67, as modified below, is used to determine compliance with § 60.412(c) and § 60.412(d). A sample of the wet waste material to be disposed of is taken from each of three different batches of waste materials. Each of the three samples is analyzed using ASTM Method D322–67 modified by using a Bidwell-Sterling type distillation trap in place of a gasoline dilution trap and by adding a known sample mass to the flask instead of a known sample volume so as to obtain a weight prcent of perchloroethylene in the waste material.

(Sec. 114 of the Clean Air Act, as amended (42 U.S.C. 7414))

[FR Doc. 80-36702 Filed 11-24-80; 8:45 am]
BILLING CODE 6560-26-M

ENVIRONMENTAL PROTECTION AGENCY

■

STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

GRAPHIC ARTS INDUSTRY: PUBLICATION ROTOGRAVURE PRINTING

SUBPART QQ

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 60

[1579-1]

Standards of Performance for New Stationary Sources; Graphic Arts Industry: Publication Rotogravure Printing

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule and notice of public hearing.

SUMMARY: Standards of performance are proposed to limit emissions of volatile organic compounds (VOC) from new, modified, and reconstructed publication rotogravure printing presses. Emissions would be limited to 16 percent of the total VOC solvent volume used at the press. Reference Method 29 is also proposed for determination of the VOC volume content of solvent-borne inks and related coatings.

The proposed standards implement Section 111 of the Clean Air Act and are based on the Administrator's determination that the graphic arts industry contributes significantly to air pollution which may reasonably be anticipated to endanger public health or welfare. The intent is to insure that new, modified, and reconstructed publication rotogravure printing facilities use the best demonstrated system of continuous emission reduction, considering costs, nonair quality health and evnironmental impacts, and energy requirements.

A public hearing will be held to provide interested persons an opportunity for oral presentation of data, views, or arguments concerning the proposed standards.

DATES: *Comments.* Comments must be received on or before December 29, 1980.

Public Hearing. A public hearing will be held on November 25 (about 30 days after proposal) beginning at 9:00 a.m.

Request to Speak at Hearing. Persons wishing to present oral testimony must contact EPA by November 18 (1 week before hearing).

ADDRESSES: *Comments.* Comments should be submitted (in duplicate if possible) to: Central Docket Section (A-130), Attention: Docket Number A-79-50, U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, D.C. 20460.

Public Hearing. The public hearing will be held at Environmental Research Center Auditorium RTP, NC. Persons wishing to present oral testimony should notify Ms. Deanna Tilley, Standards Development Branch (MD-13) U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5477.

Background Information Document. The Background Information Document (BID) for the proposed standards may be obtained from the U.S. EPA Library (MD-35), Research Triangle Park, North Carolina 27711, telephone number (919) 541-2777. Please refer to "Publication Rotogravure Printing—Background Information for Proposed Standards," EPA-450/3-80-031a.

Docket. Docket No. OAQPS-79-50, containing supporting information used in developing the proposed standards, is available for public inspection and copying between 8:00 a.m. and 4:00 p.m., Monday through Friday, at EPA's Central Docket Section, West Tower Lobby, Gallery 1, Waterside Mall, 401 M Street, S.W., Washington, D.C. 20460. A reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: Mr. Gene W. Smith, Section Chief, Standards Development Branch, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5421.

SUPPLEMENTARY INFORMATION:

Proposed Standards

The proposed standards would apply to new publication rotogravure production presses. Existing presses would not be subject to the proposed standards unless they undergo a modification or a reconstruction as defined in 40 CFR 60.14 and 40 CFR 60.15, respectively. The smaller four-unit proof presses, used only to check the quality of the image formation of newly etched or engraved printing cylinders, would not be affected by the proposed standards. Emissions of volatile organic compounds (VOC) from publication rotogravure presses would be limited to 16 percent of the total VOC solvent volume used at the press. Total VOC solvent used would include all VOC solvent in the purchased raw inks and related coatings used at the press, all VOC solvent added to the inks and coatings, and all VOC solvent used as a cleaning agent at the press. For compliance purposes, the emission percentage could be reported as rounded-off to the nearest whole number.

The proposed standards are based on the use of solvent-borne ink systems, with a solvent vapor cpture system and a fixed-bed carbon adsorption/solvent recovery system for VOC emission control. For the use of waterborne ink systems, the proposed emission limit is expressed as a maximum allowed VOC volume to solids volume ratio of 0.64 in the purchased raw inks and related coatings, with only water addition allowed for dilution. Emission control equipment and metering devices would be required with waterborne ink systems only if the specified waterborne conditions are not met.

Initial compliance with the proposed emission limit would have to be demonstrated in a long-term performance test. This initial test would cover normal operations over 30 calendar days instead of an average of three runs as prescribed under 40 CFR 60.8. Actual press emissions and the average control system performance over the 30 days would be determined by an overall VOC solvent volume balance. The total volume amount of recovered solvent would be compared to the total volume amount of solvent used at the press. The amount of recovered solvent would include all VOC solvent recovered by the emission control system, all waste VOC solvent, and all waste inks removed from the affected facility. VOC volume analyses of raw solvent-borne inks and related coatings, as purchased, would be obtained from the ink manufacturer or determined by the proposed Reference Method 29. VOC analyses of air streams from the facility or the control system, and any waste water streams would not be required.

Once the initial performance test is completed, the affected facility would be required to monitor and calculate the amount of VOC emissions as a percentage of the VOC solvent volume used each month at the press. Emissions would be determined using the same procedures used in the initial performance test. These monthly test records of emissions would serve to determine compliance on a continuing basis, but would be reported only for the months during which non-compliance is determined. Compliance with the proposed standards would thus be determined for 12 periods each year from monthly performance test records. As an alternative, four-week performance test averaging periods could be chosen in order to coincide with the plant's normal accounting procedures. This alternative would require 13 compliance periods per year.

Affected facilities using waterborne ink systems would also be subject to continual compliance after completion of the initial performance test. Determination of compliance procedures would be the same as previously described, except that the VOC volume

analyses of raw waterborne inks and related coatings, as purchased, would be from only the ink manufacturer's data. A reference test method for verification of the VOC content of waterborne ink systems is not being proposed.

The proposed emission limits can also be met through the use of solvent destruction (i.e. oxidation) control systems. However, specific procedures for determination of compliance with solvent destruction are not being proposed since this control technique is not expected to be used on any new, modified, or reconstructed press. The Administrator will welcome comments on whether this expectation and the exclusion of compliance provisions for solvent destruction devices are reasonable.

Summary of Environmental, Energy, and Economic Impacts

The environmental, energy, and economic impacts of the proposed standards are expressed as incremental differences relative to a baseline level. A 75 percent overall VOC reduction efficiency, or 25 percent emission level, was chosen as the baseline for the impact analyses. This baseline level corresponds to the recommendation in EPA's control techniques guideline (CTG) document, "Control of Volatile Organic Emissions from Existing Stationary Sources—Volume VIII: Graphic Arts—Rotogravure and Flexography" (EPA-450/2-78-033 [CTG]). The states are expected to use this document in developing their revised State Implementation Plans (SIP) for existing publication rotogravure printing facilities. The impact analyses are based on the use of fixed-bed carbon adsorption/solvent recovery systems for control of VOC emissions from both existing and affected facilities. All existing facilities installed before the year 1980 are assumed to be controlled at the 75 percent baseline level.

The projected impacts are based on the expectation that, most of the time, only 15 percent (85 percent overall control) of the total VOC solvent used at affected facilities would be emitted. Emissions are expected to increase to the 16 percent level (84 percent overall control) during only one or two months per year.

Compared to the baseline control level, the proposed standards would further reduce VOC air pollutant emissions from typical affected facilities by 40 percent. A typical sized new plant in this industry would have four production presses, each consisting of eight printing units, and would have the capacity for a total annual solvent usage of about 6,400 megagrams. The potential reduction in VOC emissions from a typical sized plant controlled under the proposed standards would be about 700 megagrams per year more than that for control at the baseline level. The proposed standards would reduce the industrywide VOC emissions from both affected and existing facilities by about 7,900 megagrams per year in the year 1985, the fifth year after the appliable date of the standards. This would represent about 13 percent less industry emissions than with control of affected facilities at the baseline level. This projection is based on the expectation of 7 percent annual real growth rate in this industry.

Potential water pollution from a facility controlled under the proposed standards would be 3 percent greater than that from one controlled at the baseline level. The incremental potential wastewater discharges from a typical four-press plant would be about 2.6 million liters per year more than for baseline control. Dissolved organic compounds in this effluent would amount to an incremental increase of about 0.5 megagram per year. Projected national discharges for 1985 would be increased by about 32 million liters above that for control at the baseline level. In the year 1985, dissolved organic solvents in the nationwide effluent would potentially amount to about 6 megagrams per year more than for control at the baseline level. This would represent about a five percent incremental increase. The dissolved solvent content could be virtually eliminated on-site by demonstrated, inexpensive removal systems. The resultant solvent-free water could be recycled as make-up feed water to the plant steam boiler. Alternatively, the waste water could be discharged to a conventional biological waste treatment system.

The solid waste impact resulting from the proposed standards would increase proportionally over those for baseline control because of additional amounts of spent carbon, carbon fines, and used solvent laden air (SLA) filters. In 1985, the amount of nationwide waste carbon would be increased by about 85 megagrams above that for control at the baseline level. An estimate of the incremental bulk quantity of waste filters was not attempted, but should be a very small impact.

The only significant source of noise would be from the large SLA fans. However, these are normally installed in an enclosed housing, and should not affect the surrounding environment.

In the Administrator's opinion, the proposed standards' environmental impacts as just described are reasonable.

The energy impact of the proposed standards is not unreasonable on an industry basis and is entirely favorable when viewed from a national perspective. The direct energy consumption by a facility controlled under the proposed standards would be about 18 percent higher than if controlled at the baseline level. The direct annual energy consumption for a typical four-press plant would be increased by about the equivalent of 2,200 barrels of fuel oil. The industry's total direct energy consumption for the year 1985 would be about 40,200 barrels of fuel oil above that required for baseline control. This would represent an energy consumption increase of about 9 percent more than with control of affected facilities at the baseline level.

The national energy impact of the proposed standards would result in net national energy savings when the fuel energy value of the recovered solvent is considered. Under the proposed standards, nationwide energy consumption for the year 1985 would be actually decreased by about the equivalent of 21,800 barrels of fuel oil from that required for baseline control. The Administrator believes that the direct energy impact on the industry is reasonable, particularly in view of the net national energy savings which would result from decreased solvent demand.

The proposed standards would increase the required total plant capital investment and annualized operating costs over that for emission control at the baseline level. However, the high cost value of the recovered solvent would enable the installation of solvent recovery control systems to provide a net profit (negative annualized costs) and positive return on investments for emission controls under the proposed standards. The capital investment for a typical four-press plant would be increased by about $650,000, or about two percent more than for control at the baseline level. Industry's cumulative five-year capital investments, through the year 1985, would be increased by about $17 million. For the typical plant, the annualized control cost with solvent recovery credit would be about −$345,000 at baseline level and −$271,000 under the proposed standards, for an incremental cost increase of about $74,000. In the year 1985, the industrywide total annualized control cost with solvent recovery credit would be an estimated −$4.2 million at baseline control level and −$1.7 million

under the proposed standards, for an incremental cost increase of about $2.5 million.

The increase in capital requirements and annualized control cost under the proposed standards would have a negligible impact on industry growth, profitability, and product prices. First, the two percent incremental increase in initial capital costs is not large enough to reduce capital availability and, therefore, would not restrict industry growth. Secondly, the industry's average pre-tax profit of eight percent at the baseline control level would not be reduced below 7.8 percent under the proposed standards. Finally, there would be no significant price increases for publication gravure products. The Administrator, therefore, believes that the economic impacts of the proposed standards are reasonable.

Rationale—Selection of Source

The publication rotogravure printing industry is a significant source of volatile organic compound (VOC) emissions. The EPA has ranked the graphic arts industry, of which publication rotogravure is a part, sixth out of 59 on the "Priority List and Additions to the List of Categories of Stationary Sources". This list for New Source Performance Standards was promulgated at 44 FR 49222 on August 21, 1979. This priority list ranks the emission sources on a nationwide basis in terms of quantities of air pollutant emissions from the source category, the mobility and competitive nature of each source category, and the extent to which each pollutant endangers public health and welfare.

The publication rotogravure printing industry is a rapidly growing segment of the graphic arts industry, and a rapidly increasing source of potential VOC air pollutants. In the year 1977, the entire graphic arts industry was responsible for about 380,000 megagrams of organic solvent vapor emissions in the United States. Although in sales, publication rotogravure constituted only about five percent of the graphic arts industry, it was responsible for almost 15 percent of the total graphic arts VOC emissions in 1977. Growth projections show that the publication rotogravure industry will experience about a seven percent annual real growth rate through the year 1985. Potential uncontrolled emissions from a typical four-press plant amount to about 6,400 megagrams per year. In the year 1985, the cumulative potential uncontrolled VOC emissions from this industry are projected to be about 236,000 megagrams.

Selection of Pollutants and Affected Facilities

Volatile organic compounds (VOC) are the only air pollutants emitted from publication rotogravure printing facilities. The sources of the VOC emissions are the solvent components in the inks and related coatings used at the printing presses, as well as solvent added for printing and cleaning. The gravure printing method usually involves only four colors of inks—yellow, red, blue, and black. The related coatings are usually referred to as extenders or varnishes. There are two general types of solvents used by the publication rotogravure industry. In a few cases only toluene is used, but the more common solvent is a toluene-xylene-lactol spirits (naphtha) mixture. The various solvent components exhibit a range of moderate to high photochemical reactivity. VOC along with nitrogen oxides are precursors to the formation of ozone and other oxidants. Photochemical oxidants result in a variety of adverse impacts on health and welfare, including impaired respiratory function, eye irritation, necrosis of plant tissue, and deterioration of selected sysnthetic materials, such as rubber. Further information on these effects can be found in the U.S. Environmental Protection Agency (EPA) document entitled "Air Quality Criteria for Ozone and Other Photochemical Oxidants" (EPA-600/8-78-004).

At present, this industry uses only solvent-borne ink systems. The proposed standards would also allow the use of waterborne inks, but none have been successfully developed yet for the rotogravure printing method. Current research is being directed toward development of low-VOC, waterborne inks so that the proposed emission limit could be met without the use of emission control systems. The industry expects to develop waterborne inks in the next five to ten years.

All new web-fed (roll-fed) rotogravure presses used to print salable products, described under SIC Code numbers 27541 and 27543, would be the "affected facilities." These presses typically consist of 8 to 12 printing units. They are used to print magazines, catalogs, newspaper supplements, and advertising products, as well as other products. Existing rotogravure production presses in this industry which are determined to have been modified or reconstructed in accordance with 40 CFR.14 or 40 CFR.15 would also be subject to the proposed standards. There are expected to be very few, if any, such facilities. Installation of the higher speed, more efficient, and better electronically controlled newer presses will be more attractive than upgrading existing presses because of the highly competitive and fast growing nature of this industry. In addition, it would be easier to control VOC emissions from newer pressses than from older presses because modern presses are designed, for economic reasons, to minimize fugitive solvent vapor losses.

VOC emissions from ink and solvent storage and transfer facilities, as well as emissions from other printing operations would not be affected by the proposed standards. The emissions from storage and transfer facilities should normally be negligible compared to the printing press emissions. Additional presses that print other gravure products and different types of printing processes are sometimes housed within the same plant. The other sectors of gravure printing are slightly smaller and are not growing as rapidly as the publication sector. In addition, each gravure printing sector and other printing processes have different operating and emissions control characteristics. An attempt to cover entire printing plants would have, therefore, dramatically increased the complexity of the proposed standards. Air pollutant emissions from these other gravure presses and other printing processes may be regulated under future standards.

The smaller four-unit proof presses, used only to check the quality of the image formation of newly engraved or etched printing cylinders, would not be affected. These proof presses are operated intermittently and at much slower speeds compared to the production presses. The inks and solvents used at the proof presses are normally not metered, but are handled out of drums. The total solvent usage by proof presses in this industry is estimated to be about only one percent of the usage by production presses.

Selection of the Basis of the Proposed Standards

VOC emissions from publication rotogravure printing facilities could be controlled by either emission control systems, or by using low-VOC, waterborne ink systems. Emission control devices in this industry presently involve only solvent recovery, although solvent destruction (i.e. oxidation) could be used. The overall performance of control devices can be enhanced by installation of well-designed fugitive VOC vapor capture systems.

Control Technologies

The complete emission control system in a modern publication rotogravure

printing plant consists of two sections: the capture system and the emission control device system. The capture system is designed to gather the VOC vapors emitted from the presses. The captured vapors are then directed to a control device where they are either recovered or destroyed.

Most of the solvent used in the rotogravure printing process is driven off in the drying operation after the ink has been applied to the paper web. All new and existing presses have dryer enclosures and ductwork to capture and convey dryer exhaust vapors away from the press (e.g., to a control device). Vapors that are not captured by the dryers are called fugitive emissions. Of the total amount of solvent used at the press, 80 to 90 percent is captured by the dryers and the rest is fugitive. Fugitive emission capture systems can be designed to capture part of all of the fugitive vapors in the pressroom.

The capture efficiency of the dryers is limited by their temperature and the operating speed of the newer presses. Dryer temperatures range from ambient to about 120°C (250°F). The higher temperatures in this range can only be used on the units printing with black ink. Higher temperatures impair product quality and increase the frequency of web breaks. The increasing operating speeds of modern presses of over 10 m/s (2,000 fpm) limit the web's residence time in the dryers. Thus, significant amounts of fugitive vapors are emitted from the presses because of the limited dryer capture efficiency.

Facilities that capture only the dryer exhausts must install some type of ventilation to remove the fugitive solvent vapors from the pressroom. The solvent vapor concentration in the pressroom air must be kept below the level of OHSA regulations (29 CFR 1910.1000). The present OSHA time-weighted average (TWA), 8-hour exposure limit for toluene vapors is 200 ppmv. The allowable vapor concentration limits for the components of the naphtha-based mixed solvents range from 100 ppmv up to 500 ppmv. OSHA has a proration formula for determining compliance with vapor component mixtures.

A highly efficient capture system is necessary to achieve high overall emission reduction efficiencies. Fugitive solvent vapors, as well as the concentrated dryer exhausts must be captured. Some of the fugitive solvent vapors result from evaporated solvent in the ink fountains, from the exposed part of the gravure printing cylinder, and from exposed portions of the paper web before entering the dryers. Enclosed ink fountains and extended enclosed dryer designs of newer presses help to minimize the escape of fugitive vapors from these locations during press operation. However, these areas must be uncovered to obtain access to the press during shutdowns for web breaks, cylinder changes, or maintenance items. The major source of fugitive vapors from newer presses during operation is the paper web after exiting the dryers. Fugitive vapors are emitted from this source even during press shutdowns. In addition, the final printed product retains some of the solvent used at the press, and continues to be a source of fugitive vapors from the cutting and folding areas after leaving the press.

All of the products printed in this industry retain a small amount of solvent. The amount of retained solvent appears to vary from about one to seven percent of the total solvent used at the press, depending on the finished product. Product solvent retention is apparently influenced by the ink coverage, the use of varnish and other coatings, and the type of paper and inks used. The ultimate efficiency of any capture system is, therefore, limited by the amount of solvent retained in the printed product.

Three types of capture systems were evaluated. The first type, demonstrated at the facilities of Texas Color Printers, Inc., captured only dryer exhaust vapors while pressroom ventilation air was discharged to the atmosphere. Naphtha-based mixed solvents were used at these tested facilities. Test data for this capture system showed that the amount of ventilation air required represented about 30 percent of the total dryer exhaust and ventilation air removed from the pressroom. In addition, the solvent vapor content in the ventilation air accounted for about eight percent of the total solvent volume used at the press. The test results showed that the dryers alone captured as must as 85 to 89 percent of the total solvents used at the press. Calculated addition of the discharged fugitive solvent vapors to the dryer exhausts showed potential total capture effciencies of 93 to 97 percent. The remaining 3 to 7 percent represents solvent retained in the product.

A second type capture system was demonstrated at the newest facilities of Meredith/Burda, Inc. Cabin enclosures were installed over the top portion of the printing presses. Fugitive solvent vapors (toluene only at these tested facilities) from the paper web and from around the printing presses were pulled up through the cabin enclosures and then directed along with the dryer exhausts to a carbon adsorption system. Pressroom ventilation fans were not installed at these facilities. Test data showed capture efficiencies ranging from 94 to 97 percent. Solvent retained in the printed product thus represented the remaining 3 to 6 percent of the solvent used at the presses.

Application of the demonstrated Meredith/Burda cabin enclosure design may, however, present difficulties in meeting some OSHA regulations. Toluene vapor concentrations inside the enclosures were measured to be as high as 200 to 300 ppmv, during press shutdowns. These vapor concentration levels are within the ceiling limits of OSHA regulations; however, repeated exposure to these high concentrations, combined with pressroom ambient vapor concentration levels, measured at 40 to 200 ppmv, may cause some press operators to be exposed in excess of the 8-hour TWA limit. In addition, Meredith/Burda handles larger volume print orders than some printers in this industry. Some of the shorter-run products not handled by Meredith/Burda may cause more frequent web breaks and press shutdowns. The printing of these more troublesome products could require the press operators to enter a cabin enclosure more often than required at Meredith/Burda, thereby increasing their potential for exposure to solvent vapors. Press operating data supporting this reasoning were obtained for two types of products printed during tests conducted at both the Merdith/Burda and Texas Color facilities. The test results showed a wide range of actual press printing times of about 62 to 86 percent of the total test time, with shutdown frequencies averaging about 10 to 12 press shutdowns per equivalent 24 hour period. The magazine product printed at Meredith/Burda caused twice as many press shutdowns and a lower percentage printing time than the advertising product. At Texas Color, the advertising product caused more press shutdowns, but resulted in a slightly higher percentage printing time than the magazine product. Press shutdown data for other products printed in this industry were not available; however, these test results were consistent with general information provided by industry on typical operations.

The Administrator believes that for most facilities in this industry cabin enclosures could be designed to very effectively capture fugitive solvent vapors without violating OSHA regulations. As explained in Chapter 4 of the BID (Section 4.2.1), the Meredith/Burda capture system design could be improved to easily meet OSHA regulations by (1) modifications of the

cabin enclosure design, (2) modification of the pressroom air handling system, and (3) increasing the ventilation air flow rate through the cabin. The required increase in air flow rate would cause a decrease of less than 0.5 percent in the carbon adsorber efficiency. In addition, the use of naphtha-based mixed solvents rather than toluene would pose fewer problems in meeting OSHA regulations because of the higher allowable vapor concentration limits. On the other hand, the Administrator acknowledges that printing of some products handled by this industry might cause more press down time than other products, and thus a cabin enclosure design may not be a suitable capture system for some facilities.

A third type control system which captures all the pressroom air was demonstrated at the facilities of Standard Gravure, Inc. Naphtha-based mixed solvents are used at these facilities. This capture system is similar to what the potential Texas Color capture system would be with the fugitive ventilation air directed to the control device system. In addition, ventilation air from the cutting, folding, and product storage areas are captured at this plant and sent to a carbon adsorption system. EPA testing was not conducted at this plant because its control system was assumed to be less cost effective than the other systems just described. The amount of captured air needed to be treated with this design is much greater than for the other systems, causing it to be less economical. Plant data was obtained from Standard Gravure, however, and the Administrator believes these are of sufficient accuracy to be used in support of the proposed standards.

There are three alternative emission control devices which can effectively reduce the VOC emissions from a publication rotogravure press: solvent destruction (i.e. oxidation), fixed-bed carbon adsorption, and fluidized-bed carbon adsorption. Any of these systems can control 95–99 percent of the vapors they receive, but fixed-bed carbon adsorption is currently used almost exclusively in this industry.

Some modern solvent destruction devices could possibly be economical in certain cases. Conventional thermal oxidation would require large amounts of supplemental fuel. The operating costs could be reduced somewhat by utilizing waste heat recovery designs. Catalytic oxidation permits lower oxidation reaction temperatures, and therefore, requires about 50 percent less energy than thermal oxidation. A third technique involves regenerative thermal combustion. This method would probably be the most energy efficient, and thus most economical solvent destruction device. However, as the solvents used in this industry are refined from crude oil, they are expected to become increasingly expensive in the future. Recovery rather than destruction of captured solvent vapors is, therefore, expected to be the only economically justifiable control alterative for new publication rotogravure printing presses.

Fixed-bed carbon adsorption has undergone considerable research, development, and modification in recent years. Most of the corrosion problems of the past have been solved. Energy requirements, and thus operating costs for the fixed-bed system are greater than that of a fluidized-bed carbon adsorber system, but capital costs are less. Problems associated with the use of a fluidized-bed carbon adsorption system to control VOC emissions from publication rotogravure presses cannot be adequately assessed because available data is very limited.

The average operating efficiencies of fixed-bed carbon adsorption systems were determined during the two plant tests. The newest Meredith/Burda adsorbers operated at 97 to 98+ percent efficiency. The Texas Color plant adsorbers operated at 94 to 96 percent efficiency. The difference in performance results from higher inlet SLA vapor concentrations, lower outlet vapor concentrations, and better instrumentation controls at Meredith/Burda. The total VOC vapor concentrations at Meredith/Burda ranged from about 300 to 1,800 ppmv at the adsorber inlet and about only 10 to 30 ppmv at the outlet. The vapor concentrations at Texas Color ranged from about 70 to 1,000 ppmv at the inlet and about 20 to 300 ppmv at the adsorber outlet.

The average operating efficiency of the better designed carbon adsorption systems available to this industry should remain at or above the 97 percent level, when printing most products. Several carbon adsorption systems installed in this industry provide evidence that the carbon bed maintains the design "activity" for more than five years. Bed blockages from high molecular weight reaction products have not occurred with existing adsorption systems and solvent blends used in the publication rotogravure printing industry. Routine maintenance requires periodic filtering out of carbon fines, addition of makeup carbon, and repairing valve leaks. However, the capture system design affects the air handling requirements, as previously mentioned, and thus could result in lower adsorber efficiencies. Moreover, adsorber efficiencies may be somewhat lower when more troublesome, shorter run products are printed.

In summary, the standards as proposed are based on the use of fixed-bed carbon adsorption with a solvent vapor capture system. As previously explained, the facilities at both tested plant sites demonstrated that at least a 90 percent average capture efficiency can be expected when fugitive solvent vapors are captured along with the dryer exhausts from new presses. This conservative average efficiency allows for printing of products that retain larger amounts of solvent or that cause more fluctuations in the printing operations than were experienced during the two short-term plant tests. If only dryer exhausts are directed to the control device, then the average capture efficiency can be expected to be only about 85 percent, as demonstrated during tests at Texas Color. Older facilities treating only the dryer exhausts can be expected to achieve an average capture efficiency of about 84 percent. This lowest capture efficiency reflects an estimate of slightly more fugitive solvent vapor losses from the more exposed areas of older press designs. Modern carbon adsorber/solvent recovery control devices can be expected to achieve a long-term average performance of about 95 percent efficiency. Short-term efficiencies of the best demonstrated adsorbers may be higher at times, but this average efficiency accounts for the wide fluctuations of vapor concentrations in the solvent laden air (SLA) inlet to the adsorber. In comparison, older adsorber systems were designed to perform at about only a 90 percent average efficiency.

As an alternative emission control technique, this industry is researching the possibilities of using low-VOC, waterborne ink systems to reduce their VOC emissions. At present, waterborne inks have not been developed for publication rotogravure printing. In order not to discourage future development of waterborne inks, the proposed standards would allow printing of publication rotogravure products without air pollution control equipment if waterborne inks containing sufficiently low amounts of VOC are used. To qualify for this allowance, the VOC content would be limited to not more than 16 volume percent of the total volatile portion of the waterborne ink mixture as applied to the gravure printing cylinder.

Regulatory Alternatives

The overall reduction efficiency for VOC emission control systems is equal to the capture system efficiency times the control device efficiency. The expected average efficiencies for capture systems and control devices applicable to this industry were combined to develop three regulatory alternatives. The alternatives considered call for an overall VOC reduction at 75, 80, and 85 percent levels. Fixed-bed carbon adsorption systems were assumed as the control devices for all alternatives. Alternatives were not developed to represent VOC reduction by low-VOC, waterborne ink system usage without emission controls since waterborne inks have not been developed yet for this industry.

The first regulatory alternative is a 75 percent overall control level that represents capturing the dryer exhausts from older presses—baseline level. This corresponds to the CTG recommendation for existing facilities. This control level is achievable by capturing about 84 percent of the potential solvent vapors from the press, with a 90 percent adsorber efficiency.

The second regulatory alternative is an 80 percent overall control level that represents capturing the dryer exhausts from new, well-designed presses. In this case 85 percent capture would be required with a 95 percent efficient adsorber. This corresponds to a typical, modern facility. Overall emission reduction in the 80 to 84 percent range were determined from short-term test data and five months of plant data at Texas Color Printers. In addition, over four months of plant data from World Color Press showed four-week average overall control efficiencies ranging from 78 to 84 percent.

The third regulatory alternative is an 85 percent overall control level that represents capturing the dryer exhausts from newer presses, as well as some of the fugitive solvent vapors. This is intended to correspond to a 90 percent efficient capture system with a 95 percent efficient adsorber. This alternative represents application of the best demonstrated control technology. The fugitive vapors would be captured by—

- A partial enclosure fugitive vapor capture system that is vented to the control device; or
- A system of multiple fugitive vapor capture vents that are located around the press and collectively ducted to the control device; or
- Total pressroom ventilation air that is directed to the control device.

Overall control efficiency data for the three best demonstrated VOC emission reduction systems support the long-term average achievability of an 85 percent regulatory level. Four-week average overall control efficiencies reported by Standard Gravure range from 85 to 90 percent for over a year of typical operations. Corrected overall control efficiencies of 89 to 92 percent were demonstrated in short-term tests at the Meredith-Burda plant. In addition, data were obtained from this plant for normal operations over ten separate months indicating corrected overall control efficiencies ranging from 84 to 91 percent. Calculations using short-term test data combined with five months of plant data indicated that the Texas Color facilities might potentially achieve about 88 percent overall recovery by directing their existing floor sweep vents to the adsorber system, rather than to the atmosphere. these data show that considerable variation occurs in the long-term control performance; however, an average 85 percent overall control level is achievable, with performance dropping to a low point of about 84 percent for one or two months a year.

Environmental, Energy, and Economic Impacts

The incremental potential environmental, energy, and economic impacts of the two higher regulatory alternatives relative to the baseline alternative were determined through development of model plants, representing new facilities. Projections of these impacts were based on analyses of two model plant sizes, resulting in a total of six model plant cases. The small model plant consisted to two eight-unit presses; the large model plant consisted to four eight-unit presses. Only one press width of 1.83 meters (72 inches) with an operating speed of 10.16 m/s (2,000 fpm) was considered. There are some smaller and some larger existing presses; however, the press size chosen is the most common. Most modern rotogravure presses are designed to operate at about the speed chosen for study, although older presses operate at only about half that speed.

The control of VOC emissions from each model plant was based on solvent vapor capture systems combined with fixed-bed carbon adsorption/solvent recovery devices. Model plants were not developed for emission control by any other solvent recovery devices, such as fluidized-bed carbon adsorption, because sufficient operating information for use in this industry was not available. Also, model plants were not developed for analysis of VOC emissions control by solvent destruction devices (i.e., oxidation) since these devices are not presently used and not expected to be employed in the future by this industry. Furthermore, model plants representing the use of low-VOC, waterborne ink systems without emission control systems were not analyzed since waterborne inks are not expected to be developed for this industry for another five to 10 years. Since modified and reconstructed existing facilities are also subject to standards proposed under Section III of the Clean Air Act, model plants representing these affected existing facilities are typically developed. However, model plants representing these affected facilities were not developed because neither modification nor reconstruction is expected in this industry, as explained in a later section. The environmental, energy, and economic impacts on modified and reconstructed facilities to comply with the proposed standards would be essentially equivalent to those impacts on new facilities.

The seven percent annual real growth rate projected for this industry corresponds to about 75 new presses to be installed by the year 1985. Most of these new facilities will provide expansion capabilities; however, some of these new presses will simply replace old, worn-out existing presses, with no production expansion intended. Also, since modern presses operate at higher speeds with increased efficiency compared to older presses, the required utilization of new presses would be less than that for older presses to meet customer demands. No modifications or reconstructions are expected during this period. the annual total solvent usage in this industry will increase to about 236,000 megagrams by 1985. New Source Performance Standards (NSPS) set at the 80 percent control level would further reduce 1985 nationwide VOC emissions by about 4,000 megagrams per year over control at the 75 percent baseline level. An 85 percent regulatory control level would result in an additional reduction of 1985 VOC emissions by about 7,900 megagrams per year over that for baseline control.

Emissions of air pollutants from two secondary sources result form the energy required for operation of the carbon adsorption/solvent recovery control systems. First, required electrical power was assumed to be generated by coal/fired utilities (worst cast). Fuel combustion emissions from these power generation facilities are regulated under MSPS promulgated at 44 FR 33580 on June 11, 1979. Secondly, required steam

production or regeneration of the carbon beds results in fuel combustion emissions from the uncontrolled plant steam boilers. Total resultant secondary flue gas emissions from these two sources was estimated to represent about 0.5 percent of the corresponding VOC emission reduction from the publication rotogravure presses. Control ov VOC emissions from a typical four-press printing plant at the 80 and 85 percent levels would result in total secondary emissions of about two and five megagrams per year more than for control at the baseline level, respectively. In 1985, the nationwide total secondary emissions for control at the 80 and 85 percent levels would be about 25 and 100 megagrams more than for control at the baseline level, respectively. Corresponding incremental VOC reductions would be 4,000 and 7,900 megagrams for the 80 and 85 percent levels. Therefore, the resulting total air pollutants emitted from secondary sources only slightly offset the primary impact of reducing VOC emissions.

There are three potential sources of water pollution associated with carbon adsorption/solvent recovery systems. The largest source would be the dissolved solvent in the condensate discharged from the decanter section of the adsorber system. This condensate typically contains from 130 to 200 ppm solvent, but can be as high as 1.900 ppm solvent, depending on the solvent used and the temperature. Control of VOC emissions at the 80 and 85 percent levels would result in increased potential wastewater discharges of about seven and thirteen percent over that for baseline control, respectively. The VOC content in the condensate respresents less than 0.1 percent of the respective VOC emission reductions from the presses. Also, this potential water pollution source could be virtually elimiated by air-stripping the condensate and recycling the resultant solvent-free water as make-up feed water to the plant steam boiler. The solvent laden air from the stripping tower could be recycled to the adsorption beds. Alternatively, the condensate could be discharged to a conventional biological waste treatment system. A small amount of the dissolved VOC solvent would naturally evaporate out of the waste water during biological treatment, but these vapor emissions would be part of the 16 percent emission limit allowed under the proposed standards, and would not constitute any additional primary VOC emissions or any secondary air pollutant emissions. Dissolved organics and solids in the plant cooling tower and steam boiler blowdowns represent two minor sources of water pollution. The cooling tower water and steam usages increase in direct proportion to the amount of solvent recovered. The respective blowdown rates would thus increase correspondingly. All three waste water sources are subject to State and local effluent regulations for five-day biochemical oxygen demand (BOD_5), chemical oxygen demand (COD), and some specific compound contents.

There are two potential sources of solid waste material resulting from VOC emissions control by carbon adsorption/solvent recovery systems. Activated carbon used in the absorbers should last at least five years for service in this industry before replacement is required. The total amount of activated carbon used for control at the 80 to 85 percent overall recovery levels would be larger by about seven and thirteen percent over that for baseline control, respectively. In 1985, the amount of nationwide waste carbon for control at the 80 and 85 percent levels would be, respectively, about 42 and 85 megagrams more than for control at the baseline level. The second source of solid waste is the SLA filters, which are usually made of fiberglass material. Usage of the filters increases proportionately to the SLA flow rate. The amount of waste filters for control at the 80 to 85 percent levels would, thus, increase by about nine and 40 percent over that for baseline control, respectively. Some of the spent carbon can be regenerated and recycled. Likewise, some of the air filters can be cleaned and reused. The solid waste impact from emissions control at any of the three regulatory levels is not expected to cause any significant handling problems.

In the Administrator's opinion, these incremental environmental impacts for the two higher regulatory alternatives are reasonable.

There would be direct energy consumption increases for plants with affected facilities controlled at either of the alternative regulatory levels above 75 percent baseline control. Control of VOC emissions at the 80 percent level would require about seven percent more direct energy than at the 75 percent level. Similarly, control at the 85 percent level would increase energy consumption by about 18 percent over that for baseline control.

On the national level, there would be net energy savings for VOC emissions control at all of the regulatory alternative levels considered when the fuel energy value of the recovered solvent is included. Fuels and organic solvents can both be derived from a common source of crude oil. A decrease in the demand for solvents will thus increase the potential for fuel availability. The net energy savings in the year 1985, compared with baseline control, would be increased by about the equivalent of 15,600 and 21,800 barrels of fuel oil per year for controlling new press emissions at the 80 and 85 percent levels, respectively.

The Administrator believes that the direct incremental energy impacts on the industry for the 80 and 85 percent control levels are reasonable, particularly in view of the net national energy savings which would result from decreased solvent demand.

The economic impacts of the regulatory alternatives were analyzed in terms of capital investment requirements, total annualized costs, and affects on product price and profitability. VOC emissions control equipment would represent a significant fraction of total plant capital investment at any level of control, although the incremental capital costs required for either plant size to attain higher levels of control would be very small compared to control at the baseline level. The installed capital investment for a baseline level VOC emissions control system for a four-press plant would represent about 5.5 percent of the controlled plant's total cost; VOC controls for a two-press plant would represent about seven percent of the total costs. The total plant installed capital cost for control at the 80 and 85 percent levels, relative to the cost for baseline control, would increase by about 0.5 and two percent, respectively.

The capital investment in the model plant carbon adsorption systems were mainly influenced by the air flow handling requirements. Model plant characteristics, representing current practice in this industry, included usage of naphtha-based solvents with dryer exhaust vapor concentrations at the 19 to 20 percent of the Lower Explosive Limit (LEL) level. The LEL is the lowest vapor concentration in air, expressed as volume percent, at which the mixture could support a flame or explosion at temperatures below 121°C (250°F). Insurance safety regulations require normal operation at less than about 25 percent of the LEL. Operation up to 50 to 60 percent of the LEL is permitted when continuous vapor monitoring systems are employed to control the vapor concentration in the air.

The cost value of the recovered solvent would provide for annualized cost savings and positive return on investments (ROI) for emissions control for all six model plant cases studies.

Annualized cost savings and ROI for the emission controls increase in going from 75 to 80 percent overall control as a result of the additional solvent recovered from dryer exhausts. However, the savings and positive ROI decrease in going from 80 to 85 percent control because of the added costs of capturing and treating fugitive vapors. A profit-maximizing operation would therefore practice about 80 percent overall control. ROI for emission controls with the large model plant is about ten percentage points higher at all three control levels than that for the small plant. These analyses are based on the cost value of recovered solvent at the early 1979 market price of $0.17 per liter ($0.65/gallon). The increment in cost savings are much more favorable for both the 80 and 85 percent control levels when projected late 1979 conditions are assumed (i.e. solvent cost value at $0.24 per liter ($0.90/gallon) with 10 percent increased operating and capital costs). The late 1979 conditions reflect inflationary price increases in the cost of solvent and yield more favorable economic impacts for solvent recovery.

An 85 percent solvent recovery requirement would not pose any problems of capital availability and thus, would not restrict industry growth. The average pre-tax profit for this industry with baseline controls is about eight percent of the total sales. For control at the 85 percent level, small sized plants' profitability would only decrease by about 0.2 percentage points at both the early and late 1979 economic conditions; profitability for larger sized plants would decrease by an estimated 0.1 percentage point. No measurable price increases for gravure products would occur with VOC control at any of the three regulatory alternatives considered. The Administrator believes that the incremental economic impacts for the 80 and 85 percent regulatory alternatives are reasonable.

In summary, the model plant analyses show that the impacts associated with 85 percent overall control are the most reasonable of the three regulatory alternatives considered. The environmental impacts of the 85 percent alternative would not pose any major wastewater or solid waste problems, while providing a significant increase in the primary benefit of VOC reduction. National energy consumption would decrease compared with that for baseline control because of the fuel energy value of the extra recovered solvent. Finally, the cost value of the recovered solvent would provide for annualized control cost savings for the 85 percent alternative. While this cost savings is less than the savings that could be achieved at the 75 to 80 percent regulatory levels, the economic impact would not adversely affect profit margin and thus industry growth. Moreover, publication gravure product prices are not expected to increase noticeably.

Selection of Format for Proposed Standards

Three formats were considered for the proposed standard: (1) a mass emission rate related to unit production, (2) a concentration limitation and (3) a percentage overall reduction or emission limit.

A fixed emission percentage limit format, or overall percentage reduction, is selected because it provides the only adequate measure of actual VOC emissions control. A variable emission percentage limit corresponding to a fixed VOC emission rate allowance per unit of applied solids is not necessary for this industry. A characteristic of rotogravure printing is that the solvent to solids ratio of the applied ink mixture can only vary within a narrow range and still have the correct fluid properties for high quality printing. For solvent recovery control systems, the average emission percentage can be determined over long-term periods by simple comparison of the total liquid volume amount of recovered solvent to the total liquid volume amount of solvent used at the facility. This format allows for determination of compliance without the necessity for monitoring of any gas streams, and inherently indicates whether or not VOC vapors are being adequately captured. Also, the VOC retained by the printed product is accounted for with this format. Finally, an emission limit format is simple to use and insensitive to the many process fluctuations, upsets, variations in product types, and variations in the captured SLA VOC vapor concentration.

An allowable VOC vapor concentration in the gas streams vented to the atmosphere would appear to be the easiest format for standards enforcement. However, a typical printing facility may have numerous direct atmospheric vents, as well as, the exhaust stream out of the control device. Short-term monitoring of all the vents may be feasible, but continuous on-line monitoring of all vents would be very expensive. Moreover, monitoring of just the control device exhaust stream would not provide for sufficient indication of effective capture of VOC vapors emitted from the facility. In addition, the amount of VOC retained by the printed products can not be determined by monitoring just the VOC vapor concentration of the gas stream vents. Furthermore, concentration limitation formats are susceptible to dilution problems, which can cause poor indication of true emission rates. Thus, a concentration limitation would not be a suitable standards format for this industry.

The printing of rotogravure products is characterized by the variable amounts of solvent usage and ink coverage on the paper web. There is no fixed relationship between the amount of solvent used, or VOC emitted, and the bulk quantity of printed products. Therefore, a mass emission rate per unit of product format is inappropriate for this industry.

For solvent recovery control systems, an overall solvent volume balance around the affected facility is selected to be used with the emission percentage limit format. Most new rotogravure printing plants install liquid volume meters for process monitoring and control, and for customer billing purposes. Meters are used to measure the amount of ink and related coatings, and solvent used for printing and cleaning at the facilities. A meter also measures the amount of liquid solvent recovered by the adsorption system. The total amount of solvent used would be determined by the liquid meter readings combined with the VOC content analyses of the purchased raw inks and related coatings. The total amount of recovered solvent would be determined by the liquid meter readings combined with miscellaneous liquid volume amounts of unmetered waste solvent and waste inks from the affected facility. Subtracting the total amount of solvent recovered from the total amount of solvent used and then dividing that result by the total amount of solvent used would complete an overall solvent balance, and determine the VOC emissions percentage for the affected facility.

The same overall solvent volume balance and emission percentage limit format would be used when more than one affected facility is controlled by a common solvent recovery system. For these cases, the total amount of solvent used would be the collective volume amounts for all associated affected facilities.

The VOC emissions from some existing and affected facilities could be controlled in common by the same solvent recovery system. Some existing control systems were originally oversized in order to handle future press installations. In addition, new carbon adsorption systems could be installed to control emissions from affected presses, as well as some uncontrolled existing presses. For these combination cases, the same overall solvent volume balance

and emission percentage limit format would be used. The proposed standards would still apply to only the affected facilities. Determination of compliance for the affected facilities in these combination cases is explained in the Compliance Provisions section.

Some plants may decide to capture and recover the relative small amount of solvent vapors from existing or new proof presses. Captured VOC vapors from either of these operations could be sent to the emissions control systems for affected facilities; however, the proposed standards would still apply to only the affected facilities. The ink and solvent usage at the proof press would not have to be accounted for in determining compliance with the proposed standards.

In principle, the same emission percentage format could be used with solvent destruction emission control devices. Procedures for determination of the emission percentage with these control devices are not being proposed, however, because these control devices are not presently employed by this industry, and are not expected to be used in the future. The Administrator will welcome comments on whether this expectation is a reasonable assumption.

The emission percentage format would also be used for affected facilities using low-VOC, waterborne ink systems without emission controls. The actual emission percentage would not be determined for these cases, however. Instead, the affected facility would be determined to be in compliance with the proposed emission percentage limit if the VOC content is not more than 16 volume percent of the total volatile portion of the waterborne ink mixture as applied to the gravure printing cylinder. Since there are no waterborne inks presently used in this industry, a suitable analysis method could not be developed for determination of the VOC content in the ink mixture as applied. Therefore, in the absence of test data a allowable VOC to solids volume ratio for purchased inks and coatings was developed on a theoretical basis to correspond to the proposed 16 percent emission limit. A general material balance for typical solvent-borne ink systems usage showed that the ink mixture as applied contains an average of 20 volume percent solids and 80 volume percent VOC. An allowable 16 percent emission of the VOC content shows that an equivalent waterborne ink mixture would have to have a VOC to solids volume ratio of less than or equal to 0.64. Thus, if only water were added to dilute the raw inks and related coatings, the ink manufacturer's analysis data on the purchased inks and coatings could be used to determine compliance with the proposed emission limit.

Liquid metering devices would not be required with waterborne ink systems provided that only water is added for ink dilution. If VOC solvent were added for ink dilution, liquid meters would be required to facilitate calculation of the VOC content in the applied ink mixture. The Administrator believes that the stipulation for water dilution only is reasonable for two reasons: (1) Not having to install liquid meters should provide an extra incentive for using waterborne ink systems, and (2) If ink formulation technology advances far enough to develop useable low-VOC, waterborne inks, there should be no need nor desire to dilute the ink with VOC solvent.

Selection of Numerical Emission Limits

The proposed 16 percent emission limit, or 84 percent overall reduction, is the maximum control level judged by the Administrator to be achievable on a continual basis by the best demonstrated system of emission reduction. The most stringent regulatory alternative considered, requiring 85 percent overall control or a 15 percent emission limit, is achievable most of the time and has, in the Administrator's judgment, acceptable environmental, energy, and economic impacts. However, long-term plant data showed that a 15 percent emission limit might not be achievable during one or two months over a year's operation. Therefore, the emission limit has been set at 16 percent to accommodate this expected variation in overall control efficiency. As noted previously in the control technologies and regulatory alternatives sections, the proposed overall emission control level of 85 percent has been demonstrated by existing facilities employing VOC vapor capture systems of greater than 90 percent efficiency combined with solvent recovery devices of greater than 95 percent efficiency. These efficiencies were first of all achieved during tests at the newest Meredith/Burda facilities. Secondly, tests conducted at Texas Color Printers showed that those facilities could potentially achieve the 85 percent overall control level. Thirdly, more than a year of data reflecting normal operation at Standard Gravure showed long-term achievement of the 85 percent level. Finally, evaluation of more data from Meredith/Burda covering ten months of normal plant operation caused the Administrator to select 84 instead of 85 percent overall control as the correct basis for the proposed emission limit.

The newest facilities at Meredith/Burda were tested after observation revealed that these modern facilities employed the best continuous fugitive VOC vapor capture system combined with a thoroughly instrumented, modern carbon adsorption/solvent recovery system. The two presses involved in the tests consisted of eight printing units each and were printing a magazine and an advertising product at average press speeds of 4.6 to 9.6 m/s (900 to 1,900 f/m), while using toluene as solvent. Overall liquid solvent volume balances were conducted during three separate nine-hour runs, and over 50 hours of normal printing operations. The normal operations involved numerous press shutdowns and startups for web breaks and other typical problems. Liquid meter readings and manufacturers data on the VOC content of the purchased raw inks and related coatings were used as first calculations of the overall solvent volume material balances. As explained in Chapter 4 of the BID (Section 4.1.2), the apparent overall VOC control efficiency results were then reduced by five percent to compensate for two unique characteristics at these facilities. A two percent factor was required for the density variation of the higher metered temperature of the recovered solvent over the assumed metered temperature of the raw inks and toluene used at the presses. An additional three percent factor was required for infiltration of toluene vapors from neighboring pressrooms. The results of supplemental measurements showed that some air containing 60 to 70 ppmv toluene vapors was drawn into the newest pressroom from other pressrooms and plant areas. The final adjusted tests results showed overall solvent recovery efficiencies ranging from about 89 to 92 percent. In addition to the short-term test results, ten individual months of plant material balance data were compensated for the temperature and infiltration factors resulting in adjusted overall VOC control efficiencies ranging from about 84 to 91 percent.

The test results and reported plant data on the overall VOC control efficiency by liquid meter readings are believed to be based on the most accurate measurements that continuous modern instrumentation can provide. The meters were not calibrated before testing, however the tests were conducted within six months after the new meters were installed and should still have been within the original factory calibrations. Also, the meter

readings were not cross-checked with storage tank level readings, but the Administrator believes that the liquid meters should be more accurate than solvent inventory by tank level readings.

The capture system demonstrated at Meredith/Burda consisted of dryer exhaust collection combined with fugitive vapor cabin enclosures around the top portion of each press. The cabin enclosures represent the most effective VOC vapor capture system, requiring the least amount of SLA handling to capture essentially all fugitive vapors from the presses. However, as explained in the "Control Technologies" section, application of this type enclosure may require some modifications to alleviate potential OSHA violations.

The product mix handled at Meredith/Burda is somewhat specialized and is therefore not fully representative of the entire publication rotogravure printing industry. Meredith/Burda handles special long run products, while most other plants print shorter run products. The shorter run products cause more frequent web breaks and press shutdowns during printing, as well as more press downtime between job runs. In addition, some of the industry's products may retain more solvent than the products printed at Meredith/Burda, although there is no known satisfactory method for this determination. Therefore, the high VOC vapor capture efficiencies demonstrated at Meredith/Burda may not be representative of that achievable by the rest of the industry.

It was realized that the Meredith/Burda facilities had several unique features so facilities at a second plant site were tested. The two Texas Color Printers facilities were tested because they were modern printing facilities which use the more common mixed, naphtha-based solvent. Unfortunately, the facilities did not employ a fugitive vapor capture system and the solvent recovery system was not as well instrumented as that at Meredith/Burda. The tested presses consisted of eight and twelve printing units each and were printing a magazine and advertising products at average press speeds of 4.6 to 9.1 m/s (900 to 1,800 f/m). Overall liquid solvent volume balances and gas phase monitoring of pressroom ventilation air streams were conducted during three four and one-half hour runs. In addition, a solvent volume balance was conducted over a 27 hour period of normal operation. The test results from direct liquid meter readings, ink manufacturers data, and the gas phase monitoring showed that overall solvent recovery efficiencies ranging from about 91 to 93 percent could potentially be achieved if the pressroom ventilation air streams were directed to the control device rather than to the atmosphere. However, combination of the test data with five months of plant data indicated potential overall solvent recovery efficiencies of only about 88 to 90 percent. The lowest calculated potential efficiency, in each case, was based on a one percent decrease in adsorber efficiency which would result from the 30 percent increase in the captured SLA flowrate. The highest calculated potential efficiencies would correspond to increased adsorber efficiencies from modification and better instrument controls comparable with those at Meredith/Burda.

A third data source considered in setting the proposed emission limit level consists of over a year of plant data from Standard Gravure. This plant is regarded as having the most thorough capture system; however, the average adsorber efficiency is probably lower than Meredith/Burda's because of the lower solvent vapor concentration in the inlet SLA. At this plant, the VOC emission control system performance is determined by overall liquid solvent mass balances, instead of volume balances. Converted recovered solvent meter readings are compared to total amount of solvent used, determined from converted solvent addition meter readings plus tank truck weighings of purchased raw inks combined with ink manufacturers VOC analysis data. Six rotogravure production presses, consisting of eight to 16 printing units each, are used to print only newspaper supplements at average press speeds of 6.6 to 7.6 m/s (1300 to 1500 fpm). The mixed, naphtha-based type solvents are used at these printing facilities. The long-term plant data showed individual four-week averaged overall recovery efficiencies ranging from 85 to 90 percent. The plant suggested that the inlet SLA vapor concentration, and thus the adsorber efficiency, is lower during periods of less solvent usage because the SLA capture system has no turndown or valve diverting mechanisms. The overall recovery versus solvent usage data, however, does not show any definite correlation.

The Administrator believes that the Standard Gravure plant data should be included as part of the data base for setting the proposed emission limit level, even though EPA testing was not conducted at this plant. These plant data serve as additional sources of long-term performance data, which have been shown to be more realistic than short-term tests for evaluating the achievable overall emission control performance. The Standard Gravure plant data show overall efficiencies continually above the proposed standard 84 percent level (16 percent emission limit). The normal plant procedure for determining the emission control system performance does not follow the exact format for the proposed standards, but the Administrator believes that the method used should provide sufficient accuracy for supporting the proposed emission limit.

The variations in press widths, press operating speeds, and number of printing units per press can significantly affect the overall efficiency of a carbon adsorption/solvent recovery system. Operating conditions such as a narrow web being printed on a wide press, decreased ink coverage, and technological advancements allowing press speeds of over 10.2 m/s (2,000 fpm) could cause decreased capture efficiency and excessive dryer exhaust SLA dilution. These effects were shown during the two plant tests while printing both narrow and full width webs with several different products and ink coverages.

The Administrator acknowledges these potential effects and believes that they can be minimized by careful design of new presses and the SLA capture system. A VOC vapor monitor could be installed in the dryer exhausts streams to control the amount of internal air recirculation; this would maximize the VOC vapor concentration in the SLA stream treated by the control device. Adjustable width openings for the dryer inlets and outlets could be designed to help minimize the amount of dilution air drawn into the dryer. These adjustments could be made when the printing cylinders are changed between job runs. More thorough dryer designs will need to be utilized to handle the higher press speeds. In addition, fugitive vapor capture-air systems incorporating valve-diverting or turndown mechanisms could be installed for periods of low production and press shutdowns. The Administrator believes that the proposed standards allow for these effects, since the emission limit is based on long-term, typical operations while printing various types of products at three different plants.

In conclusion, the Administrator selected the proposed 16 percent emission limit after a thorough evaluation of the data base and a careful consideration of factors which influence control system performance. The data base consists of short-term test data and long-term plant data for facilities at the Meredith/Burda and Texas Color plant sites, along with long-

term plant data from Standard Gravure. The data base shows that 90 percent overall control is achievable under some conditions; however, the Administrator realized that 90 percent control is not representative of all conditions for the entire affected industry. The Administrator believes that the proposed 16 percent emission limit (84 percent overall control) is reasonable and is continually achievable. The proposed emission limit level allows for control efficiency variations resulting from such factors as low solvent usage, solvent retention in the product, and printing products that cause frequent production delays.

Selection of Compliance Provisions

Performance Averaging and Reporting

After the required initial performance test is completed, continual compliance with the proposed standards would be determined on a calendar month averaging basis. Each calendar month would be considered a performance test. The results of the monthly compliance determinations would have to be reported within ten calendar days following the end of any calendar month for which non-compliance is determined. Reporting of performance test results showing compliance with the standards would not be required. As an alternative, four-week averaging compliance periods may be chosen by an owner or operator in order to coincide with the plant's normal accounting procedures. Affected facilities would be subject to potential enforcement action for any compliance period in which a violation of the proposed standards is determined.

The variability of rotogravure printing requires a long-term averaging period to adequately assess the true performance of fixed-bed carbon adsorption/solvent recovery systems. Several different types of publication and advertising products are printed with a wide range of coverage of ink and related coatings. Operating parameters such as press speed, web width, production run length (number of printed copies), press shutdown frequency, product solvent retention, liquid hold-up volume of printing unit ink fountains, and solvent hold-up volume in carbon adsorbers vary substantially within this industry on a daily basis. The combination of these factors influences the amount of solvent vapors generated and the performance of the emission control system. The Administrator believes that calendar monthly or four-week period averaging would allow enough time for printing operation fluctuations to average out.

The necessity for longer-term averaging periods, such as over several months, was considered. The emission limit increase from 15 to 16 percent on a calendar month averaging basis was selected for proposal instead of an option for allowing performance averaging over several months with the 15 percent emission limit alternative. The long-term adjusted Meredith/Burda data showed that a minimum averaging time of four calendar months would have been required on a rolling calendar month basis to meet continual achievability of the 85 percent regulatory alternative.

Initial Performance Test

For affected facilities controlled by solvent recovery systems, the initial performance test would cover 30 consecutive calendar days. The long-term test period was chosen to allow sufficient time for averaging of process variations. A certain number of test days is specified rather than a calendar month so that the initial test could begin as soon as the facility is ready without having to wait until the first day of a month. Determination of compliance during the initial performance tests during the succeeding months or four-week periods, as described in the FORMAT section.

The apparent overall solvent volume balance calculation would have to be density corrected to a base temperature to compensate for the temperature differences between the recovered solvent and the ink/solvent used at the press. This requirement is necessary because of the volumetric expansion of liquid solvent with temperature. Temperature indicators would have to be installed by each meter for the inks, coatings, and solvent used at the press. An automatic temperature compensator would have to be installed for the recovered solvent meter. The temperature of the metered liquids used at the press would probably represent a constant and uniform base temperature at about 20°C (69°F) since the liquids should be at ambient temperature and the meters would be located inside the pressroom. The temperature of the metered recovered solvent can vary from ambient to over 40°C (104°F), depending on the condenser and cooler designs and performance. Since automatic temperature compensators are employed, only direct meter readings would be required.

For affected facilities controlled in common with existing facilities by the same solvent recovery system, the initial performance test would also cover 30 consecutive calendar days. The existing facilities involved would have to install liquid meters and temperature monitoring devices just as required of affected facilities. Raw ink and related costing supplies used at the subject existing facilities would have to be analyzed for VOC content just as for affected facilities. The initial performance test would be performed with both affected and existing facilities simultaneously connected to the solvent recovery system, although only the affected facility would be subject to the proposed standards. For these combination cases, one of two options may be chosen for the initial determination of compliance for the affected facilities.

The first compliance determination option would require a separated initial emission test for the controlled existing facilities involved before the initial performance test is conducted. To determine the true control performance for the affected facilities involved, the amount of VOC emissions from the existing facilities would first need to be subtracted from the total emissions for the combined facilities controlled in common. The separate emission test would determine the average operating emission percentage for the controlled existing facilities by using the overall solvent volume balance procedures developed for affected facilities. The emission test would be performed on the controlled existing facilities without the affected facilities being connected to the emission control system. The emission test would cover 30 consecutive calendar days. Only on existing facilities sharing control systems with affected facilities would emission testing be required. Initial compliance of the affected facilities would then be determined by the initial performance test after being connected to the emission control system with the existing facilities. The existing facilities' tested average emission percentage would then be multiplied by the 30-day total volume of solvent used at only the existing facilities during the initial performance test to determine the amount of VOC emissions from only the existing facilities. The performance of the affected facilities would finally be determined by subtracting the VOC emissions of the existing facilities from the total solvent volume balance for the combined affected and existing controlled facilities.

The second compliance determination option for the combination cases would not require separate testing of existing facilities, but would require more thorough control of emissions from existing facilities.The combined performance of the affected and existing

controlled facilities would have to show compliance with the proposed 16 percent emission limit. Fugitive emissions would have to be captured at the existing facilities to meet the emission limit. From an environmental impact view, this option would be the more favorable choice.

Initial performance test compliance provisions for affected facilities controlled by solvent destruction devices (i.e. oxidation) are not being proposed. These control devices are not presently used by this industry and are not expected to be employed in the future.

For affected facilities using low-VOC, waterborne ink systems without emission control systems, the initial performance test would cover 30 calendar days. Determination of compliance during the initial test would be by VOC analysis data of the purchased raw inks and related coatings used at the affected facility. The affected facility would be in compliance with the proposed 16 percent emission limit provided that the VOC to solids volume ratio is less than or equal to 0.64 for each shipment of all purchased raw inks and related coatings, and only water addition is used as dilution.

Subsequent Performance Tests

For solvent recovery controlled facilities, the second performance test would start with the first day of the next calendar month following completion of the initial performance test or the following Monday for facilities using the four-week averaging period. The period between completion of the initial performance test and the start of the second performance test would not constitute a performance test.

Determination of compliance with solvent recovery systems would be by liquid meters and analysis of all solvent-borne inks and related coatings used at the press. Non-resettable totalizer meters would have to be permanently installed to determine the volume quantities of solvent addition and inks and related coatings used at the press. In addition, a non-resettalbe totalizer meter would be required for the recovered solvent stream from the solvent recovery decanter. Meter readings would have to be taken and recorded during each day of press operation. Daily meter readings would also serve to detect meter malfunctions, and account for the times when the totalizer's reading turns over to zero. Volumetric quantities of any waste inks and waste solvent from the tested facility would be determined using any suitable means approved by the Administrator and recorded as they occur. The VOC volume content analysis of each shipment of ink and related coatings could be obtained from the ink manufacturers. Alternatively, a routine weekly average VOC content could be determined by analysis of the liquid mixtures in the respective storage tanks.

The overall solvent volume balance format, previously described, would then be applied at the end of each performance test averaging period to determine the actual averaged emission percentage and compliance. The total volume amount of solvent in the inks and related coatings would be determined from a summation of several calculated quantities. The VOC volume fraction of each purchased liquid mixture would be multiplied by the respective volume amount of liquid used. This proration is required to compensate for liquid mixture analyses which may change somewhat with each shipment. Alternatively, a weekly average VOC volume fraction for each liquid used could be multiplied by the volume amount of the respective liquid mixture used that week. In either case, the volume amounts of each liquid mixture used at the press would be determined directly from meter readings. The amount of solvent added for printing and cleaning at the press, and metered recovered solvent would be determined directly from meter readings. The quantities of waste inks and waste solvent would be included directly as recovered solvent. Analyses of these two sources of solvent would not be required since they should normally represent relatively insignificant quantities.

The proposed standards would require that the liquid meters necessary for determining compliance be calibrated at least every six months. This requirement is in accordance with maintenance recommendations by most meter manufacturers. This calibration would be done onsite, or the meter could be removed for calibration while a calibrated spare meter is used in its place. The confidence limits of each calibration must be determined and kept on record. Manufacturer's data on some of the liquid meters currently installed in this industry were used to set meter accuracy requirements. Meters used for the inks and related coatings would have to show an accuracy of within ± 1.5 percent. Meters used for solvent added at the press and recovered solvent would have to show an accuracy of within ± 0.5 percent, since solvent doesn't contain any solids and is an easier metering service.

For affected facilities controlled in common with existing facilities by the same solvent recovery system, the subsequent performance tests would follow the same procedures used during the initial performance test. If prior to the initial performance test the option to test the existing facilities separately was chosen, the averaged performance of the affected facility during each month or four-week performance averaging period would be calculated considering the existing facilities' tested emission percentage. Each existing facility's tested emission percentage would be assumed to remain constant for each performance average period until the Administrator requests another emission test for that existing facility. If the option to not test the existing facilities prior to the initial performance test was chosen, the combined performance of the affected and existing controlled facilities would have to show compliance with the proposed 16 percent emission limit during each month or four-week averaging period.

Procedures for determination of compliance with solvent destruction devices are not being proposed, as previously explained.

The affected facility must be in compliance with the proposed emission limit during all periods of normal operations. Non-compliance would be allowed during periods of startups, shutdowns, and malfunctions of the emission control system as provided for under 40 CFR 60.8(c). However, the startups and shutdowns caused by web breaks and other typical operations upsets would be considered normal operation of printing presses.

Determination of compliance for affected facilities using waterborne ink systems, without emission controls, would be by VOC analysis data from the ink manufacturer, as explained for the initial performance test. Liquid meters would not be required, provided that only water is added for ink dilution.

Selection of Performance Test Methods

Reference methods, equivalent methods, alternative methods, or procedures specified in a regulation must be used for performance tests. This section describes the methods and procedures proposed for this standard.

The proposed Reference Method 29, "Determination of Volatile Matter Content and Density of Printing Inks and Related Coatings", would be employed to determine the VOC volume content of all solvent-borne inks and related coatings used at presses controlled by solvent recovery systems. As an alternative, an owner or operator may obtain analysis data on the VOC

content of the purchased inks used from the ink manufacturer. Reference Method 29 could be used for verification of the ink manufacturer's data, if needed. Reference Method 29 would be applicable for analysis of only solvent-borne inks and related coatings. The proposed method could not be used for verification of ink manufacturer's data on the VOC content of waterborne inks.

The proposed Reference Method 29 determines the total amount of volatile matter content in solvent-borne inks and related coatings. Employment of this method for determination of VOC content requires that the volatile portion of the solvent-borne coating must be assumed to consist of essentially all organic compounds. That is, as proposed, the method does not provide procedures for determination of any water content (e.g. by Karl Fischer titration) and subsequent correction for the actual VOC content. It is the Administrator's understanding that all present and future solvent-borne inks and related coatings will usually contain much less than one percent water in the volatile portion, but, at most, up to about five weight percent water. The Administrator will welcome comments on the proposed Reference Method, especially regarding (1) the assumed range of water content in solvent-borne inks and related coatings, (2) the necessity for correcting the Reference Method analysis for water content, and (3) any recommended analytical procedures for accurately determining the water content.

The VOC content data supplied by the ink manufacturer for the purchased raw inks and related coatings should be based on the best method available to the manufacturer. Calculated compositions from liquid meter readings or weigh-tank outages used for measuring the amounts of the individual components that go into making up the product ink mixture may be considered. An analysis method similar to the proposed Reference Method 29 may be used. In general, however, formulation guidelines data are not regarded as the most reliable method since the actual composition of the ink mixture shipment can vary somewhat from the formulation recipe.

For affected facilities using low-VOC, waterborne ink systems without air pollution control equipment, no Reference Methods would be applicable. The owner or operator could determine the VOC content analysis of the purchased inks and coatings by any method acceptable to the Administrator. A reference method for verification of waterborne ink analysis is not being proposed.

Modification/Reconstruction Considerations

Any number of printing units is considered a single press if all the units are capable of printing simultaneously on the same continuous substrate. Since additional units could be added to an existing press to increase its versatility, it is highly unlikely that other units of the same press would be shutdown. Each unit is potentially an equal source of emissions; therefore, the addition of units would cause an incremental increase in emissions and would be considered a modification as defined in 40 CFR 60.14.

A major renovation in which substantial portions of an existing press are replaced is considered a reconstruction according to the provisions under 40 CFR 60.15. If the capital cost of the new components exceeds 50 percent of the total replacement capital cost of a new printing press, the existing press would be considered reconstructed and subject to the proposed standards. This could be achieved by replacement of more than half the units of a press. It is unlikely that only a portion of the units of a press would be replaced, since all the units receive the same use and care. If extensive replacement is indicated, it is more likely that all units will be replaced at once.

As previously mentioned, model plants representing modified and reconstructed existing facilities were not developed because these cases are not expected in this industry. Advanced technological designs of modern printing presses and associated equipment makes the installation of newer presses much more attractive over attempts to upgrade older presses. However, the Administrator believes that both modified and reconstructed existing facilities could achieve the proposed emission limit with reasonable environmental, energy, and economic impacts. These impacts would be essentially equivalent to those impacts for new facilities. Installation of a fugitive vapor capture system would be necessary for each subject facility or for the entire associated pressroom, if fugitive vapors are not already captured. In addition, improvements or modernization of older emission control devices and associated instrumentation may be necessary. Alternatively, low-VOC, waterborne ink systems could be employed to comply with the proposed standards.

Impacts of Reporting Requirements

The "Reports Impact Analysis of New Source Performance Standards for the Publication Rotogravure Printing Industry" is located in Docket No. A-79-50, category 77/8-II-A-11. The results of the analysis are summarized in this section.

The authority for the reporting requirements necessitated by the proposed standards is provided in Section 114 of the Clean Air Act. Several types of reports would be required. The industry would be required to submit notifications of the following: construction, anticipated start-up, actual initial startup, physical or operational changes, and initial performance tests. A report of the initial performance test results would be required. Monthly non-compliance reports would be required; the industry would not be required to submit monthly performance test results when compliance with the standards is determined. Records of startups, shutdowns, and malfunctions of the air pollution control systems, and monthly performance test results would have to be maintained for two years. The industry would also be required to maintain records of daily meter readings, ink analyses, and liquid meter calibrations.

The reporting requirements would necessitate the industry to hire about five additional personnel to cover about 22 person-years over the five years of applicability of the standard. There are presently 17 parent companies in this industry. Thus, less than one-third of an extra person's time would be required per company. This estimate was based on the projection of 7 percent annual real growth in the publication rotogravure industry. Seventy-five new presses would be affected over the five-year period, for an average of 15 presses per year.

Public Hearing

A public hearing will be held to discuss the proposed standards in accordance with Section 307(d)(5) of the Clean Air Act. Persons wishing to make oral presentations should contact EPA at the address given in the ADDRESSES section of this preamble. Oral presentations will be limited to 15 minutes each. Any member of the public may file a written statement before, during, or within 30 days after the hearing. Written statements should be addressed to the Central Docket Section address given in the Addresses section of this preamble.

A verbatim transcript of the hearing and written statements will be available for public inspection and copying during

normal working hours at EPA's Central Docket Section in Washington, D.C. (see Addresses section of this preamble).

Docket

The docket is an organized and complete file of all the information submitted to or otherwise considered in the development of this proposed rulemaking. The principal purposes of the docket are (1) to allow interested parties to readily identify and locate documents so that they can intelligently and effectively participate in the rulemaking process, and (2) to serve as the record in case of judicial review.

Miscellaneous

As prescribed by Section 111, establishment of standards of performance for publication of rotogravure printing presses in the graphic arts industry was preceded by the Administrator's determination (40 CFR 60.16, 44 FR 49222, dated August 21, 1979), that the graphic arts industry contributes significantly to air pollution which may reasonably be anticipated to endanger public health or welfare. In accordance with Section 117 of the Act, publication of this proposal was preceded by consultation with appropriate advisory committees, independent experts, and Federal departments and agencies. The Administrator will welcome comments on all aspects of the proposed regulation, including economic and technological issues, and on the proposed test methods. Comments are especially welcomed concerning the exclusion of compliance procedures for solvent destruction devices.

It should be noted that standards of performance for new sources established under Section 111 of the Clean Air Act reflect:

> . . . application of the best technological system of continuous emission reduction which (taking into consideration the cost of achieving such emissions reduction, any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated [Section 111(a)(1)].

Although there may be emission control technology available that can reduce emissions below those levels required to comply with standards of performance, this technology might not be selected as the basis of standards of performance due to costs associated with its use. Accordingly, standards of performance should not be viewed as the ultimate in achievable emission control. In fact, the Act required (or has the potential for requiring) the imposition of a more stringent emission standard in several situations.

For example, applicable costs do not necessarily play as prominent a role in determining the "lowest achievable emission rate" for new or modified sources locating in nonattainment areas, i.e., those areas where statutorily-mandated health and welfare standards are being violated. In this respect, Section 173 of the Act requires that new or modified sources constructed in an area where ambient pollutant concentrations exceed the National Ambient Air Quality Standard (NAAQS) must reduce emissions to the level that reflects the "lowest achievable emission rate" (LAER), as defined in Section 171(3) for such category of source. The statute defines LAER as that rate of emissions based on the following, whichever is more stringent:

> (A) the most stringent emission limitation which is contained in the implementation plan of any State for such class or category of source, unless the owner or operator of the proposed source demonstrates that such limitations are not achievable, or
>
> (B) the most stringent emission limitation which is achieved in practice by such class or category of source.

In no event can the emission rate exceed any applicable new source performance standard [Section 171(3)].

A similar situation may arise under the prevention of significant deterioration of air quality provisions of the Act (Part C). These provisions require that certain sources [referred to in Section 169(1)] employ "best available control technology" (BACT) as defined in Section 169(3) for all pollutants regulated under the Act. Best available control technology must be determined on a case-by-case basis, taking energy, environmental and economic impacts and other costs into account. In no event may the application of BACT result in emissions of any pollutants which will exceed the emissions allowed by any applicable standard established pursuant to Section 111 (or 112) of the Act.

In all events, State Implementation Plans (SIP's) approved or promulgated under Section 110 of the Act must provide for the attainment and maintenance of NAAQS designed to protect public health and welfare. For this purpose, SIP's must in some cases require greater emission reduction than those required by standards of performance for new sources.

Finally, States are free under Section 116 of the Act to establish even more stringent emission limits than those established under Section 111 or those necessary to attain or maintain the NAAQPS under Section 1110. Accordingly, new sources may in some cases by subject to limitations more stringent than standards of performance under Section 111, and prospective owners and operators of new sources should be aware of this possibility in planning for such facilities.

This regulation will be reviewed four years from the date of promulgation as required by the Clean Air Act. This review will include an assessment of such factors as the need for integration with other programs, the existence of alternative methods, enforceability, improvements in emission control technology, and reporting requirements. The reporting requirements in this regulation will be reviewed as required under EPA's sunset policy for reporting requirements in regulations.

Section 317 of the Clean Air Act requires the Administrator to prepare an economic impact assessment for any new source standard of performance promulgated under Section 111(b) of the Act. An economic impact assessment was prepared for the proposed regulations and for other regulatory alternatives. All aspects of the assessment were considered in the formulation of the proposed standards to insure that the proposed standards would represent the best system of emission reduction considering costs. The economic impact assessment is included in the Background Information Document.

Dated: October 16, 1980.

Douglas M. Costle,

Administrator.

It is proposed that 40 CFR Part 60 be amended as follows:

1. A new Subpart QQ is added as follows:

Subpart QQ—Standards of Performance for the Graphic Arts Industry: Publication Rotogravure Printing

Sec.

60.430 Applicability and designation of affected facility.
60.431 Definition and notations.
60.432 Standards for volatile organic compounds.
60.433 Compliance provisions.
60.434 Performance test procedures.
60.435 Emission monitoring and recordkeeping.
60.436 Reporting requirements.
60.437 Test methods and procedures.

Authority: Sec. 111 and 301(a) of the Clean Air Act, as amended (42 U.S.C. 7411, 7601(a)), and additional authority as noted below.

Subpart QQ—Standards of Performance for the Graphic Arts Industry: Publication Rotogravure Printing

§ 60.430 Applicability and designation of affected facility.

(a) The affected facility to which the provisions of this subpart apply is each publication rotogravure printing press.

(b) Any facility under paragraph (a) of this section which commences construction, modification, or reconstruction after [date of publication in the **Federal Register**] is subject to the requirements of this subpart.

§ 60.431 Definitions and notations.

(a) All terms used in this subpart that are not defined below have the meaning given to them in the Act and in Subpart A of this part.

"Automatic temperature compensator" means a device which continuously senses the temperature of the fluid flowing through a metering device and automatically adjusts the registration of the measured volume amount to the corrected equivalent volume amount at a base temperature.

"Base temperature" means the average temperature of the total amount of VOC solvent as metered at a publication rotogravure printing press.

"Density" means the mass of a unit volume of liquid, expressed as the weight in grams per cubic centimeter, at a specified temperature.

"Gravure cylinder" means a plated cylinder with a printing image consisting of minute cells or indentations, specially engraved or etched into the cylinder's surface to hold ink when continuously revolved through a fountain of ink.

"Performance averaging period" means 30 calendar days, one calendar month, or four consecutive weeks as specified in the sections of this subpart.

"Publication rotogravure printing press" means any number of publication rotogravure printing units used to print saleable products described under SIC code numbers 27541 and 27543, and capable of printing simultaneously on the same continuous web or substrate, which is fed from a continuous roll, but does not include proof presses which are used to check the quality of the image formation of newly engraved or etched gravure cylinders.

"Publication rotogravure printing unit" means any device designed to print one color ink on one side of a continuous web or substrate using the intaglio printing process with a gravure cylinder.

"Raw ink" means all purchased ink.

"Related coatings" means all non-ink purchased liquids and liquid-solid mixtures containing VOC solvent, usually referred to as extenders or varnishes, that are used at publication rotogravure printing presses.

"Solvent-borne ink systems" means raw ink and related coatings whose volatile portion consists essentially of VOC solvent with not more than five weight percent water.

"Solvent recovery system" means an air pollution control system by which VOC solvent vapors in air are captured and directed through a control device containing beds of activated carbon or other adsorbents. The vapors are adsorbed, then desorbed by steam or other media, and finally condensed and recovered.

"Total amount of VOC solvent used" means all VOC solvent added to the ink used at the subject facility, all VOC solvent included by the ink manufacturers in the inks and related coatings used at the facility, and all VOC solvent used as a cleaning agent at the facility.

"VOC" means volatile organic compound as defined in § 60.2(dd).

"VOC solvent" means an organic liquid mixture consisting of VOC components.

"Waterborne ink systems" means raw ink and related coatings whose volatile portion consists of a mixture of VOC solvent and more than five weight percent water.

(b) Symbols used in this subpart are defined as follows:

B_c = the average metered temperature of each respective color or raw ink and each related coating used at the subject facility (or facilities).

B_d = the average temperature of the metered VOC solvent added to dilute the ink used at the subject facility (or facilities) over one performance averaging period.

B_g = the average temperature of the metered VOC solvent used as a cleaning agent at the subject facility (or facilities) over one performance averaging period.

B_t = the calculated base temperature for the subject facility (or facilities) over one performance averaging period.

L_c = the liquid volume amount of each respective color of raw ink and each related coating used at the facility of a corresponding VOC content, V_o.

L_d = the total liquid volume amount of VOC solvent added to dilute the ink used at the subject facility (or facilities) over one performance averaging period.

L_g = the total liquid volume amount of VOC solvent used as a cleaning agent at the subject facility (or facilities) over one performance averaging period.

L_m = the liquid volume amount of recovered VOC solvent registered by meter devices from the subject facility (or facilities) over one performance averaging period.

L_o = the total liquid volume amount of VOC solvent contained in the raw inks and related coatings used at the subject facility over one performance averging period.

L_r = the total liquid volume amount of VOC solvent recovered from the subject facility (or facilities) over one performance averging period.

L_t = the total liquid volume amount of VOC solvent used at the subject facility (or facilities) over one performance averaging perod.

L_u = the liquid volume amount of miscellaneous unmetered recovered VOC solvent from the subject facility (or facilities) over one performance averaging period.

P = the average VOC emission percentage for the subject facility (or facilities) over one performance averaging period.

V_o = the liquid VOC content, expressed as a volume fraction, of such respective color of raw ink and each related coating stream used at the facility.

(c) The following subscripts are used in this subpart with the above symbols to denote the applicable facility:

a = affected facility

b = both affected and existing facilities controlled in common by the same air pollution control equipment.

e = existing facility.

§ 60.432 Standards for volatile organic compounds.

(a) Over the period of the initial performance test required to be conducted by § 60.8 and on and after the first day of the next performance averaging period following completion of the initial test, no owner or operator subject to the provisions of this subpart and using solvent-borne ink systems shall cause to be discharged into the atmosphere from any affected facility more than 16 percent of the total amount of VOC solvent volume used at that facility over any one performance averaging period. The averaging period for the initial performance test is 30 calendar days. The averaging period for subsequent performance tests is a calendar month or four consecutive weeks, at the option of the owner or operator.

(b) No owner or operator subject to the provisions of this subpart and using waterborne ink systems shall use a raw ink or related coating with a ratio of VOC volume content to solids volume content which is greater than 0.64, nor

shall that raw ink or related coating be diluted with anything other than water addition.

§ 60.433 Compliance provisions.

(a) The owner or operator subject to the provisions of this subpart shall show compliance with the standards set forth in § 60.432 at all times, except as provided under § 60.8(c) and paragraph (b) of this section. The startup, shutdown, and malfunction provisions in § 60.8(c) apply only to the air pollution control equipment and not to the process equipment.

(b) After the initial performance test required for all affected facilities under § 60.8, compliance with the VOC emission limitation under § 60.432 is based on the emissions for one calendar month or one four-week averaging period. A separate performance test is completed at the end of each calendar month or each four-week averaging period after completion of the initial performance test. A new calendar month or a four-week averaging period VOC emission percentage is then calculated to show compliance with § 60.432(a) or new VOC volume to solids volume ratios for waterborne ink systems are calculated to show compliance with § 60.432(b).

(c) The owner or operator of an effected facility controlled by a solvent recovery system shall use the following procedures to determine compliance with the emission limit in § 60.432(a) for each performance averaging period:

(1) the total liquid volume amount of VOC solvent in all the raw inks and related coating used at the effected facility is determined by the following equation:

$$(L_o)_a = \sum_{i=1}^{k} (V_{oi})_a (L_{ci})_a$$

The indexing subscript, i, designates the "ith" coating for the number of coatings with different VOC contents ranging from 1 to k. V_o is determined in accordance with § 60.437(a). L_c is determined from direct readings of the metering devices required under § 60.435(a)(2).

(2) The total liquid volume amount of VOC solvent used at the affected facility is determined by the following equation;

$(L_t)_a = (L_o)_a + (L_d)_a + (L_s)_a$

L_d and L_s are determined from direct readings of the respective metering devices required under § 60.435(a)(1) and § 60.435(a)(3).

(3) The total liquid volume amount of VOC solvent recovered from the affected facility is determined by the following equation:

$(L_r)_a = (L_m)_a + (L_u)_a$

L_u is determined as stipulated in § 60.435(j). L_m is determined from direct readings of the metering devices required under § 60.435(a)(4).

(4) The average VOC emission percentage for the affected facility is determined by the following equation:

$$P_a = \left[\frac{(L_t)_a - (L_r)_a}{(L_t)_a}\right] \times 100$$

(d) The owner or operator of two or more affected facilities that are controlled by same solvent recovery system shall use the procedures specified in paragraph (c) of this section to determine compliance, except that $(L_t)_a$ and $(L_r)_a$ are the collective VOC solvent amounts corresponding to all the affected facilities controlled by that solvent recovery system. The average VOC emission percentage for each of the affected facilities controlled by that same solvent recovery system is assumed to be equivalent.

(e) The owner or operator of an existing facility (or facilities) and an affected facility (or facilities) that are controlled in common by the same solvent recovery system shall use one of the following procedures to determine compliance with § 60.432(a):

(1) The owner or operator shall determine compliance for the affected facility (or facilities) by first conducting an emission test on only the controlled existing facility (or facilities) and then conducting a performance test on the combined controlled facilities as follows:

(i) The average VOC emission percentage for the existing facility (or facilities) is first determined separately by using the following equation in accordance with the conditions stipulated in § 60.434(c):

$$P_e = \left[\frac{(L_t)_e - (L_r)_e}{(L_t)_e}\right] \times 100$$

$(L_t)_e$ and $(L_r)_e$ are determined by the procedures specified in articles (c)(1), (2), and (3) of this section for one facility or by paragraph (d) of this section for more than one facility, except that the VOC solvent amounts pertain only to the existing facility (or facilities).

(ii) The average VOC emission percentage for the affected facility (or facilities) is then determined by using the following equation with both existing and affected facilities connected to the solvent recovery system:

$$P_a = \left[\frac{(L_t)_b - (L_r)_b - (L_t)_e\left(\frac{P_e}{100}\right)}{(L_t)_a}\right] \times 100$$

$(L_t)_b$ and $(L_r)_b$ are determined by the procedures specified in articles (c)(1), (2), and (3) of this section, except that the VOC solvent amounts pertain to all the facilities controlled in common by the solvent recovery system over one performance averaging period. $(L_t)_a$ and $(L_t)_e$ pertain to the VOC solvent amounts used at the affected facility (or facilities) and the existing facility (or facilities), respectively, over one performance averaging period, as determined by the procedures specified in articles (c)(1), (2), and (3) of this section. P_e is assumed to be constant during each performance averaging period and is equivalent to the VOC emission percentage determined in the latest emission test in accordance with article (1)(i) of this paragraph.

(2) The owner or operator shall show compliance of the combined performance of existing and affected

facilities controlled in common. A separate emission test for existing facilities is not required. The average VOC emission percentage for the combined facilities with both existing and affected facilities connected to the solvent recovery system is determined by the procedures specified in paragraph (c) of this section with the following equation:

$$P_b = \left[\frac{(L_t)_b - (L_r)_b}{(L_t)_b}\right] \times 100$$

(f) The owner or operator of an affected facility using waterborne ink systems shall install air pollution control equipment to comply with the emission limit in § 60.432(a) if the standard in § 60.432(b) cannot be met. Compliance with the standard in § 60.432(b) for each performance averaging period is determined by—

(1) Obtaining from the ink manufacturer analyses of the VOC volume and solids volume contents of each purchased shipment of all color raw inks and all related coatings used at the affected facility (or facilities); and

(2) Calculating the ratio of VOC volume content to solids volume content from the ink manufacturer's analsyses data for each shipment of raw ink and related coatings used at the affected facility during each performance averaging period.

§ 60.434 Performance test procedures.

(a) Before start of the initial performance test required under § 60.8, the owner or operator subject to the provisions of this subpart shall notify the Administrator in writing as to whether a calendar month or a four-week averaging period basis will be used for determination of compliance with the standards under § 60.432.

(b) The owner or operator of an affected facility (or facilities) controlled by a solvent recovery system shall conduct an initial performance test to determine compliance with § 60.432(a) as follows:

(1) The initial performance test required under § 60.8 is based on 30 consecutive calendar days and not on an average of three runs as prescribed under § 60.8(f).

(2) The average VOC emission percentage for the affected facility (or facilities) over the 30 day test period is determined as specified in § 60.433(c), (d), or (e), whichever applies.

(c) If the procedures in § 60.433 (e)(1) are used to determine compliance of an affected facility (or facilities) controlled by a solvent recovery system which handles VOC emissions from both affected and existing facilities, the owner or operator shall conduct a separate emission test on the existing facility (or facilities) as follows:

(1) The emission test is based on 30 consecutive calendar days.

(2) The emission test is to be conducted without connection of the affected facility (or facilities) to the air pollution system.

(3) The emission test is to be conducted before both the affected and existing facilities are initially connected to the same control system, and at any other time as requested by the Administrator.

(4) § 60.435(h) applies to the existing facility (or facilities) during the emission test.

(5) The average VOC emission percentage for the existing facility (or facilities) over the 30 day test period is determined as described in § 60.433(e)(1)(i).

(6) The emission test is to be conducted under conditions that the Administrator will specify to the plant operator.

(7) The owner or operator of the existing facility (or facilities) shall provide the Administrator 30 days prior notice of the emission test to afford the Administrator the opportunity to have an observer present.

(8) The owner or operator of the existing facility (or facilities) shall furnish the Administrator a written report of the results of the emission test.

(9) After completion of this separate emission test on the existing facility (or facilities), the affected facility (or facilities) is then connected to the air pollution control system with the existing facility (or facilities). During emission tests on the existing facilities, the affected facilities are still subject to the standards stipulated in § 60.432—neither the owner nor operator shall operate affected facilities uncontrolled.

(d) The owner or operator of an affected facility (or facilities) using waterborne ink systems shall conduct an initial performance test to determine compliance with § 60.432(b) as follows:

(1) The initial performance test required under § 60.8 is based on 30 consecutive calendar days and not on an average of three runs as prescribed under § 60.8(f).

(2) The VOC volume to solids volume ratio for each shipment of raw inks and related coatings used at the affected facility (or facilities) over the 30 day test period is determined as specified in § 60.433(f).

(e) After the initial performance test, the owner or operator shall conduct successive performance tests during each calendar month or four-week averaging period as described in § 60.433(b).

§ 60.435 Emission monitoring and recordkeeping.

(a) The owner or operator of any affected facility controlled by a solvent recovery system shall install, calibrate, maintain, and continuously operate—

(1) One or more non-resettable totalizer metering device(s), accurate to within ±0.5 percent, for continuously indicating the cumulative liquid volume amount of VOC solvent added to the ink used at the affected facility;

(2) One or more non-resettable totalizer metering device(s), accurate to within ±1.5 percent, for continuously indicating the cumulative liquid volume amount of each color or raw ink and each related coating used at the affected facility;

(3) One or more non-resettable totalizer metering device(s), accurate to within ±0.5 percent, for continuously indicating the cumulative liquid volume amount of VOC solvent used as a cleaning agent at the affected facility, if the cleaning solvent used is not registered by the metering devices required in article (a)(1);

(4) One or more non-resettable totalizer metering device(s), accurate to within ±0.5 percent, for continuously indicating the cumulative liquid volume amount of VOC solvent recovered by the solvent recovery system which serves the affected facility; and

(5) an automatic temperature compensator, calibrated in accordance with paragraph (i) of this section, to adjust the totalizer volume readings of each recovered solvent metering device required by article (4) of this paragraph.

(b) The owner or operator shall install all metering devices described in articles (a)(1), (2), (3) and (4) of this section with no taps upstream and no unmetered bypasses.

(c) The owner or operator shall install, maintain, and continuously operate an air eliminator and strainer upstream of each metering device required in paragaph (a) of this section in accordance with the meter manufacturer's recommendations to maintain meter calibration accuracy.

(d) The owner or operator shall install and maintain a monitoring device.

accurate to within ±2° C (±4° F), for continuously indicating the temperature of the fluid metered by each device required in articles (a)(1), (2), and (3) of this section.

(e) The metering devices described in articles (a)(1), (2) and (3) of this section shall not serve an affected facility and any existing facilities simultaneously.

(f) The owner or operator shall recalibrate all metering devices at least semi-annually, and at other times as the Administrator may require in accordance with the procedures under § 60.13(b)(3). The requirements of articles (a)(1), (2), (3), and (4) must be met before the metering device can be returned to service. The owner or operator shall record the actual calibrated accuracy of each metering device and shall maintain these records for two years.

(g) When the facility is in operation, the owner or operator shall take daily readings of each temperature monitoring device and of the totalizer of each metering device specified in this section, shall record the readings for each performance averaging period, and shall maintain these records for two years.

(h) The owner or operator of an affected facility controlled by a solvent recovery system shall record the VOC volume content analyses as determined under § 60.437(a) for all color raw inks and all related coatings used at the affected facility, and shall maintain these records for two years.

(i) The owner or operator shall calibrate annually the automatic temperature compensators required by article (a)(5) of this section and shall adjust the base temperature setting after each performance averaging period, if needed, according to the following procedures:

(1) The density variation with temperature of the metered recovered VOC solvent is determined by the methods stipulated in § 60.437(d). The recovered VOC solvent density is determined in temperature increments of 10° C, from 15° C to 45° C, or the maximum expected recovered VOC solvent metered temperature.

(2) Calibration is then carried out in accordance with the manufacturer's recommended procedures using the density-temperature profile determined in article (1).

(3) The base temperature for each performance averaging period is derived by the following equation on a weighted average, by volume, basis:

$$B_t = \left[\frac{(B_d)(L_d) + (B_g)(L_g) + \sum_{i=1}^{k} (B_{ci})(V_{oi})(L_{ci})}{L_t} \right]$$

The indexing subscripts, i and k, are defined under § 60.433(c)(1).

(4) If the base temperature calculated by article (3) deviates by more than 5° C (9° F) from the base temperature setting of the associated automatic temperature compensator, that base temperature setting is then adjusted to the newly calculated value.

(5) The base temperature calculated by article (3) and the corresponding base temperature setting of each automatic temperature compensator is recorded for each performance averaging period and the records maintained for two years.

(j) The owner or operator of an affected facility controlled by a solvent recovery system shall determine, using any suitable means approved by the Administrator, the liquid volume amounts of all unmetered solvent-borne waste inks and waste VOC solvents recovered from the facility. The owner or operator shall record these unmetered volume amounts for each performance averaging period and shall maintain these records for two years.

(k) If the air pollution control device which serves the affected facility (or facilities) also serves an existing facility (or facilities), the exisiting as well as the affected facility are subject to the requirements of paragraph (a) through (j) of this section.

(l) Affected facilities using waterborne ink systems and in compliance with § 60.432(b) are not subject to the requirements of paragraphs (a) through (k) of this section.

(m) The owner or operator of an affected facility using waterborne ink systems which comply with § 60.432(b) shall record for each performance averaging period the ink manufacturer's analysis data for—

(1) Each purchased shipment of raw inks;

(2) Each purchased shipment of related coatings; and

(3) The corresponding calculated ratios required in § 60.433(f). The owner or operator shall maintain these records for two years.

[Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414)]

§ 60.436 Reporting requirements.

(a) The owner or operator of any affected facility shall prepare a written non-compliance report for each calendar month or each four-week averaging period in which non-compliance with § 60.432 is determined. Each report shall state—

(1) The identification of whether continual compliance is determined based on calendar month or four-week averaging periods;

(2) The identification of the calendar month or four-week averaging period covered by the report;

(3) The type of air pollution control system used;

(4) The average VOC emission percentage calculated in accordance with § 60.433(c), (d), or (e), whichever applies, for the calendar month or four-week averaging period;

(5) Which procedure and equation from § 60.433 was used to calculate the emission percentage;

(6) The total liquid volume amounts of VOC solvent used and recovered at the equivalent base temperature for the affected facility during the performance averaging period;

(7) How many and which affected facilities are served together by the same air pollution control device;

(8) What existing facilities are served by an air pollution control system in common with an affected facility;

(9) The measured average VOC emission percentage for the existing facility (or facilities) when § 60.433(e)(1) is used to determine compliance for the affected facility;

(10) The date and time identifying any periods during which the required metering devices described under § 60.435(a) were inoperative and the nature of the system repairs or adjustments;

(11) Specific identification of each period of excess emissions resulting from the startup, shutdown, or malfunction of the air pollution control equipment;

(12) The nature and causes of any malfunctions of the air pollution control equipment (if known) and the corrective action taken or preventative measures adopted;

(13) For affected facilities using waterborne ink systems without air pollution control equipment, a copy of the record of ink manufacturer's data and calculated ratios required by § 60.435(m); and

(14) Affected facilities using waterborne ink systems which comply with § 60.432(b) are not subject to the requirements of articles (4) through (12) of this paragraph.

(b) The owner or operator of any affected facility shall submit to the Administrator the non-compliance reports required under paragraph (a) of

this section postmarked by the 10th calendar day following the end of—

(1) The calendar month when compliance with the standards in § 60.432 is determined for each calendar month; or

(2) The four-week period when compliance with the standards in § 60.432 is determined for each four-week period.

[Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414)]

§ 60.437 Test methods and procedures.

(a) The owner or operator of an affected facility (or facilities) controlled by a solvent recovery system shall determine the VOC volume content of raw solvent-borne inks and related coatings used at the affected facility through one of the following procedures:

(1) Routine weekly samples of raw ink and related coatings in each respective storage tank are analyzed using Reference Method 29.

(2) Samples of each shipment of all purchased raw inks and related coatings are analyzed using Reference Method 29, or analysis of each shipment of all purchased raw inks and related coatings may be obtained from the ink manufacturer.

(3) The results of verification analyses by Reference Method 29 is used for determination of compliance when discrepancies with ink manufacturer's analysis data occur.

(b) The owner or operator of an affected facility (or facilities) controlled by a solvent recovery system in common with any existing facilities shall determine the VOC volume content of raw solvent-borne inks and related coatings used at the existing facility (or facilities) by following one of the procedures specified in paragraph (a) of this section.

(c) The owner or operator of any affected facility using water borne ink systems shall determine, using any suitable method approved by the Administrator, the VOC volume content of raw inks and related coatings used at the affected facility.

(d) The owner or operator of an affected facility (or facilities) controlled by a solvent recovery system shall determine the density of liquid solvents according to—

(1) The procedure outlined in ASTM D 1475–60 by making a total of three determinations for each solvent sample at a specified temperature, and recording the density as the arithmetic average of the three determinations; or

(2) Other values acceptable to the Administrator.

[Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414)].

2. Method 29 is added to Appendix A as follows:

Appendix A—Reference Methods

* * * * *

Method 29—Determination of Volatile Matter Content and Density of Printing Inks and Related Coatings

1. Applicability and Principle

1.1 Applicability. This method applies to the determination of the volatile organic compound (VOC) content and density of solvent-borne (solvent reducible) printing inks or related coatings as defined in § 60.431.

1.2 Principle. Separate procedures are used to determine the VOC weight fraction and density of the coating and the density of the solvent in the coating. The BOC weight fraction is determined by measuring the weight loss of a known sample quantity which has been heated for a specified length of time at a specified temperature. The density of both the coating and solvent are measured by a standard procedure. From this information, the VOC volume fraction is calculated.

2. Procedure

2.1 Weight Fraction VOC.

2.1.1 Apparatus.

2.1.1.1 Weighing Dishes. Aluminum foil, 58 mm in diameter by 18 mm high, with a flat bottom. There must be at least three weighing dishes per sample.

2.1.1.2 Disposable syringe, 5 ml.

2.1.1.3 Analytical Balance. To measure to within 0.1 mg.

2.1.1.4 Oven. Vacuum oven capable of maintaining a temperature of 120 ±2°C and an obsolute pressure of 510 ±51 mm Hg for 4 hours. Alternatively, a forced draft oven capable of maintaining a temperature of 120 ±2°C for 24 hours.

2.1.1.5 Analysis. Shake or mix the sample thoroughly to assure that all the solids are completely suspended. Label and weigh to the nearest 0.1 mg a weighing dish and record this weight (M_{x1}).

Using a 5-ml syringe without a needle remove a sample of the coating. Weigh the syringe and sample to the nearest 0.1 mg and record this weight (M_{cy1}). Transfer 1 to 3 g of the sample to the tared weighing dish. Reweigh the syringe and sample to the nearest 0.1 mg and record this weight (M_{cy2}). Heat the weighing dish and sample in a vacuum oven at an absolute pressure of 510 ±51 mm Hg and a temperature of 120±2°C for 4 hours. Alternatively, heat the weighing dish and sample in a forced draft oven at a temperature of 120 ±2° C for 24 hours. After the weighing dish has cooled, reweigh it to the nearest 0.1 mg and record the weight (M_{x2}). Repeat this procedure for a total of three determinations for each sample.

2.2 Coating Density. Determine the density of the ink or related coating according to the procedure outlined in ASTM D 1475–60. Make a total of three determinations for each coating. Report the density D_c as the arithmetic average of the three determinations.

2.3 Solvent Density. Determine the density of the solvent according to the procedure outlined in ASTM D 1475–60. Make a total of three determinations for each coating. Report the density D_v as the arithmetic average of the three determinations.

3. Calculations

3.1 Weight Fraction VOC. Calculate the weight fraction volatile organic content W_o using the following equation:

$$W_o = \left[\frac{M_{x1} + M_{cY1} - M_{cY2} - M_{x2}}{M_{cY1} - M_{cY2}}\right] \quad \text{Eq. 29-1}$$

Report the weight fraction VOC W_o as the arithmetic average of the three determinations.

3.2 Volume Fraction VOC. Calculate the volume fraction volatile organic content V_o using the following equation:

$$V_o = \frac{\bar{W}_o \bar{D}_c}{\bar{D}_v} \quad \text{Eq. 29-2}$$

4. Bibliography

4.1 Standard Method of Test for Density of Paint, Varnish, Lacquer, and Related Products. In: 1974 Book of ASTM Standards, Part 25, Philadelphia, Pennsylvania, ASTM Designation D 1475–60. 1974. p. 231–233.

4.2 Telecon. Wright, Chuck, Inmont Corporation with Reich, R.A., Radian Corporation. September 25, 1979. Gravure Ink Analysis.

4.3 Telecon. Oppenheimer, Robert, Gravure Research Institute with Burt, Rick, Radian Corporation. November 5, 1979. Gravure Ink Analysis.

[FR Doc. 80-33550 Filed 10-27-80; 8:45 am]

BILLING CODE 6560-26-M

40 CFR Part 60

[1579-1]

Standards of Performance for New Stationary Sources; Graphic Arts Industry: Publication Rotogravure Printing

Correction

In FR Doc. 80-33550 appearing on page 71538 in the issue of Tuesday, October 28, 1980, make the following changes:

Page	Column/¶/line	Item
71538	Col. 2, last ¶, line 3	"cpture" should be "capture".
71539	Col. 2, ¶ 2, line 3	"3 percent" should be "13 percent".
71541	Col. 1, ¶ 2, 2nd to last line	"of" should be "or".
	Col. 2, ¶ 3, line 18	"must" should be "much".
71543	Col. 3, ¶ 1, line 14	"Section III" should be "Section 111".
	Col. 3, last ¶, line 2	"form" should be "from".
	Col. 3, last ¶, line 7	"coal/fired" should be "coal-fired".
	Col. 3, last ¶, 2nd to last line	"MSPS" should be "NSPS".
71544	Col. 1, ¶ 1, line 10	"ov" should be "of".
	Col. 1, ¶ 2, line 9	"1,900 ppm" should be "1,900 ppm".
	Col. 3, last line	"studies" should be "studied".
71546	Col. 1, ¶ 1, line 7	"Compliance Provisions" should be all caps.
	Col. 1, ¶ 4, line 19	"a" should be "an".
	Col. 3, line 47	"tests" should be "test".
71548	Col. 2, ¶ 2, line 13	Insert the following after "test": "would be based on the same format and procedures as for the performance tests * * *".
	Col. 3, line 4	"costings" should be "coatings".
	Col. 3, ¶ 2, line 2	"separated" should be "separate"
71550	Col. 3, 5th line from bottom	"Addresses" should be all caps.
71551	Col. 1, line 3	"Addresses" should be all caps.
	Col. 1, ¶ 3, line 3	"of" should not be there.

Regulation		
71551	Col. 3, § 60.431	There should be an "s" on "Definition".
71552	Col. 1, § 60.430(b)	"October 28, 1980" should be inserted in "[date of publication * * *]".
	Col. 2, § 60.430(b), B_s, line 2	"or" should be "of".
	Col. 3, § 60.430(b), V_p, line 2	"such" should be "each".
71554	Col. 2, § 60.434 ¶ (c)(2), line 4	Insert: "control" after "pollution".
	Col. 3, § 60.434, ¶ (a)(5), line 1	"an" should be "An".
71555	Col. 3, § 60.436(a), line 2	"60,432" should be "60.432".
71556	Col. 1, § 60.437, ¶ (c), line 2	"water borne" should be one word.
	Col. 2, ¶ 1.2, line 4	"BOC" should be "VOC".
	Col. 3, ¶ 2.2, line 5	"D_c" should be "D_s".
	Col. 3, ¶ 2.3, line 5	"D_s" should be "D_c".
	Col. 3, ¶ 3.1, line 5	"W_s" should be "W_o".

40 CFR Part 60

[AD-FRL 1739-1]

Standards of Performance for New Stationary Sources; Graphic Arts Industry: Publication Rotogravure Printing; Clarification

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule; clarification.

SUMMARY: This document clarifies a proposed rule on the standards of performance for publication rotogravure printing presses that appeared at page 71538 in the **Federal Register** of Tuesday, October 28, 1980, (45 FR 71538). The action is necessary to cite the source of the referenced SIC product classes and to clarify what products are covered under these product classes.

FOR FURTHER INFORMATION CONTACT: Mr. Gene W. Smith, Section Chief, Standards Development Branch, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5421.

SUPPLEMENTARY INFORMATION: The Environmental Protection Agency is clarifying the proposed definition of "publication rotogravure printing press" appearing in the first column on page 71552 in the **Federal Register** issue of October 28, 1980. This clarification notice is being published because several rotogravure printers and one State Agency requested clarification of the SIC product classes used to define "publication rotogravure printing press." The source of the five-digit SIC product classes referenced in the proposed definition was not cited in the proposed rulemaking. These classes were taken from the 1972 Census of Manufacturers (U.S. Department of Commerce, Bureau of the Census. 1972 Census of Manufacturers. Vol II, Industry Statistics. Part II, SIC Major Groups 27-34. August 1976. p. 27B21-27B22). The above edition lists the following products under SIC codes 27541 and 27543:

Product	Product class	Product code
Publication Printing, Gravure	27541	
Newspapers	27541	11
Magazines and periodicals, excluding magazine and comic supplements for Sunday newspapers	27541	33
Magazine and comic supplements for Sunday newspapers	27541	35
Catalogs	27541	74
Directories:		
Telephone	27541	77
Other, including business reference services	27541	79
Publication printing, gravure, n.s.k	27541	00
Advertising Printing, Gravure (designed to sell products or services)	27543	
Advertising printing (direct mail, including circulars, letters, pamphlets, cards, and printed envelopes)	27543	41
Display advertising:		
Posters, including outdoor advertising; car cards; and window	27543	43
Counter, and floor displays; point-of-purchase, and other printed display material	27543	45
Preprinted newspaper inserts (advertising supplements not regularly issued):		
Rolls, including hi-fi and spectacolor	27543	46
Sections (2 pages or more)	27543	47
Other advertising printing, including brochures, pamphlets, catalog sheets, circular folders, announcements, package inserts, book jackets, market circulars, magazine inserts, etc	27543	49

The use of SIC product classes will be deleted in final rulemaking. Instead, only the above list of products will be included in the definition of "publication rotogravure printing press."

Dated: January 15, 1981.

David Hawkins,

Assistant Administrator for Air, Noise, and Radiation.

[FR Doc. 81-2880 Filed 1-26-81; 8:45 am]

ENVIRONMENTAL PROTECTION AGENCY

■

STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

PRESSURE SENSITIVE TAPE AND LABEL SURFACE COATING OPERATIONS

SUBPART RR

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 60

[AD-FRC 1533-8]

Standards of Performance for New Stationary Sources; Pressure Sensitive Tape and Label Surface Coating Operations

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed Rule and Notice of Public Hearing.

SUMMARY: Standards of performance are proposed to limit the emission of volatile organic compounds (VOC) from new, modified, or reconstructed pressure sensitive tape and label (PSTL) manufacturing facilities. Emissions would be limited to 0.20 kilograms of VOC per kilogram of coating solids applied for each affected coating line as measured by Reference Methods 24 and 25 (promulgated in the Federal Register on October 3, 1980 45 FR 65956). As an alternative, the owner or operator may demonstrate either a 90 percent overall VOC emission reduction or an overall percent emission reduction which is equivalent to the 0.20 kilograms per kilogram of coating solids applied level, whichever is less stringent. This overall reduction is based on the amount of solvent applied with the coating solids.

The proposed standards implement Section 111 of the Clean Air Act and are based on the Administrator's determination that industrial paper coating facilities contribute significantly to air pollution which may reasonably be anticipated to endanger public health or welfare. Pressure sensitive tape and label manufacturing is one of the largest contributors to air pollution in the industrial paper coating category. The intended effect of this proposal is to require new, modified, and reconstructed pressure sensitive tape or lable manufacturing facilities to use the best demonstrated system of continuous emission reduction, considering costs, nonair quality health, and environmental and energy impacts.

A public hearing will be held to provide interested persons an opportunity for oral presentation of data, views, or arguments concerning the proposed standards.

DATES: *Comments.* Comments must be received on or before March 2, 1981.

Public Hearing. A public hearing will be held on January 30, 1981 (about 30 days after proposal) beginning at 9 a.m.

Request to Speak at Hearing. Persons wishing to present oral testimony should contact EPA by January 23, 1981.

ADDRESSES: *Comments.* Comments should be submitted (in duplicate if possible) to: Central Docket Section (A-130), Attention: Docket Number A-79-38, U.S. Environmental Protection Agency, 401 M Street SW., Washington, D.C. 20460.

Public Hearing. The public hearing will be held at OA Auditorium EPA, R.T.P. North Carolina. Persons wishing to present oral testimony should notify Mrs. Naomi Durkee, Standards Development Branch (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5331.

Background Information Document. The Background Information Document (BID) for the proposed standards may be obtained from the U.S. EPA Library (MD-35), Research Triangle Park, North Carolina 27711, telephone number (919) 541-2777. Please refer to "Pressure Sensitive Tape and Label Surface Coating Industry, Background Information Document for Proposed Standards, "EPA-450/3-80-003a.

Docket. Docket Number A-79-38, containing supporting information used in developing the proposed standards, is available for public inspection and copying between 8 a.m. and 4 p.m., Monday through Friday, at EPA's Central Docket Section, Room 2902, Waterside Mall, 401 M Street SW., Washington, D.C. 20460. A reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: Mr. Gene W. Smith, Standards Development Branch, Emission Standards and Engineering Division (M-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5421.

SUPPLEMENTARY INFORMATION:

Proposed Standards

The proposed standards would apply to new, modified, and reconstructed adhesive, release, and precoat coating lines used in the manufacture of PSTL. The emission of VOC would be limited to 0.20 kilograms per kilogram of coating solids applied. As an alternative, the owner or operator may demonstrate either a 90 percent overall VOC emission reduction or an overall percent emission reduction which is equivalent to the 0.20 kilograms per kilogram of coatings solids applied level, whichever is less stringent. Compliance will be determined over a calendar month averaging period by Reference Method 24. Reference Method 25 will be used to performance test coating lines controlled by incineration systems. Coating lines which emit no more than 125 kilograms of VOC per day and 15 megagrams of VOC per year are not subject to the emission limits of the proposed standard. If either the daily or yearly limit is exceeded, the coating line will become subject to the proposed emission limit of 0.20 kg VOC per kg coating solids applied. If the daily or yearly limits are not exceeded an affected facility is only subject to the recordkeeping and reporting requirements of the proposed standard.

The proposed standards are based on an overall VOC emission reduction. The overall reduction is calculated by multiplying the operational efficiency of the control device (carbon adsorbers or incinerators) by the operational efficiency of the vapor capture system (hooding or enclosures). The resultant efficiency is the overall VOC emission reduction achievable by a coating facility.

The proposed standard allows for compliance by using either low-solvent coatings or add-on control equipment. Carbon adsorption and thermal incineration control systems are capable of meeting the proposed standard. Generally, hot melt and waterborne adhesive coatings and 100 percent solid and waterborne release coatings would comply with the proposed standard because they would contain less than 0.20 kilograms of VOC per kilogram of coating solids applied.

Summary of Environmental, Energy, and Economic Impacts

The environmental, energy, and economic impacts of a new source performance standard (NSPS) are expressed as incremental differences between the impacts for facilities complying with the proposed standard and for those complying with a typical State Implementation Plan (SIP) emission standard. Most existing PSTL surface coating operations are located in areas which are considered nonattainment areas for purposes of achieving the National Ambient Air Quality Standard (NAAQS) for ozone. New facilities are expected to locate in similar areas. For the purpose of this analysis it is assumed that states have adopted or will adopt the recommended guidelines in the control techniques guideline (CTG) document, "Control of Volatile Organic Emissions from Existing Stationary Sources—Volume II: Surface Coating of Cans, Coil, Paper, Fabrics, Automobiles and Light-Duty Trucks" (EPA-450/2-77-008 [CTG]). The States, however, are not legally bound to adopt the recommended emission

limits of the CTG document. In this analysis the CTG limits were used as a comparison baseline because they reflect the control level most likely to be instituted in the states' air pollution control regulations (State Implementation Plans).

Compared to emission control levels recommended in the CTG document, the proposed standards of performance would further reduce emissions of VOC from new, modified, or reconstructed pressure sensitive tapes and labels manufacturing operations by about 16 percent in 1985. National emissions of VOC would be reduced by about 4,300 megagrams (metric tons) per year in 1985.

National wastewater discharges would be 13 percent greater than those occurring from plants controlled to the CTG level. National discharges of wastewater would increase in 1985 by about 2.5 million liters (661,000 gallons) as a result of the 13 percent change. This increase is reasonable in light of the nationwide reduction in VOC emissions being achieved.

The solid waste impact of the proposed standards would be small compared to the amount of solid waste generated by the daily production operations of a PSTL coating facility. A coating facility can generate large quantities of solid waste consisting of flawed coated products, imperfect face stock, substandard release paper, empty cartons, and spools. The only additional solid waste from a controlled facility is spent activated carbon from carbon adsorption units. In 1985 the maximum expected increase in national solid waste as a direct result of the NSPS would be about 55 megagrams (metric tons). The proposed standard is reasonable despite this solid waste increase.

The national energy impact would be dependent on whether the majority of new solvent-based coating lines used incineration, carbon adsorption, or low-solvent coatings for VOC control purposes. Because the Agency is unable to predict with certainty the fraction of new facilities which will use each of these technologies, this analysis is performed on the two technologies—carbon adsorption and incineration—which would result in the extreme impacts. The best case energy situation would result if all lines used carbon adsorption. If, in 1985, all solvent-based lines used carbon adsorption controls, a potential net national energy savings equivalent to 27,100 barrels (4.3 million liters) of crude oil per year is projected. A savings is possible because of the large credit received for usable recovered solvent. The worst case energy situation would occur if all solvent-based coating lines used incinerators to control VOC emissions. All solvent would be destructed and no recovery value could be obtained. A potential national energy demand of 31,000 barrels (4.9 million liters) of crude oil for VOC control is estimated. The proposed standard is reasonable even taking into account the worst case energy estimate.

The proposed standards would have minimal economic impact on the PSTL industry. The maximum expected price increase necessary to offset the impact of the proposed standards would be 0.9 percent. Nationwide in 1985, the anticipated incremental annualized cost of compliance, including depreciation and interest, would be $2.6 million. Effects on growth, industry structure, and profitability would not cause significant inflationary impacts or market withdrawals.

In addition to emission reductions beyond those achieved by a typical SIP, standards of performance have other benefits. They establish a degree of national uniformity to avoid situations in which some States may attract industries by relaxing air pollution standards relative to other States. Further, standards of performance improve the efficiency of case-by-case determinations of best available control technology (BACT) for facilities located in attainment areas, and lowest achievable emission rates (LAER) for facilities located in nonattainment areas, by providing a starting point for these determinations. This results from the process for developing a standard of performance, which involves a comprehensive analysis of regulatory alternatives. Detailed cost and economic analyses of various regulatory alternatives are presented in the supporting documents for the proposed standards.

Rationale

Selection of Source

The "Priority List and Additions to the List of Categories of Stationary Sources for New Source Performance Standards under the Clean Air Act Amendments of 1977", promulgated at 44 FR 49222 on August 21, 1979, ranked sources according to the impact that the standards promulgated in 1980 would have on emissions and public health in 1990. The paper coating industry ranked fourth on this list of 59 sources to be controlled for air pollutants. The manufacture of pressure sensitive tapes and labels is the largest organic solvent-using segment of the paper coating industry.

Approximately 80 percent of all pressure sensitive tapes and labels are coated with organic solvent-based coatings. All but a very small percentage of this solvent is emitted during the manufacturing process. The pressure sensitive tape and label surface coating source consists of any rollcoating operation which applies pressure sensitive adhesives, release coatings or precoats on a continuous web material. Decals and adhesive specialty products are included in the definition of pressure sensitive tapes and labels because plant visits and industry literature showed that the manufacturing operations and coating formulations for all of these products are similar.

In 1978 nationwide emissions of VOC from the pressure sensitive tape and label industry were estimated at 600,000 megagrams (metric tons). This estimate was based on PSTL industry production data and typical formulation data. Very few of these emissions were controlled by State regulations.

Selection of Pollutants and Affected Facilities

VOC are the primary air pollutants emitted from pressure sensitive tape and label surface coating operations. VOC along with nitrogen oxides are precursors to the formation of ozone and oxygenated organic aerosols (photochemical smog). Ozone and oxygenated organic aerosols result in a variety of adverse impacts on health and welfare, including impaired respiratory function, eye irritation, deterioration of materials such as rubber, and necrosis of plant tissue. Further information on these effects can be found in the April 1978 EPA document "Air Quality Criteria for Ozone and Other Photochemical Oxidants", EPA-600/8-78-004. This document can be obtained from the EPA Library (MD-35), Research Triangle Park, North Carolina 27711, telephone number (919) 541-2777.

Solvent drying ovens are potentially a source of pollutants other than VOC (for example NO_x, SO_x, and particulates). The drying ovens are operated with electricity, indirect heat sources, or direct-fired burners. The electrical ovens do not add to the pollutants expected at the source. The indirect-heated ovens are usually steam-tube heaters with an on-site steam boiler. Control of the boiler emissions is being examined by EPA in a separate strdy of industrial boilers.

Generally, natural gas or liquid petroleum gas is used in the direct-fired heaters. Coal and fuel oil are not used because fly ash material in the oven gases can adversely affect the expected

tape or label quality. The SO_2 emissions rate from the combustion of natural gas is very low. Also, the relatively low temperature environments in the direct-fired burners would result in low NO_x emissions.

Based on their overall volume magnitude and their severity as an air pollutant problem, VOC emissions would be the only pollutants regulated by this standard.

For the purposes of this standard, a single coating line, consisting primarily of an adhesive, release, or precoating head, a drying/curing oven, and the flashoff area between the coating head and oven, is defined as the affected facility. For systems which have tandem coating facilities, each individual coating line would be considered as an affected facility. A tandem coating facility is one which coats releases and adhesives in series on one line.

The choice of the affected facility for this standard is based on the Agency's interpretation of Section 111 of the Act, and judicial construction of its meaning.* Under Section 111, the NSPS must apply to "new sources"; "source" is defined as "any building, structure, facility, or installation which emits or may emit any air pollutant" (Section 111(a)(3)). Most industrial plants, however, consist of numerous pieces or groups of equipment which emit air pollutants, and which might be viewed as "sources." EPA therefore uses the term "affected facility" to designate the equipment, within a particular kind of plant, which is chosen as the "source" covered by a given standard.

In choosing the affected facility, EPA must decide which pieces or groups of equipment are the appropriate units for separate emission standards in the particular industrial context involved. The Agency must do this by examining the situation in light of the terms and purpose of Section 111. One major consideration in this examination is that the use of a narrower definition results in bringing replacement equipment under the NSPS sooner; if, for example, an entire plant were designated as the affected facility, no part of the plant would be covered by the standard unless the plant as a whole is "modified." If, on the other hand, each piece of equipment is designated as the affected facility, then as each piece is replaced, the replacement piece will be a new source subject to the standard. Since the purpose of Section 111 is to minimize emissions by the application of the best demonstrated control technology (considering cost, other health and environmental effects, and energy requirements) at all new and modified sources, there is a presumption that a narrower designation of the affected facility if proper. This ensures that new emission sources within plants will be brought under the coverage of the standards as they are installed. This presumption can be overcome, however, if the Agency concludes that the relevant statutory factors (technical feasibility, cost, energy, and other environmental impacts) point to a broader definition. The application of these factors is discussed below.

Designation of the entire coating operation from unwind to rewind as an affected facility was also considered. Such a designation would allow those sources that achieve highly effective control on some coating sections (of a single coating line) to provide less control on other sections, so long as the aggregate emissions from the coating line are less than or equal to those allowed under the proposed standard. The proponents of a broader designation of affected facility (as the operation from unwind to rewind) believe it would provide additional incentive to industry for the innovative use of low-solvent technology in processes where it is not currently available.

Based on currently available information, EPA believes that the cost and energy savings already associated with using low solvent technology are so great that any additional incentive derived through the use of the broader designation of affected facility will have little or no impact on the rate of innovation. If this is true, the proposed designation of affected facility would give more total emission reduction than the alternative broader designation because the low-solvent materials would be used regardless and the other sections of the coating line would still have to be fully controlled with a capture system and a control device.

In order to promulgate the broader designation, EPA would have to find that it would achieve greater total emission reductions or equivalent total reductions with significant other benefits such as reduced costs, energy consumption or other environmental impacts. EPA solicits comments on this issue.

Persons urging consideration of the alternative broader designation should specifically address the issue of how much additional incentive (or disincentive) the designation of affected facility is likely to provide for an owner or operator's decision to use low-solvent coatings. Where possible the comments should present an economic and environmental analysis to support the position taken.

New coating lines which do not discharge into the atmosphere more than 125 kilograms of VOC per day or 15 megagrams of VOC per year would not be subject to the emission limits of the proposed new source standard. A major factor influencing the institution of these limits was PSTL industry comment concerning the treatment of research and development (R&D) coating lines. The industry felt that R&D lines should not be subject to the same emission limits as a production facility. Upon examination of these operations, the EPA determined that: the cost to control R&D emissions would be high, the achievable emissions reduction would be minimal, and normal production coating lines would operate well above the stated daily and yearly limits. For these reasons the exemption limits were developed. The limits were based on industry information concerning R&D operations. The exemption limits, however, apply to all new, modified, or reconstructed coating lines, and not just to R&D facilities. If either the daily or yearly limit is exceeded, the coating line would be subject to all the requirements of the proposed standard. If the exemption limits are not exceeded, the owner or operator must only record solvent usage at the coating line and report it to the Administrator.

The daily and yearly exemption limits are based on data received from tape and label companies on their R&D facilities and on the model plant analysis in Chapter 6 of the BID. Manufacturers in the tape and label industry have indicated that 61 cm (24 in) coaters are very popular for use in R&D projects. This size corresponds to the small size model plant in the BID analysis. Industry sources also stated that R&D coaters, when used, only run about two hours a day. The model plant analysis determined that a 61 cm coater will use, on the average, about 29 kg (64 lb) of solvent per hour. A typical PSTL facility will then consume about 58 kg (128 lb) of solvent per day for R&D purposes. Taken on an annual basis, this translates to about 15 megagrams of solvent for a facility operating 6000 hours a year. The EPA feels this number is reasonable because industry sources proposed exemption emission limits of 5 to 10 megagrams per year for R&D coating lines.

Manufacturers also indicated that R&D projects are run for more than two hours a day in some cases. These cases occur when larger quantities of material are needed for quality testing and marketing purposes. Industry sources

*The most important case if *ASARCO, Inc.* v. EPA, 578 F. 2d 319 (D.C. Cir. 1978).

estimated that one-half a day or 4 hours is usually sufficient for these R&D coating situations. Based on this information and the model plant figures, the daily emission limit of 125 kg (275 lb) was calculated and determined to be reasonable. The level of the daily limit allows coating firms greater flexibility in their R&D operations.

The affected facility was chosen to incorporate the primary sources of VOC emissions from PSTL coating. The drying/curing oven represents the major source of VOC emissions within the affected facility. The coated web is heated in the oven where 80 to 95 percent of the solvent is evaporated and vented either to the atmosphere or to a control device. These oven emissions can be effectively controlled by ducting them so they discharge to the atmosphere through either a carbon adsorption or a thermal incineration system. One to eighteen percent of the total applied solvent escapes as fugitive emissions and zero to five percent ends up trapped in the final coated product. The area from the coating head to the entrance of the oven is potentially the highest source of fugitive VOC emissions. Hoods or enclosures can be used in this area to effectively capture fugitive emissions. Once captured the fugitives may be ducted to either the oven or to a control device.

Other equipment such as wind and rewind stations are a part of the affected coating line, but are not VOC emission sources. VOC emissions from formulation, storage, and cleanup operations are not included in this regulation. These emissions are not being regulated at this time because: (1) Formulation emissions are already controlled to low levels due to occupational safety reasons and (2) the solvent cleanup emissions are generally low concentration, low volume sources which are very difficult to capture and control.

Selection of Basis of Proposed Standards

This section describes the emission control technology applicable to the PSTL industry and the regulatory alternatives considered by EPA in the development of this standard. Included is a summary of the environmental, energy, and economic impacts, and nonair quality health impacts of the aternatives and a description of the basis of the proposed standards.

Control Technologies. Available control technologies for reducing VOC emissions from PSTL facilities include the use of low-solvent coatings or an emission capture and control system. Low-solvent coatings provide the best environmental alternative for reducing VOC emissions. By 1985, it is estimated that 80 percent of all pressure sensitive coatings will be low-solvent-type coatings. These alternative coatings are available for both adhesives and releases and can be purchased as waterborne, emulsion, or 100 percent solids formulations. Advantages of these coatings include low cost, low energy use, good viscosity even at a high solids content, and negligible air pollution, toxicity, or fire hazards. However, low-solvent coatings are not technologically advanced to the point where they can be interchanged with all solvent-based formulations. Major technical problem areas for low-solvent coatings include cohesive strength, solvent resistance, UV degradation, wettability, and dimensional stability. The added difficulty of total customer acceptance further reduces the range of product substitutability for low-solvent coatings. Because low-solvent coatings cannot be applied in all cases, they cannot be used as the sole basis for the proposed standard.

Carbon adsorption and thermal incineration used in conjunction with emission capture systems have both been used as control devices to reduce VOC emissions from pressure sensitive tape and label coating facilities. Available performance data indicate that the two devices are equivalent in reducing VOC emissions. Although both control devices have experienced operating problems, it has been demonstrated that they can be successfullly used. Two of the problems are: (1) Poor control performance on low VOC concentration gas streams and (2) plugging or fouling problems resulting from volatilization of oligomeric adhesive and release materials. Both of these problems can be reduced or eliminated through proper design and operation of drying ovens and the control devices to the extent that a facility will comply with the proposed standard.

A thermal incinerator is an effective VOC emission control device for all types of solvents. Thermal incinerators operating at temperatures greater than 760°C (1400°F) have demonstrated the ability to achieve at least 95 percent reduction of all VOC in the incinerator feed. The EPA document, "Control of Volatile Organic Emissions from Existing Stationary Sources—Volume I: Control Methods for Surface Coating Operations" (EPA-450/2-78-028), verifies that this level of reduction is achievable. Catalytic incineration has also been demonstrated, in the same EPA document, to be capable of achieving at leat 95 percent efficiency in reducing VOC from an inlet feed stream. Chapter 4 of the BID examines the use of catalytic incineration for PSTL plants. However, the primary incineration focus in this rationale was devoted to thermal incineration, because no catalytic incineration was found in use in PSTL facilities for VOC emissions control.

Thermal incineration is most cost effective when heat exchange equipment is used to recover the heat from the combustion of the solvent and any additional fuels. At 40 percent of the lower explosive limit (LEL), the implementation of primary (preheating of the incinerator feed gases) and secondary heat recovery could supply the primary and secondary heat requirements for one coating line and the secondary requirements for another line. At the very least, primary heat recovery should be included in new incinerator design. Additional heat can be easily recovered and used as heat energy for work area space heating.

The question of LEL is important for safety and economic reasons. The LEL is the lowest vapor concentration in air, expressed as volume percent, at which the mixture would support a flame or explosion at temperatures below 121°C (250°F). Insurance safety regulations require normal operation at less than about 25 percent of the LEL. Operation up to 50 to 60 percent of the LEL is permitted when continuous vapor monitoring systems are employed to control the vapor concentration in the air. The operation of an incinerator at higher LEL values is cost effective because less supplemental fuel is required. While optimal, operating at high LEL levels is not always possible in every coating facility. Factors such as poor coating line design, operation at slow line speeds, and stream dilution by excess ventilation air may limit the achievable LEL. Occupational Safety and Health Administration (OSHA) rules may require excess ventilation air in some facilities to meet certain maximum solvent concentrations in the worker area.

Heat exchanger fouling has been one of the greatest problems with incineration systems. This is especially true in silicone release and adhesive systems. The silicone monomers which volatilize are oxidized in the incinerator and coat the heat exchanger surfaces as a silica material. Operating experience has indicated that routine heat exchanger surface cleanup is required for proper incinerator operation. The experience of one manufacturer with this type of system and these operating

problems is detailed in Chapter 4 of the BID.

The second means of effectively controlling VOC emissions from pressure sensitive tape and label coating lines is carbon adsorption. Several plants in the industry presently use this technology with success. Test data from PSTL plants and self-monitoring data supplied by PSTL manufacturers have indicated that operational efficiency levels of at least 95 percent or greater are attainable with carbon adsorbers. For the purposes of this analysis, carbon adsorbers were assumed to be 95 percent efficient in reducing VOC emissions. This efficiency level has been attained in PSTL facilities despite the occurrence of problems such as: bed fires, carbon fouling, freeze damage, corrosion, and low LEL inlet streams. Carbon adsorption systems are generally regenerated with steam, although any hot, non-reactive gas can be used to strip the beds. If steam is used, the carbon adsorption system is generally limited to solvents which are not water soluble (unless the operator uses add-on distillation or separation processes). All systems currently operating on PSTL coating lines in the United States use steam for carbon bed regeneration. Fouling of the carbon beds by volatilized adhesives and releases is a recurring operational problem. This problem can be adequately reduced by filtering the feed gas before it enters the carbon beds. Again silicone materials are a greater problem than the adhesive resins. Generally carbon beds on silicone coating lines are changed twice as often as beds on rubber or acrylic resin coating lines.

Low VOC concentration gas streams (less than 10 percent LEL) are a problem for both carbon adsorption and incineration VOC control equipment. In incinerators the low concentration gas stream will require much more fuel to incinerate the same amount of solvent gases as in a high concentration stream. The higher fuel usage will mean higher operating costs. Data from existing PSTL facilities demonstrate that the attainment of a 90 percent overall VOC emission reduction, on a monthly basis, is possible at less than 10 percent LEL.

For carbon adsorption systems, the low VOC concentration means poor bed performance. The beds are usually designed for a certain maximum VOC concentration based on a desired outlet VOC concentration. Operating experience has shown that at low solvent concentrations the performance of the bed decreases resulting in a lower overall VOC reduction. Higher gas stream, VOC concentrations can be maintained through design of drying ovens with high turn down ratios and air tight gas ducting systems. Operators can also minimize the low VOC concentration problem by, whenever possible, coating products with similar solvent loadings on the same coating line.

The use of hoods or enclosures can be an effective means for capturing fugitive solvent emissions around the coater area. Fugitive solvent is that solvent which is emitted from the coating applicator and flashoff areas. The hood can be located directly over the web to capture vapors released from the coated surface. In small lines the time interval between when the web is coated and when it enters the oven is about two to five seconds. In large and medium lines the interval is two seconds or less. Since most solvents are heavier than air, floor seeps and hooding under the web can also be used to effectively capture emissions. The ideal situation is to totally enclose the coater and get an effective 100 percent VOC capture. When a hood or enclosure is used, all of the captured fugitive solvent emissions should be ducted back into the system and the control device. If the captured gases are used as makeup air to the ovens, the dilution of the oven gases is minimized.

Presently no total enclosure structures are used in the pressure sensitive tape and label industry. However, when surveyed, firms engaged in similar coating operations (for example, zinc oxide paper coating) responded favorably concerning the use of totally enclosed coaters. No problems related to enclosure use were given. In addition to environmental benefits, occupational safety concerns were also given as a reason for enclosure use. Enclosures were useful in reducing VOC levels along the floor and in the general work area around the coater, thereby lessening any potential explosion hazards.

In the tape and label industry one firm does operate a total building air evacuation system. This system removes all air from the coating building and sends it to a carbon adsorber. In effect the plant operates a total building enclosure. Calculations on the overall efficiency of this system indicate that a solvent capture efficiency of 95 percent is being obtained.

The best controlled coating operating examined in the tape and label manufacturing industry has four coating lines controlled by one carbon adsorption unit. Three of the lines are 0.71 meters (28 inches) wide and one line is 1.4 meters (56 inches) wide. The company produces a wide variety of label stock materials. Their operations are typified by short products runs (less than four hours), varied line speeds, and varied solvent-adhesive mixtures. These operating conditions make this facility a more difficult control situation than operations which run on a continuous basis. Over a four week period this system has shown an overall solvent recovery efficiency of slightly greater than 93 percent. During that time the company performed 140 runs and used such solvents as toluene, acetone, hexane, ethyl acetate, methyl ethyl ketone, rubber solvent, heptane, xylene, ethyl alcohol, isopropanol and recovered solvents. The coating lines use hoods to capture VOC emissions over the freshly coated web. The hoods are ducted into the ovens. The oven makeup air is pulled from the coater room with the ovens running at a slightly negative pressure with respect to the room. The overall effect is to draw all fugitive emissions into the oven with their eventual discharge through the carbon adsorption system. This plant demonstrated that high VOC reductions can be achieved even with low VOC concentration streams. During this four week recovery period the LEL in the system was less than ten percent.

A second tape coating facility with a carbon adsorption control system has a near 90 percent overall reduction. This system has hoods over the coating areas; however, all hood gases are vented directly to the atmosphere. Test data indicate that if the solvent vapors captured by the hoods are ducted back into the ovens the system would show a greater than 90 percent overall VOC reduction. Further data from this plant indicated an average overall VOC reduction of 90 percent for the entire year of 1979. The overall reduction for most of the calendar months was 90 percent or more. In the latter part of the year the overall reduction dropped below 90 percent on a monthly basis. This drop occurred because the carbon life of the control device had been exceeded by several months. With the installation of new carbon the overall reduction efficiency once again reached 90 percent or more. Through April of 1980 an average overall VOC reduction of about 94 percent has been attained.

Regulatory alternatives. The regulatory alternatives considered in developing the standard are based on the methods available to control the VOC emissions from the PSTL industry. In this industry the two primary emission sources are the oven exhausts and fugitives, with the oven exhausts being the more significant source. Therefore, the regulatory alternatives

are designed to control: (1) The oven emissions only or (2) the oven and fugitive emissions together.

Regulatory Alternative I is a no additional regulation alternative. This alternative represents what could happen if no NSPS were written and new sources were regulated by the SIP regulations. The recommended guideline for the SIP regulations represents a system which captures 90 percent of all volatilized solvents and then destroys or recovers 90 percent of those emissions. The overall reduction of VOC emissions from all affected facilities would be about 80 percent. The Alternative I control level is the baseline of comparison for the other regulatory alternatives. Regulatory Alternative I control could be achieved by the use of carbon adsorption, incineration, or low-solvent coatings.

Regulatory Alternative II is based on the control of oven emissions only. This regulatory alternative is very similar to Alternative I except that the efficiency of the add-on control device is selected as 95 percent rather than the 90 prcent control level because it is more indicative of current control system operations. Therefore, with a capture efficiency of 90 percent, the overall VOC reduction for this control system is approximately 85 percent. Carbon adsorption, incineration, or low-solvent coatings could be used to control emissions under this alternative.

Regulatory Alternative III is based on the control of both oven and fugitive VOC emissions. To obtain a high degree of fugitive capture a fugitive control device (such as a hood or a complete enclosure of the coating area) is used between the coater and the oven. The captured fugitive VOC emissions are ducted into the oven or the add-on control device. The recommended method of ducting is to use the captured gases containing fugitive VOC as makeup air to the drying oven. Control of the fugitives results in a higher VOC capture. In this case, 95 percent of the applied solvent that is volatilized is captured. Under Alternative III the control device reduces 95 percent of the captured emissions, and an overall VOC reduction of 90 percent or greater is achieved. Data from existing well-designed pressure sensitive tape and label coating facilities indicate that up to 93 percent overall VOC reduction can be achieved. Chapter 4 and Appendix C of the BID examine data from well-controlled facilities in greater detail.

Environmental, Energy, and Economic Impacts

The environmental, energy, and economic impacts of the NSPS are based on a comparison of the expected impacts of Regulatory Alternatives II and III to Regulatory Alternative I. The overall impacts of the regulatory alternatives are heavily influenced by the predicted decline in the use of organic solvent-based systems. Currently, 80 to 85 percent of all pressure sensitive tape and label coatings are applied with organic solvent formulations. By the year 1990 it is predicted that organic solvent coating will only constitute 10 percent of PSTL all coatings. Based on total solvent use these numbers represent approximately 600,000 megagrams (metric tons) of solvent used in 1978 while only 91,000 megagrams (metric tons) are expected in 1990. The use of organic solvent coatings will decline because of: (1) The increasing availability of alternative low-solvent coatings, (2) the high cost and lessening supply of organic solvents, and (3) increasing environmental regulations relating to solvent use.

Environmental Impacts. An analysis was made to compare the estimated national impacts of VOC emissions, wastewater effluents, solid waste generation, and energy use associated with the regulatory alternatives. The impacts in 1978 are based only on Regulatory Alternative I which represents no NSPS action and SIP adoption of the CTG recommended emission limit. For all environmental parameters the impacts decrease due to the predicted dramatic increase in the use of energy-efficient, low-solvent coating technology. In 1985 the expected increases in adverse environmental impacts from Regulatory Alternatives II and III are not major.

By 1985 it is predicted that the PSTL industry will use 125,000 megagrams (metric tons) of solvents. Regulatory Alternative I (no NSPS with SIP control only) would result in expected total VOC emissions of 27,400 megagrams (metric tons) per year. If Regulatory Alternative II is applied these emissions are expected to be reduced by 2,600 megagrams (metric tons) to 24,800 megagrams (metric tons) per year. This represents a 9.5 percent reduction in emissions. If Alternative III control is exercised the total VOC emissions are expected to be 23,100 megagrams (metric tons) per year. This represents a 16 percent reduction in total emissions over the projected baseline control level.

Wastewater discharge from PSTL coating operations increases with the use of carbon adsorption systems for VOC control. The additional wastewater comes from steam condensate which is separated from the recovered solvent. Generally this water is routed into local waste treatment systems or is emitted directly to the environment. If one assumes that all VOC emissions from PSTL coating facilities are controlled by carbon adsorption units (worst case estimate), the resulting wastewater flow for Alternative III is 13 percent greater than that expected from systems required to meet the Alternative I control level. In 1985, if all the solvent-based coating facilities used carbon adsorption, the total amount of wastewater would be about 20 million liters per year. The amount of VOC potentially in this volume of water is about 10 megagrams (metric tons). Even in the worst case situation the proposed standard is reasonable.

The solid waste impact from the addition of VOC controls in the PSTL industry is expected to be small. The use of carbon adsorption systems produces waste activateds carbon. The carbon must be replaced every one to six years depending on performance. The waste carbon can be landfilled, burned as a solid fuel, or sold to firms which reactivate the carbon. The landfill operation represents the greatest potential adverse environmental problem. This problem can be minimized by proper design, construction, and operation of the landfill site. In 1985 the estimated national incremental carbon solid waste production from PSTL facilities is approximately 55 megagrams (metric tons). This waste load would occur under Regulatory Alternative III control. The solid waste impact is reasonable when compared to the total nationwide VOC reduction being achieved.

Energy Impact. The total industry-wide use of electricity and fossil fuels is expected to decline in the next ten years. The primary reasons for this decline is the greater use of more fuel efficient, low-solvent systems, such as hot melts and waterborne adhesives and 100 percent solids and waterborne releases. The low-solvent systems eliminate the need for large, full-consuming solvent drying ovens.

For an individual coating facility, the supplement energy use is higher for a solvent-type coating line with an add-on VOC control device than a line with no controls at all. More electrical energy is needed to power an increased number of fans and fans with higher capacities. For coating lines controlled by carbon adsorption units, fossil fuels must be used to run the steam boilers. Coating lines controlled by incineration would have fuel requirements that are dependent on the concentration of the

incinerator feed gases. If the concentration can be maintained near 40 percent LEL, fuel requirements will be low.

There is a potential in the PSTL industry for a net national energy savings. This savings would be possible if many or all solvent-based coating lines used solvent recovery control systems. The recovered solvent more than offsets the supplemental energy needed to operate the systems. The net recovered solvent could be translated into barrels of oil, consequently equaling barrels of oil that would not then have to be imported.

In 1985, Regulatory Alternative II would have an increased energy requirement of about 7,900 barrels (1.26 million liters) of crude oil per year above that required by Regulatory Alternative I. If all solvent-based coating lines were controlled by carbon adsorption to the Alternative II level, a best case, gross energy savings of about 23,600 barrels (3.75 million liters) of crude oil is estimated. By deducting the required energy for controls, a potential net national energy savings of 15,700 barrels (2.5 million liters) of crude oil exists.

Under Regulatory Alternative III an incremental (above Alternative I) energy demand of approximately 12,000 barrels (1.9 million liters) of crude oil is projected. Assuming all controls are carbon adsorption units, a gross national energy savings of about 39,100 barrels (6.2 million liters) of crude oil is predicted. This gross savings equates to a potential net national energy savings of 27,100 barrels (4.3 million liters) of crude oil for Alternative III. This estimate reflects the best case energy impact.

If all solvent-based coating lines were controlled by incineration the worst case national energy impacts result. Because no solvent is recovered, there are no credits to offset the increased energy used by the VOC control systems. For Alternative II control an annual 17,700 barrels (2.8 million liters) of crude oil may be consumed by the PSTL industry over that required under Alternative I. Under Alternative III incinerations controls would require aproximately 31,000 barrels (4.9 million liters) of crude oil per year.

Neither total carbon adsorption nor total incineration control is anticipated in this industry. The actual use of the two control devices will be determined by the availability and price of solvent, the applicability of alternative fuels, the rapidity with which low-solvent technologies replace solvent-based ones, and the stringency of environmental regulations.

Economic Impact. The economic impacts of all three regulatory alternatives are minimal. In cases where they can be used, owners or operators will invest in low-solvent coating methods such as 100 percent solids or waterborne coatings. If technological constraints prevent the use of waterborne and 100 percent solid technologies, the regulatory alternatives will have a small impact on the industry. Based on the net present value (NPV) analysis, the large lines will generally experience a greater impact than the medium and small lines. Industry-wide, it is estimated that a price increase of 0.0 to 0.9 percent would be required to offset the impact of the NSPS.

The economic impact of the NSPS was evaluated through the costing of model facilities. These model facilities are based on sizes and flow-rates which represent typical new coating facilities. For this study, three line widths (0.61 m, 0.9 m and 1.5 m) and three line speeds (0.13 m/sec, 0.30m/sec, and 1.2 m/sec) were examined. The large width and high speed were combined in one case to represent a facility which is a large volume (39 million m^2/year) producer. The medium and small widths and slower speeds were combined to represent facilities which are small volume (1.7 million m^2/year and 5.8 million m^2/year) coating operations. The adhesive coating cases were examined separately from the silicone release coating operations. Tandem coating facilities were also analyzed during the economic study.

In the impact analysis, alternative low-solvent technologies are used to give a comparison for the systems which required add-on VOC controls. These alternative systems include hot melt and waterborne adhesives and 100 percent solid and waterborne silicone releases.

Detailed cost data were developed for the adhesive and silicone release model plants. All cost data were based on model plants that would be operating for 6,000 hours per year. The model plant costs were used in an economic model to assess the economic impact of the proposed standard. Both control equipment and coating line costs were developed. A discount rate of 16 percent and capacity utilization rates of 75 and 100 percent were used in the analysis. Inputs on different company structures were also used in the economic model. The model takes all the inputs and analyzes the various alternatives to rate them on net present value (NPV). The alternatives with the highest NPV's are considered as the best alternatives. High NPV's are advantageous because they represent the highest annual cash flows generated by an investment. All impacts represent the situation in 1985.

An economic analysis was not performed for the precoat coating lines because the physical and operational characteristics of a precoat line are very similar to those of release coat lines. To avoid duplications of effort and information, only release coat lines were examined in the economic analysis. Conclusions determined for release coat lines would apply to precoat coating lines.

To adequately represent the alternatives available to a coating operation the economic analysis is done from two perspective cases. In the unconstrained case, it is assumed that both low-solvent and high-solvent technologies can be used as identical product substitutes. This means that the 100 percent solid and waterborne formulations will produce a product equal to that of the solvent systems. In the constrained case, it is assumed that neither waterborne nor 100 percent solids coatings can be used as solvent-based product substitutes. A firm may only use solvent-based technology (with controls) to produce a tape or label product.

In the unconstrained cases, Regulatory Alternative II and III would have no impacts on the pressure sensitive tapes and labels industry. Waterborne and 100 percent solids coatings are available that meet the control requirements of these alternatives. Because low-solvent systems are more profitable than solvent-based ones, firms in the PSTL industry would have an economic incentive to adopt them even in the absence of an NSPS based on Alternatives II or III. The regulatory alternatives would not force firms to change the type of coating line they would build in the absence of any regulatory alternatives.

In the constrained cases, Regulatory Alternatives II and III would have minor impacts. Under Alternative II control, a product price increase of 0.0 to 0.4 percent would result if all costs for controls were passed on to the consumer. If all costs were absorbed by the manufacturer, an industry-wide decrease in return on investment (ROI) of 0.0 to 0.6 percent would result. Under Alternative III control, a product price increase of 0.0 to 0.9 percent is predicted. Full cost absorption by the manufacturer would reduce the ROI by 0.0 to 1.0 percent. With both regulatory alternatives, the large coating lines would be slightly more impacted than the medium and small lines.

The regulatory alternatives would have little or no impact on the industry's

growth rate and structure. The availability of low-solvent technologies and the small price and ROI impacts on the conventional solvent-based systems imply that the regulatory alternatives would not deter new investment and adversely affect growth. Although the large facilities would be affected more than the medium and small facilities, the difference is not great enough to put the large facilities at a competitive disadvantage. Thus, the regulatory alternatives would not cause any significant changes in the structure of the industry.

Best System of Emission Reduction

Based on the environmental, energy, and economic impacts, Regulatory Alternative III is selected as the best system of continuous emission reduction. This alternative is considered affordable and the impacts reasonable. Although this alternative is based on the use of a control device operated in conjunction with a well-designed VOC capture system. It is recognized that low-solvent coatings are available for some applications and are just as effective in reducing VOC emissions.

The control device may be either a carbon adsorber or incinerator. Both control devices have been determined to be capable of at least 95 percent efficiency in reducing VOC emissions. The attainable efficiency of VOC capture systems has been estimated based on PSTL facilities' overall VOC emission reduction data and control device efficiencies for these systems. Based on these calculations the best hooding and enclosure systems are 95 percent efficient in capturing all VOC emissions from a coating operation. The remaining five percent of total emissions are trapped in the coated product or are lost as fugitive emissions. The continuous overall emission reduction achievable by the best system is 90 percent. After consideration, the Administrator has determined that under normal operating conditions all affected facilities could achieve the level of the proposed standard using the best system.

Selection of Format of Proposed Standard

The formats were examined based on their effectiveness in ensuring overall VOC control. The criteria for choosing the format are effectiveness, compatibility with existing coatings and control systems, complexity of compliance testing, and ease of application in the industry.

The formats considered for the pressure sensitive tape and label industry were: (1) Total concentration of emissions from all exhaust gases discharged to the atmosphere. (2) kilograms of emissions per unit of production, (3) control efficiency, and (4) kilograms of emissions per unit weight or volume of coating solids. The following paragraphs discuss the advantages and disadvantages of the regulatory formats.

An allowable concentration of emissions in the exhaust gases discharged to the atmosphere is the easiest standard to enforce. Direct emission measurements can be made using Reference Method 25 on a single effluent stream. The major disadvantage of this format is its poor effectiveness in identifying overall VOC control. The level of fugitive emissions capture cannot be determined with a single point measurement. Such a determination requires either absolute containment or material balance testing of all potential points. As stated earlier, fugitives may amount to 18 percent of the total applied solvent. Another disadvantage is that it does not promote efficient oven energy use. In order to reduce oven energy consumption, the operator generally tries to increase the concentration of solvent in the oven exhaust gases. Therefore, more solvent leaves in a smaller volume of gas. This means lower energy consumption because eneregy use is approximately proportional to oven exhaust gas flow rate. With the higher concentration the operator is required to get a higher percent VOC reduction than an operator with less efficient ovens. In fact, concentration limits allow an operator to emit twice as much solvent by simply doubling the amount of dilution air drawn through the ovens. The overall effect is to promote higher energy consumption, while allowing greater total VOC emissions.

A format of kilograms of emissions per unit of production relates emissions to individual plant production on a direct basis. This type of standard would be inequitable for different types of coatings. In the PSTL industry, adhesive coatingss vary in thickness and in kilograms of VOC coated per unit area of production. This is further complicated by the inclusion of solvent silicone release and precoat coatings. These coatings tend to be much thinner and contain less VOC per unit area of production than adhesive coatings. Therefore, if a single value for the standard was used, some solvent coatings would require no additional controls while others would require a very high level of control.

The control efficiency standard would be developed from two viewpoints. The first would be to set a control level across the add-on control device. This form would provide a good means for reducing oven emissions but would not insure the control of fugitive emissions. The second viewpoint would require an overall VOC reduction based on the total amount of solvent in the formulated coating before application. This would include both fugitive VOC emissions and oven emissions. Compliance testing for this situation would require a material balance-type test which is a problem for any standard.

A regulatory format which would relate total allowable mass of VOC emissions to the amount of coating applied would be a very effective standard. For the PSTL industry, this form was examined for mass of VOC emissions with respect to volume of coating, volume of coating solids, and weight of coating solids. Weight of coating solids was chosen as the best of these forms because most formulations are derived on a weight basis. Generally, resin density is constant. Therefore, the weight basis is easy to calculate from formulation data.

The format of the proposed standard is a combination of the percent overall VOC reduction and the mass of VOC emissions per mass of coating solids formats. The percent overall VOC reduction would provide an effective means of requiring an overall VOC control, while not being prohibitive for high-solvent coatings. The mass emission per weight of coating solids would allow the use of low-solvent coatings without the need for all-on VOC control devices. This combination would permit add-on VOC controls for nearly all solvent-based coating systems and promote the development and use of low-solvent coatings.

Selection of Emission Limits

Section 111(a)(1) requires the emission limits to reflect "application of the best technological system of continuous emission reduction which (taking into consideration the cost of achieving such emission reduction, any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated." Section 111(a)(1). The "best technological system" defined by Section 111(a)(1) is one that is not "exorbitantly costly." *Essex Chemical Corp.* v. *Ruckleshaus*, 486 F. 2d 427, 433 (D.C. Cir. 1973).

Application of the "best technological system" results in a two-step standard: for coatings with VOC contents of 2 kg/kg of coating solids or less, the standard is 0.2 kg/kg; for coatings with greater

than 2 kg/kg VOC content, the standard is a 90 percent reduction in VOC emissions.

As discussed earlier, VOC reductions of 90 percent are achievable by systems of capture and control. However, the cost and energy requirements of achieving VOC emission reductions vary according to the VOC content of the coating being controlled. The lower the VOC content of the coating, the higher are the cost and energy requirements of achieving a given reduction in emissions. This is for two reasons. First, a given percent control of lower VOC coatings generally requires capture and control systems of at least the same size and cost as the same percent control of higher-VOC coatings, but it achieves less mass emission reduction because there is less VOC to be controlled. Second, the cost and energy requirements of controlling lower-VOC coatings in incinerators are further increased by the need to use additional supplemental fuel to operate the incinerator.

In the Administrator's judgment, the cost and energy requirements of a capture and control system that achieves 90 percent reduction are reasonable on coatings with VOC contents of 2.0 kg/kg and greater. Such a control system is therefore the "best technological system," and the standard for such high VOC coatings is 90 percent reduction.

For coatings with lower VOC contents, the "best technological system" is one that can achieve 0.2 kg/kg. In the Administrator's judgment, the cost and energy requirements of achieving significantly greater emission reduction on such lower VOC coatings would be exorbitant. Therefore, the standard for such coatings is 0.2 kg/kg. This can be achieved by all sources at reasonable cost and energy requirments.

The effect of solvent retention in the final tape of label product and its impact on the achievability of a 90 percent overall emission reduction were considered. Test data obtained during this study indicate that the amount of solvent retained in the product does not affect the ability of a facility to achieve the proposed standard. A well-controlled PSTL facility has demonstrated a four-week overall VOC emission reduction of 93 percent. This overall reduction includes the amount of solvent that was retained in the product. During this period the facility coated 18 different adhesives with varying amounts of retained solvent. Neither the four week period nor the many varied adhesive products coated (i.e., varied amounts of retained solvent) affected the plant's ability to achieve the proposed standard. Therefore EPA believes that 90 percent overall emission reduction efficiency can be achieved under all solvent retention conditions.

Selection of Compliance Procedures

After the required initial performance test, compliance with the proposed standard will be determined on a calendar month basis. Every calendar month will be considered a performance test for carbon adsorption-controlled coating lines, for incinerator-controlled coating lines, and for coating lines using low-solvent coating technology. The owner or operator will report to the Administrator within ten days following the end of a calendar month only if an affected facility exceeded the proposed standard for that calendar month being reported.

The variability of operation of the PSTL industry makes it well-suited to a monthly compliance period. Many products are produced in this industry using hundreds of different coatings. Operating parameters such as line speed, line width, length of a coating run, product solvent retention, and control device solvent hold-up vary substantially within this industry on a daily basis. The combination of these factors influences the quantity of emissions and the ability to meet a standard. Compliance with the proposed standard on a monthly basis would allow enough time for coating system fluctuations to average out.

To determine compliance with the proposed standard, an owner or operator of an affected facility using low-solvent coatings must calculate the weighted average of the mass of VOC (solvent) used per mass of coating solids applied each calendar month. The mass of VOC per mass of coating solids applied can be obtained by using a modified version of Reference Method 24 or coating manufacturer's formulation data. At any time the Administrator may require a Reference Method 24 test to verify the VOC content. The reference method must be performed so that mass per mass units are obtained and not mass per volume units as the method is currently written. The mass per mass modification actually simplifies the method. If the calculated weighted average is less than or equal to 0.20 kg VOC per kg of coating solids applied, compliance with the proposed standard would be demonstrated. Affected facilities with weighted averages greater than 0.20 would have to install add-on control devices to achieve compliance with the proposed standard. For enforcement purposes Reference Method 24 and not manufacturer's formulation data would be used.

Every affected facility using add-on control devices to achieve compliance with the proposed standard, must determine the weighted average of the mass of VOC used per mass of coating solids applied each calendar month. The weighted average VOC content would be compared to the 0.20 kg limit each month to determine the required level of overall VOC reduction. The maximum required overall VOC reduction is 90 percent.

Affected facilities controlled by carbon adsorption will determine monthly compliance using a solvent inventory test. The total mass of solvent used every calendar month will be divided by the total mass of solvent recovered by the carbon adsorber every month to determine the overall VOC emission reduction obtained. If the overall VOC emission reduction obtained is greater than or equal to the required overall reduction, compliance with the proposed standard is demonstrated.

Affected facilities controlled by incineration will determine monthly compliance by comparing the required overall VOC emission reduction of each calendar month to the overall VOC emission reduction demonstrated during the most recent performance test which complied with the proposed standard. If the required monthly reduction is less than or equal to the performance test reduction, the affected facility is in compliance with the proposed standard.

Modification and Reconstruction

Facilities which are modified or reconstructed as defined in 40 CFR 60.14 and 60.15 after the date of proposal of this standard are subject to the standard. In the case of PSTL facilities, a modification, and thus an increase in VOC emissions, will most likely be related to an increase in production. Production increases contributing to emission increases can result from changes in web width, line speed, or hours of operation. An increase in the hours of operation is specifically excluded from new source performance standards. If changes in line speed and line width are part of the existing equipment capability and do not require capital expenditures, they are also excluded from new source performance standards.

Production increases, however, may require capital expenditures, although this is not expected to be a frequent occurrence. A coating line with a drying oven is usually designed for a maximum solvent vaporization loading. The limiting factor is the LEL level allowed in the ovens. Line speed and line width can often be readily changed as long as

the production is kept under the maximum design of the oven. If production is increased above the maximum designed for the oven, a significant capital expenditure will be made for larger exhaust fans and possibly larger recirculation fans, and larger drive motors for the coater and wind and unwind equipment. If there is an increase in VOC emissions the facility will be a modification and will have to comply with the proposed standard. All control procedures previously discussed are applicable to modified PSTL facilities, therefore, the proposed standard is determined to be reasonable for such facilities.111Reconstructed facilities are also a potential occurrence in this industry. Existing control technologies would be applicable to the VOC emissions from such facilities. Because the emissions from reconstructed facilities can be controlled to the level specified in Regulatory Alternative III, the proposed standard would be reasonable for these types of facilities.

Selection of Monitoring Requirements

Monitoring requirements are included in the proposed standard to ensure good operation and maintenance of the VOC emission control equipment. Monitoring procedures for the proposed standard were chosen based on three factors: Reasonable cost, ease of execution, and utility of the resulting data to both the owner and to EPA for assuring continued proper operation.

Affected facilities controlled by incineration must monitor the temperature of the incinerator exhaust gases. The average temperature is being monitored to determine the occurrence of improper incinerator operation. The temperature drops stated below shall be indications of improper incinerator operation. For thermal incinerators the exhaust gas temperature must be continuously monitored and recorded. Any three hour period (during actual coating operations) during which the average temperature of the device is more than 28C° (50F°) less than the average temperature of the device during the most recent performance test complying with the proposed standard shall be reported to the Administrator. For catalytic incinerators the gas temperature upstream and downstream of the catalyst bed must be monitored. Any three hour period (during actual coating operations) during which the average temperature of the device immediately before the catalyst bed is more than 28C° (50F°) less than the average temperature of the device during the most recent performance test complying with the proposed standard, or any three hour period during which the average temperature difference across the catalyst bed is less than 80 percent of the average temperature difference of the device during the most recent performance test complying with the proposed standard shall be reported to the Administrator.

Temperature monitoring equipment is usually a standard feature on most incinerators. For this reason, the requirement to monitor temperature should not be an additional cost burden on the industry. If it is not included, the cost to purchase and install an accurate temperature measurement device and recorder is estimated at $1,200.

Any affected facility which use incinerators to comply with the proposed standard and which uses a hood or enclosure to capture fugitive VOC emissions, must operate a monitoring device which continuously indicates that the hood or enclosure is operating. Examples of such devices include fan amperage meters and flow meters in ducts. No continuous monitoring will be required if the hood or enclosure system is interlocked with the affected facility's oven air recirculation system.

Selection of Performance Tests Methods

Performance test methods are used to determine the solvent content in the coating and the overall control efficiency of the add-on control system. Furthermore, the test method for determining control efficiency differs depending on whether carbon adsorption or incineration is used.

The proposed method for measuring the solvent content in the coating is Reference Method 24 promulgated at October 3, 1980 45 FR 65956 "Determination of Volatile Matter Content, Water Content, Density, Volume Solids, and Weight Solids of Surface Coatings." This method combines several ASTM standard methods to determine the volatile matter content, density of the coating, volume of solid, and water content of the paint, varnish, lacquer, and related surface coatings. From this information, the mass of volatile organic compounds (VOC) per unit volume of solids is calculated.

Because the proposed PSTL regulation for coating is in units of mass of volatile organic compounds per mass of coating solids. Reference Method 24 must be modified so its results are in the same units as the standard. This actually shortens the test method by eliminating several steps because only the non-aqueous volatile content needs to be determined. For non-aqueous coatings, the procedure to be used is ASTM D 2369–73, "Standard Test Method for Volatile Content of Paints." For coatings with water, the previously mentioned procedure (ASTM D 2369–73) is combined with another procedure which determines the water content of the coating. There are two acceptable procedures for this: (1) ASTM D 3792, "Standard Test Method for Water in Water Reducible Paint by Direct Injection into a Gas Chromatograph," and (2) an ASTM draft "Standard Test Method for Water in Paint or Related Coatings by the Karl Fischer Titration Method." The results from these procedures are the nonaqueous volatile content of the coating (as a weight fraction) and the water content (as a weight fraction). The weight fraction solids content in the coating can also be determined from these procedures. The VOC content in the coating, in mass of VOC per mass of coating solids applied, may be determined by dividing the weight fracton of non-aqueous volatiles by the weight fraction of solids.

The estimated cost of analysis per coating sample is $50 for the total volatile content procedure (ASTM D 2369–73). For aqueous coatings, there is an additional $100 per sample for water content determination. Since the testing equipment is standard laboratory apparatus, no additional purchasing costs are expected.

In certain cases, for the proposed PSTL standard, the density of a particular coating may be required. The density may be determined from the coating manufacturer's formulation data or from a procedure that is a part of Reference Method 24. The procedure in Method 24 is ASTM D 1475–60, "Standard Test Method for Density of Paint, Varnish, Lacquer, and Related Products." The analysis of a coating sample would cost about $25. Testing can be performed with standard laboratory equipment.

If the amount of solvent in the coating exceeds 0.20 kg per kg of coating solids applied, then the efficiency of the vapor control system must be determined. The overall efficiency is determined by comparing the amount of solvent controlled (either recovered or destroyed) to the potential amount of solvent emitted with no controls. For the proposed standard two different performance test methods were selected. The method to use depends upon the type of add-on control device being installed. In the PSTL industry, only two types of control devices are expected: carbon adsorbers and incinerators.

For carbon adsorbers, performance is demonstrated by comparing the solvent used versus the solvent recovered. In

using a solvent inventory system, it is necessary to monitor two things: The amount used of each coating, and the amount of solvent recovered by the carbon adsorption system.

The performance test will consist of a one calendar month solvent inventory as opposed to the three test runs method specified in § 60.8(f). Compliance in the months following the performance test will also be determined on a calendar month basis.

To determine the efficiency of the carbon adsorber system, these data would be collected over a period of one calendar month. This time interval allows the test to be conducted using a representative variety of coatings and products, as well as reducing the impact of variations in the process that would otherwise affect the representativeness of a short-term test. It should be noted that this procedure determines the overall control efficiency based on the original amount of solvent used, not on the amount entering the carbon adsorber, and fugitive emissions are allowed as long as the overall control efficiency meets the standard.

The cost of such a performance test should be minimal since the solvent inventory data would be part of normal operating equipment in the plant. If not, the estimated purchase cost of two accurate liquid weight meters is $1,400.

Because incinerators destroy the solvent rather than recover it, a different type of performance test is used. The proposed procedure measures the mass of VOC (as carbon) in the incinerator system vents (incinerator inlet, incinerator outlet, and fugitive emission vents), and determines the incinerator system's overall control efficiency. There are important differences between the carbon adsorber and incinerator test procedures that should be noted. The test procedure for the carbon adsorber system relates the original amount of solvent used at the coating head to the amount of solvent controlled, i.e. recovered, by the adsorber. It is possible to compare the two amounts because the same measurement method is used (liquid solvent used versus liquid solvent recovered). However, for incinerator systems, the amount of solvent used should not be directly related to the amount of solvent controlled, i.e. destroyed, because different measurement procedures are used, (liquid solvent used in the coating is measured as mass of solvent, while the gaseous emissions destroyed are measured as mass of carbon). Thus, for incinerators, the amount controlled or destroyed is determined by using the amount of solvent measured in the inlet vent versus the outlet vent. The overall incinerator system control efficiency is determined by relating the amount destroyed to all the potential emissions.

To make the incinerator test procedure equivalent to the carbon adsorber test procedure, one must be able to measure all the potential emissions, both fugitive emissions and oven emissions ducted into the incinerator. That is, all fugitive VOC emissions from the web coating area must be captured and vented through stacks suitable for testing. Prior to the performance test for incineration-controlled affected facilities, the owner or operator will be required to construct a temporary total enclosure around the coating line for the purpose of capturing fugitive VOC emissions. A total enclosure is defined as any structure or building around the coating applicator and flashoff area or the entire coating line for the purpose of confining and totally capturing fugitive VOC emissions. If a permanent total enclosure exists on the line prior to the performance test, and the enforcing agency is satisfied that the enclosure is totally capturing fugitive emissions; the construction of a temporary enclosure is not required.

The concentration of VOC (as carbon) in the incinerator vent system is measured by Reference Method 25, "Determination of Total Gaseous Nonmethane Organic Emissions as Carbon (TGNMO)." The results of this method combined with the results of Reference Methods 1 through 4 yields the mass of VOC (as carbon) in the vent.

Three one-hour runs of Reference Method 25 are required for a complete test, with Reference Methods 2, 3 and 4 being performed at least twice during that period. Measurements at the inlet, outlet and fugitive emission vents should be performed simultaneously. The total time required for one complete performance test is estimated at 8 hours, with an estimated overall cost $4,000, plus $2,000 for each fugitive vent measured.

The TGNMO method (Reference Method 25) was selected to measure the VOC concentration in incinerators for certain reasons. It is simple to use, especially in explosive atmospheres or when sampling high-temperature, moist streams. Also because the detector used in Reference Method 25 measures all the non-methane organics as methane, all carbon atoms give an equivalent instrument response. Therefore, the problem of varying response ratios for different organic compounds (typical of all flame ionization units) is avoided.

The decision to propose two different performance test methods was made after considering several factors. It is usually preferable to have the same performance test method regardless of the type of control device. In this case, the stack sampling procedure described for incinerators is also applicable to carbon adsorbers. However, the solvent inventory method is a far more practical and accurate procedure. It is very inexpensive, requires no special technical sampling and analytical procedures, and has a test period of one month, so that a representative variety of coatings can be tested. Unfortunately, an inventory-type method cannot be applied to incinerators. The one-day TGNMO inlet and outlet stack test procedure is the best method for testing incinerators, but this method would become exorbitantly expensive and impractical if a longer test period were required. The advantages of the solvent inventory-type test for carbon adsorbers outweigh the disadvantages of having two different performance test methods.

Reports Impact Analysis

The reporting requirements necessitated by the proposed standard are authorized in Section 114 of the Clean Air Act. The proposed standard would require the preparation of three types of reports. First, the general provisons (Subpart A of 40 CFR Part 60) would require notification reports which inform the agency of facilities subject to new source performance standards (NSPS). These reports include notification of construction, anticipated start-up, acutal start-up, and physical or operational changes. Second, reports of performance test results and performance evaluations of the continuous monitoring systems would be required. These reports show whether a facility is initially meeting the level of the standard. Third, monthly reports explaining whether an affected facility is in or out of compliance with the standard would be required

The respondent group to the reporting requirements of the proposed standard would be the pressure sensitive tapes and labels (PSTL) industry. It is estimated that through the fifth year of standard applicability, approximately 290 new PSTL sources will have been established which would have to comply with the reporting requirements of the proposed standard. This number of sources includes adhesive, release, and precoat coating facilities. To implement the reporting requirements of the proposed standard, through the first five years of applicability, the PSTL industry would incur a manpower demand of about 12 man-years. Comments are invited on any of the reporting requirements of the proposed standard.

Section 60.447 of the proposed standard explains specific reporting requirements in further detail.

Public Hearing

A public hearing will be held to discuss the proposed standards in accordance with Section 307(d)(5) of the Clean Air Act. Persons wishing to make oral presentations should contact EPA at the address given in the ADDRESSES section of this preamble. Oral presentations will be limited to 15 minutes each. Any member of the public may file a written statement before, during, or within 30 days after the hearing. Written statements should be addressed to the Central Docket Section address given in the ADDRESSES section of this preamble.

A verbatim transcript of the hearing and written statements will be available for public inspection and copying during normal working hours at EPA's Central Docket Section in Washington, D.C. (see ADDRESSES section of this preamble).

Docket

The docket is an organized and complete file of all the information submitted to or otherwise considered in the development of this proposed rulemaking. The principal purposes of the docket are (1) to allow interested parties to readily identify and locate documents so that they can intelligently and effectively participate in the rulemaking process, and (2) to serve as the record in case of judicial review.

Miscellaneous

As prescribed by Section 111, establishment of standards of performance for the manufacture of pressure sensitive tapes and labels was preceded by the Administrator's determination (40 CFR 60.16, 44 FR 49222, dated August 21, 1979) that these sources contribute significantly to air pollution which may reasonably be anticipated to endanger public health or welfare. In accordance with Section 117 of the Act, publication of this proposal was preceded by consultation with appropriate advisory committees, independent experts, and Federal departments and agencies. The Administrator will welcome comments on all aspects of the proposed regulation, including economic and technological issues, and on the proposed test methods.

Comments are specifically invited from small PSTL companies on the definition of the affected facility. Larger companies in this industry have objected to the present definition. They feel the affected facility should be defined as a coating line from initial unwind to final wind. Any comments submitted to the Administrator on this issue should contain specific information and data pertinent to an evaluation of the affected facility definition. Alternative courses of action should be suggested.

It should be noted that standards of performance for new sources established under Section 111 of the Clean Air Act reflect:

> • • • application of the best technological system of continuous emission reduction which (taking into consideration the cost of achieving such emission reduction, any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated (Section 111(a)(1)).

Although there may be emission control available that can reduce emissions below those levels required to comply with standards of performance, this technology might not be selected as the basis of standards of performance due to costs associated with its use. Accordingly, standards of performance should not be viewed as the ultimate in achievable emissions control. In fact, the Act requires (or has the potential for requiring) the imposition of a more stringent emission standard in several situations.

For example, applicable costs do not necessarily play as prominent a role in determining the "lowest achievable emission rate" for new or modified sources located in nonattainment areas, i.e., those areas where statutorily-mandated health and welfare standards are being violated. In this respect, Section 173 of the Act requires that new or modified sources constructed in an area which exceeds the National Ambient Air Quality Standard (NAAQS) must reduce emissions to the level which reflects the "lowest achievable emission rate" (LAER), as defined in Section 171(3) for such category of source. The statute defines LAER as that rate of emissions based on the following, whichever is more stringent:

> (A) The most stringent emission limitation which is contained in the implementation plan of any State for such class of category of source, unless the owner of operator of the proposed source demonstrates that such limitations are not achievable, or
>
> (B) The most stringent emission limitation which is achieved in practice by such class of category of source.

In no event can the emission rate exceed any applicable new source performance standard (Section 171(3)).

A similar situation may arise under the prevention of significant deterioration of air quality provisions of the Act (Part C). These provisions require that certain sources (referred to in Section 169(1)) employ "best available control technology" (BACT) as defined in Section 169(3) for all pollutants regulated under the Act. Best available control technology must be determined on a case-by-case basis, taking energy, environmental and economic impacts and other costs into account. In no event may the application of BACT result in emissions of any pollutants which will exceed the emissions allowed by an applicable standard established pursuant to Section 111 (or 112) of the Act.

In all events, State Implementation Plans (SIP's) approved or promulgated under Section 110 of the Act must provide for the attainment and maintenance of NAAQS designed to protect public health and welfare. For this purpose, SIP's must in some cases require greater emission reduction than those required by standards of performance for new sources.

Finally, States are free under Section 116 of the Act to establish even more stringent emission limits than those established under Section 111 or those necessary to attain or maintain the NAAQS under Section 110. Accordingly, new sources may in some cases be subject to limitations more stringent than standards of performance under Section 111, and prospective owners and operators of new sources should be aware of this possibility in planning for such facilities.

This regulation will be reviewed four years from the date of promulgated. This review will include an assessment of such factors as the need for integration with other programs, the existence of alternative methods, enforceability, and improvements in emission control technology, and reporting requirements. The reporting requirements in this regulation will be reviewed as required under EPA's sunset policy for reporting requirements in regulations.

Section 317 of the Clean Air Act requires the Administrator to prepare an economic impact assessment for any new source standard of performance under Section 111(b) of the Act. An economic impact assessment was prepared for the proposed regulations and for other regulatory alternatives. All aspects of the assessment were considered in the formulation of the proposed standards to insure that the proposed standards would represent the best system of emission reduction considering costs. The economic impact assessment is included in the Background Information Document.

Dated: December 22, 1980.

Douglas M. Costle,

Administrator.

It is proposed that 40 CFR Part 60 be amended by adding a new Subpart RR as follows:

Subpart RR—Standards of Performance for Pressure Sensitive Tape and Label Surface Coating Operations

Sec.

60.440 Applicability and designation of affected facility.
60.441 Definitions and symbols.
60.442 Standard for volatile organic compounds.
60.443 Compliance provisions.
60.444 Performance test procedures.
60.445 Monitoring of operations and recordkeeping.
60.446 Test methods and procedures.
60.447 Reporting requirements.

Authority: Sec. 111, 301(a) of the Clean Air act as amended (42 U.S.C. 7411, 7601(a)), and additional authority as noted below.

Subpart RR—Standards of Performance for Pressure Sensitive Tape and Label Surface Coating Operations

§ 60.440 Applicability and designation of affected facility.

(a) The affected facility to which the provisions of this subpart apply is each pressure sensitive adhesive coating line, each release coating line, and each precoat coating line used in the manufacture of pressure sensitive materials.

(b) This subpart applies to any affected facility which begins construction, modification, or reconstruction after [—— date of publication in **Federal Register**].

§ 60.441 Definitions and symbols.

(a) Except as otherwise required by the context, terms used in this subpart are defined in the Act, in Subpart A of this part, or in this section as follows:

"Coating applicator" means an apparatus used to apply a surface coating to a continuous web.

"Coating line" means a coating applicator, flashoff area, and oven.

"Coating solids applied" means the solids content of the coated adhesive, release, or precoat as defined by Reference Method 24.

"Flashoff area" means the portion of a coating line after the coating applicator and usually before the oven entrance.

"Fugitive volatile organic compounds" means any volatile organic compounds which are emitted from the coating applicator and flashoff areas and are not emitted in the oven.

"Hood or enclosure" means any device used to capture fugitive volatile organic compounds.

"Oven" means a chamber which uses heat or irradiation to bake cure, polymerize, or dry a surface coating.

"Precoat" means a coating operation in which a primer, lacquer, or tackifying coating (or their equivalent) is applied to a surface as a precursor to the production of a pressure sensitive or release product.

"Pressure sensitive tape and label surface coating operation" means any coating line which coats a continuous web with either pressure sensitive adhesive, release or precoat coatings associated with pressure sensitive products.

"Solvent applied in the coating" means all organic solvent contained in the adhesive, release, and precoat formulations that is metered into the coating applicator from the formulation area.

"Total enclosure" means a structure or building around the coating applicator and flashoff area or the entire coating line for the purpose of confining and totally capturing fugitive VOC emissions.

"Volatile organic compound (VOC)" means any organic compound which is measured by Reference Methods 24 or 25.

(b) All symbols used in this subpart not defined below are given meaning in the Act or in Subpart A of this part.

"a" means the gas stream vents exiting the emission control device.

"b" means the gas stream vents entering the emission control device.

"C_{aj}" means the concentration of VOC (carbon equivalent) in each gas stream (j) exiting the emission control device, in parts per million by volume.

"C_{bi}" means the concentration of VOC (carbon equivalent) in each gas stream (i) entering the emission control device, in parts per million by volume.

"C_{fk}" means the concentration of VOC (carbon equivalent) in each gas stream (k) emitted directly to the atmosphere, in parts per million by volume.

"G" means the calculated weighted average mass (kg) of VOC per mass (kg) of coating solids applied each calendar month.

"M_{oi} means the mass (kg) of VOC per mass (kg) of coating solids applied in each coating (i) used in the calendar month.

"M_r" means the total mass (kg) of solvent recovered for a calendar month.

"M_{si}" means the mass (kg) of coating solids applied in each coating (i) used in the calendar month as measured by the reference method specified in § 60.446(a) or by the coating manufacturer's formulation data.

"Q_{aj}" means the volumetric flow rate of each effluent gas stream (j) exiting the emission control device, in dry standard cubic meters per second.

"Q_{bi}" means the volumetric flow rate of each effluent gas stream (i) entering the emission control device, in dry standard cubic meters per second.

"Q_{fk}" means the volumetric flow rate of each effluent gas stream (k) emitted to the atmosphere, in dry standard cubic meters per second.

"R" means the overall VOC emission reduction achieved for a calendar month (in percent).

"R_q" means the required overall VOC emission reduction (in percent).

§ 60.442 Standard for volatile organic compounds.

(a) On and after the date on which the performance test required by § 60.8 has been completed each owner or operator subject to this subpart shall—

(1) Cause the discharge into the atmosphere from an affected facility not more than 0.20 kg VOC/kg of coating solids applied as calculated on a weighted average basis for one calendar month; or

(2) Demonstrate for each affected facility:

(i) A 90 percent overall VOC emission reduction as calculated over a calendar month; or

(ii) The percent overall VOC emission reduction specified in § 0.443(b) as calculated over a calendar month.

(b) Any coating line which causes the discharge into the atmosphere of not more than 125 kilograms of VOC per day and 15 megagrams of VOC per year is not considered an affected facility and is not therefore subject to the emission limits of § 60.442(a). If either the 125 kilogram per day limit or the 15 megagram per year limit are exceeded, the coating line shall become an affected facility and will be subject to § 60.442(a) and all its associated subparts.

§ 60.443 Compliance provisions.

(a) To determine compliance with § 60.442(1), the owner or operator of the affected facility shall calculate a weighted average of the mass of solvent used per mass of coating solids applied for a one calendar month period according to the following procedures:

(1) Measure the VOC content (kg VOC/kg coating solids applied) of all coatings applied using the reference method specified in § 60.446(a) of this subpart or by using the coating manufacturer's formulation data.

(2) Compute the weighted average by the following equation:

$$G = \frac{\sum_{i=1}^{n} (M_{oi} \times M_{si})}{\sum_{i=1}^{n} M_{si}}$$

(3) For each affected facility where the value of G is less than or equal to 0.20 kg VOC per kg of coating solids applied, the affected facility is in compliance with § 60.442(a)(1).

(b) To determine compliance with § 60.442(a)(2), the owner or operator shall calculate the required overall VOC emission reduction according to the following equation:

$$R_q = \left(\frac{G - 0.20}{G}\right) \times 100$$

If R_q is less than or equal to 90 percent, then the required overall VOC emission reduction is R_q. If R_q is greater than 90 percent, than the required overall VOC emission reduction is 90 percent.

(c) Where compliance with the emission limits specified in § 60.442(a)(2) is achieved through the use of a solvent recovery system, the owner or operator shall determine the overall VOC emissior reduction for a one calendar month period by the following equation:

$$R = \left[\frac{M_r}{\sum_{i=1}^{n} (M_{oi} \times M_{si})}\right] \times 100$$

If the R value is equal to or greater than the R_q value specified in § 60.443(b), then compliance with § 60.442(a)(2) is demonstrated.

(d) Where compliance with the emission limit specified in § 60.442(a)(2) is achieved through the use of a solvent destruction device, the owner or operator shall determine calendar monthly compliance by comparing the monthly required overall VOC emission reduction specified in § 60.443(b) to the overall VOC emission reduction demonstrated in the most recent performance test which complied with § 60.442(a)(2). If the monthly required overall VOC emission reduction is less than or equal to the overall VOC reduction of the most recent performance test, the affected facility is in compliance with § 60.442(a)(2).

(e) Where compliance with § 60.442(a)(2) is achieved through the use of a solvent destruction device, the owner or operator shall continuously record the destruction device combustion temperature during coating operations for thermal incineration destruction devices or the gas temperature upstream and downstream of the incinerator catalyst bed during coating operations for catalytic incineration destruction devices. For thermal incineration destruction devices the owner or operator shall report all three hour periods (during actual coating operations) during which the average temperature of the device is more than 28C° (50F°) below the average temperature of the device during the most recent performance test complying with § 60.442(a)(2). For catalytic incineration destruction devices, the owner or operator shall report all three hour periods (during actual coating operations) during which the average temperature of the device immediately before the catalyst bed is more than 28C°(50F°) below the average temprature of the device during the most recent performance test complying with § 60.442(a)(2), and all three hour periods (during actual coating operations) during which the average temperature difference across the catalyst bed is less than 80 percent of the average temperature difference of the device during the most recent performance test complying with § 60.442(a)(2).

(f) After the initial performance test required for all affected facilities under § 60.8, compliance with the VOC emission limitation and percentage reduction requirements under § 60.442 is based on the average emission reduction for one calendar month. A separate performance test is completed at the end of each calendar month after the initial performance test, and a new calendar month's average VOC emission reduction is calculated to show compliance with the standard.

(g) If a common emission control device is used to recover or destruct solvent from more than one affected facility, the performance of that control device is assumed to be equal for each of the affected facilities. Compliance with § 60.442(a)(2) is determined by the methods specified in § 60.443(c) and § 60.443(e) and is performed simultaneously on all affected facilities.

(h) If a common emission control device is used to recover solvent from an existing facility (or facilities) as well as from an affected facility (or facilities), the overall VOC emission reduction for the affected facility (or facilities), for the purpose of compliance, shall be determined by the following procedures:

(1) The owner or operator of the existing facility (or facilities) shall determine the mass of solvent recovered for a calendar month period from the existing facility (or facilities) prior to the connection of the affected facility (or facilities) to the emission control device.

(2) The affected facility (or facilities) shall then be connected to the emission control device.

(3) The owner or operator shall determine the total mass of solvent recovered from both the existing and affected facilities over a calendar month period. The mass of solvent determined in paragraph (h) (1) of this section from the existing facility shall be subtracted from the total mass of recovered solvent to obtain the mass of solvent recovered from the affected facility (or facilities). The overall VOC emission reduction of the affected facility (or facilities) can then be determined as specified in § 60.443(c).

(i) If a common emission control device is used to destruct solvent from an existing facility (or facilities) as well as from an affected facility (or facilities), the overall VOC emission reduction for the affected facility (or facilities), for the purpose of compliance, shall be determined by the following procedures:

(1) The owner or operator shall operate the emission control device with both the existing and affected facilities connected.

(2) The concentration of VOC (in parts per million by volume) after the common emission control device shall be determined as specified in § 60.444(c). This concentration is used in the calculation of compliance for both the existing and affected facilities.

(3) The volumetric flow out of the common control device attributable to the affected facility (or facilities) shall be calculated as a weighted average of the volumetric flows into the control device from the affected facility (or facilities) and the existing facility (or facilities). Compliance is determined by the use of the equation specified in § 60.444(c).

§ 60.444 Performance test procedures.

(a) The performance test for affected facilities complying with § 60.442(a) without the use of add-on controls shall be identical to the procedures specified in 60.443(a).

(b) The performance test for affected facilities controlled by a solvent recovery device shall be conducted as follows:

(1) The performance test will consist of one calendar month run and not the average of three runs as specified in § 60.8(f).

(2) The weighted average mass of VOC per mass of coating solids applied for a one calendar month period shall be determined as specified in § 60.443(a)(1) and § 60.443(a)(2).

(3) Calculate the required overall VOC emission reduction as specified in § 60.443(b).

(4) Inventory solvent usage and solvent recovery for a one calendar month period.

(5) Determine the performance of the solvent recovery device as specified in § 60.443(c).

(c) The performance test for affected facilities controlled by a solvent destruction device shall be conducted as follows:

(1) The weighted average mass of VOC per mass of coating solids applied for a one calendar month period shall be determined as specified in § 60.443(a)(1) and § 60.443(a)(2).

(2) Calculate the requried overall VOC emission reduction as specified in § 60.443(b).

(3) Determine the performance of the solvent destruction device by the following procedures:

$$R = \left[\frac{\sum_{i=1}^{n} (Q_{bi} \times C_{bi}) - \sum_{j=1}^{m} (Q_{aj} \times C_{aj})}{\sum_{i=1}^{n} (Q_{bi} \times C_{bi}) + \sum_{k=1}^{} (Q_{fk} \times C_{fk})} \right] \times 100$$

(i) The owner or operator of the affected facility shall construct the overall VOC emission reduction system so that all volumetric flow rates and total VOC emissions can be accurately determined by the applicable test methods and procedures specified in § 60.446(b).

(ii) The owner or operator of an affected facility shall construct a temporary total enclosure around the coating line applicator and flashoff area during the performance test for the purpose of capturing fugitive VOC emissions. If a permanent total enclosure exists in the affected facility prior to the performance test and the Administrator is satisfied that the enclosure is totally capturing fugitive VOC emissions, then no additional total enclosure will be required for the performance test.

(iii) For each affected facility where the value of R is greater than or equal to the value of R_q calculated in § 60.443(b), compliance with § 60.442(a)(2) is demonstrated.

(iv) The performance of the solvent destruction device shall be determined by averaging the results of three runs as specified in § 60.8(f).

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414))

§ 60.445 Monitoring of operations and recordkeeping.

(a) The owner or operator of an affected facility subject to this subpart shall maintain a calendar month record of all coatings used and the results of the reference test method specified in § 60.446(a) or the manufacturer's formulation data used for determining the VOC content of those coatings.

(b) The owner or operator of an affected facility controlled by a solvent recovery device shall maintain a calendar month record of the amount of solvent applied in the coating at each affected facility.

(c) The owner or operator of an affected facility controled by a solvent recovery device shall install, calibrate, maintain, and operate a monitoring device for indicating the cumulative amount of solvent recovered by the device over a calendar month period. The monitoring device shall be accurate within ±2.0 percent. The owner or operator shall maintain a calendar month record of the amount of solvent recovered by the device.

(d) The owner or operator of a coating line operating at the conditions specified in § 60.442(b) shall maintain a daily and yearly record of the amount of solvent applied in the coating at the facility.

(e) The owner or operator of an affected facility controlled by a thermal incineration solvent destruction device shall install, calibrate, maintain, and operate a monitoring device which continuously indicates and records the temperature of the solvent destruction device's exhaust gases. The monitoring device shall have an accuracy of the greater of ±0.75 percent of the temperature being measured expressed in degrees Celsius or ±2.5°C.

(f) The owner or operator of an affected facility controlled by a catalytic incineration solvent destruction device shall install, calibrate, maintain, and operate a monitoring device which continuously indicates and records the gas temperature both upstream and downstream of the catalyst bed.

(g) The owner or operator of an affected facility controlled by a solvent destruction device which uses a hood or enclosure to capture fugitive VOC emissions shall install, calibrate, maintain, and operate a monitoring device which continuously indicates that the hood or enclosure is operating. No continuous monitor shall be required if the owner or operator can demonstrate that the hood or enclosure system is interlocked with the affected facility's oven recirculation air system.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414))

§ 60.446 Test methods and procedures.

(a) The VOC content per unit of coating solids applied and compliance with § 60.442(a)(1) shall be measured by either Reference Method 24 or manufacturers' formulation data. In the event of any inconsistency between a Method 24 test and manufacturers' formulation data, the Method 24 test will govern. The Administrator may require an owner or operator to perform Method 24 tests during such months as he deems appropriate.

(1) For Reference Method 24, the coating sample must be a one liter sample taken at a point which will be representative of the coating applied to the web substrate. The one liter sample is to be divided into three aliquots for triplicate analyses.

(b) Reference Method 25 shall be used to determine the VOC concentration, in parts per million by volume, of each effluent gas stream entering and exiting the solvent destruction device or its equivalent, and each effluent gas stream emitted directly to the atmosphere. Reference Methods 1, 2, 3, and 4 shall be used to determine the sampling location, volumetric flow rate, molecular weight, and moisture of all sampled gas streams. For Reference Method 25, the sampling time for each of three runs must be at least one hour. The minimum sampling volume must be 0.003 dscm except that shorter sampling times or smaller volumes, when necessitated by process variables or other factors, may be approved by the Administrator.

(c) If the owner or operator can demonstrate to the Administrator's satisfaction that testing of representative stacks yields results comparable to those that would be obtained by testing all stacks, the Administrator will approve testing of representative stacks on a case-by-case basis.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414))

§ 60.447 Reporting requirements.

(a) For all affected facilities, the performance test data from the initial performance test are submitted to the Administrator.

(b) The owner or operator of a coating line operated at the conditions specified in § 60.442(b) shall report the total amount of the solvent applied in the coating for each operating day. Every fourth quarter the yearly amount of solvent applied in the coating shall be reported.

(c) For affected facilities complying with § 60.442 without solvent recovery or solvent destruction devices the weighted average VOC content for each calendar month as specified in § 60.443(a)(2) shall be reported to the Administrator.

(d) For all affected facilities complying with § 60.442 by using a solvent recovery device, the following information shall be reported to the Administrator for each calendar month.

(1) The required overall emission reduction specified in § 60.443(b).

(2) The demonstrated overall emission reduction as specified in § 60.443(c).

(e) For all affected facilities complying with § 60.442 by using a solvent destruction device, the following information shall be reported to the Administrator for each calendar month.

(1) The required overall emission reduction specified in § 60.443(b).

(2) The overall emission reduction demonstrated during the most recent performance test which complied with § 60.442.

(3) All periods of temperature drop as defined under § 60.443(f).

(f) The owner or operator of an affected facility shall submit the written reports required under paragraphs (a) and (b) of this section to the Administrator for every calendar quarter. All quarterly reports shall be postmarked by the 30th day following the end of each calendar quarter.

(g) The owner or operator of an affected facility shall submit the written reports required under paragraphs (c), (d), and (e) of this section to the Administrator within ten days following the end of the calendar month being reported only if:

(1) The emissions limits of § 60.442 were exceeded during the calendar month; or

(2) Temperature drops as defined under § 60.443(f) occurred during the calendar month.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414))

[FR Doc. 80-40809 Filed 12-29-80; 8:45 am]

BILLING CODE 6560-26-M

ENVIRONMENTAL PROTECTION AGENCY

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STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

INDUSTRIAL SURFACE COATING: APPLIANCES

SUBPART SS

40 CFR Part 60

[AD-FRL 1625-8]

Standards of Performance for New Stationary Sources; Industrial Surface Coating: Appliances

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed Rule and Notice of Public Hearing.

SUMMARY: Standards of performance are proposed to limit emissions of volatile organic compounds (VOCs) from new, modified, or reconstructed surface coating operations within appliance assembly plants. The standards implement Section 111 of the Clean Air Act and are based on the Administrator's determination that surface coating operations within appliance assembly plants cause, or contribute significantly to, air pollution, which may reasonably be anticipated to endanger public health or welfare. The intent is to require new, modified, and reconstructed appliance surface coating operations to use the best demonstrated system of continuous emission reduction, considering costs, nonair quality health, and environmental and energy impacts.

A public hearing will be held to provide interested persons an opportunity for oral presentation of data, views, or arguments concerning the proposed standards.

DATE: Comments. Comments must be received on or before February 23, 1981.

Public hearing. The public hearing will be held on January 28, 1981 beginning at 9 a.m.

Request to speak at hearing. Persons wishing to present oral testimony should contact EPA by January 21, 1981.

ADDRESSES: Comments. Comments should be submitted (in duplicate if possible) to: Central Docket Section (A-130), Attention: Docket number A-80-6, U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, DC 20460.

Public hearing. The public hearing will be held at OA Auditorium EPA, R.T.P., North Carolina. Persons wishing to present oral testimony should notify Mrs. Noami Durkee. Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5331.

Background Information Document. The Background Information Document (BID) for the proposed standards may be obtained from the U.S. EPA Library (MD-35), Research Triangle Park, North Carolina 27711, telephone number (919) 541-2777. Please refer to *Industrial Surface Coating: Appliances—Background Information for Proposed Standards*, EPA-450/3-80-037a.

Docket. The docket, number A-80-6, containing supporting information used in developing the proposed standards, is available for public inspection and copying between 8:00 a.m. and 4:00 p.m., Monday through Friday, at EPA's Central Docket Section, West Tower Lobby, Gallery 1, Waterside Mall, 401 M Street, SW, Washington, DC 20460. A reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: Mr. Gene W. Smith, Standards Development Branch, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5421.

SUPPLEMENTARY INFORMATION:

Proposed Standards

The proposed standards would limit VOC emissions from each surface coating operation to 0.90 kilogram of VOCs per liter (kg/*l*) of coating solids applied to appliance parts or products. Compliance with the proposed standards could be achieved by the use of coatings that result in VOC emissions less than or equal to 0.90 kg/*l* of applied coating solids or by the use of coatings with an average organic-solvent content that, in conjunction with any capture system and control device operated at the reduction efficiency demonstrated during the most recent performance test, limits emissions to 0.90 kg/*l* of applied coating solids. Formulation data from the coating manufacturer would be used to determine the VOC content of coatings applied for each affected facility. Reference Method 24 published on October 3, 1980 (45 FR 65956) would be the reference method for verification. Reference Method 25 published on October 3, 1980 (45 FR 65956) would be used to determine the percentage reduction of VOC emissions achieved through the use of a capture system and control device.

The proposed standards would apply to each new, modified, or reconstructed surface coating operation within an appliance assembly plant. Existing facilities would not be subject to the regulation unless modified or reconstructed as defined in 40 CFR 60.14 or 60.15. For these standards, any of the following organic surface-coated metal products manufactured for household, commercial, or recreational use would be considered appliance products:

Range	Dryer
Range hood	Dry cleaning equipment
Microwave oven	Water heater
Oven	Trash compactor
Refrigerated display case	Water Softener
Refrigerator	Interior lighting fixture
Freezer	Vacuum cleaner
Washer	Ice maker
Dishwasher	

The following organic surface-coated metal products manufactured for household use would also be considered appliance products:

Air purifier	Fan
Baseboard heater	Furnace
Room heater	Window air conditioner
Humidifier	Unitary air conditioner
Dehumidifier	Heat pump

The majority of the data upon which the proposed standards were developed pertained to the surface coating of traditional household appliances such as cooking equipment, laundry equipment, refrigerators, and freezers. Recent EPA research indicates that many other appliances are coated with similar materials by similar methods. These other appliances are often similar in size and shape to the traditional household appliances. The coating application methods—flow coat, dip coat, electrodeposition, and air, airless, and electrostatic spray—are identical. These additional appliance coating operations use coating materials similar to those used in large appliance coating operations. Coating performance specifications are also similar, except for slight variations depending upon whether the unit is designed for indoor or outdoor use. Therefore, these

operations produce the same types, and proportionally the same quantities, of VOC emissions as large appliance surface coating operations. EPA believes that similarities also often exist in the ratio of the cost of coating the appliance to its total unit cost.

Because these other segments of the appliance industry are similar in key respects to the large appliance surface coating industry and because these segments would not be subject to other standards under development by the Agency, EPA believes that the source category for appliance surface coating operations should be expanded to include products other than large household appliances.

There appears elsewhere in this issue of the **Federal Register** a proposed amendment to the priority list for standards of performance for new stationary sources. The amendment proposes to change the source category "Industrial Surface Coating: Large Appliances" to "Industrial Surface Coating: Appliances," thereby including in the source category appliance products in addition to the traditional large household appliances. All references in this preamble to proposed standards for appliance surface coating operations take into account the proposed amendment source category. Comments are invited concerning the list of products to be subject to the proposed standards (see **Miscellaneous** section of this preamble).

An affected facility is defined as a surface coating operation. A surface coating operation may be a prime coat or a topcoat operation and includes the application station(s) (spray booth(s), dip tank, or flow coating unit), flashoff area, and curing oven. The proposed standards would require each owner or operator, unless otherwise specified, to calculate for each affected facility the total mass of VOC emissions per liter of coating solids applied to appliance parts or products during 1 calendar month. Following this initial performance test period, the owner or operator would calculate VOC emissions for each calendar month. Each monthly calculation would be considered a performance test. Violations would be reported within 10 days of the end of the month. Equations and transfer efficiencies for calculating the emissions for each affected facility are provided in the proposed standards.

The proposed standards contain tables specifying the maximum allowable VOC content per unit volume of coating solids for generic families of application equipment. When the VOC content per unit volume of coating solids of each coating used during the month is less than or equal to the maximum allowable VOC content for the lowest transfer efficiency of any application equipment used in the affected facility, the owner or operator will not be required to calculate VOC emissions for each month.

The owner or operator would obtain the information necessary to calculate emissions from formulation data supplied by the manufacturer of the coating or from an analysis of each coating by Reference Method 24 or by an equivalent or alternative method acceptable to the Administrator. Coating and organic-solvent usage data would be obtained from company records. In the case of a question regarding the VOC content of coatings, Reference Method 24 would serve as the means by which the VOC content of the coating, and the resultant emissions, would be determined.

The proposed standards also contain performance test provisions for an affected facility that elects to use incineration as a means of compliance. The owner or operator would be required to determine monthly the average uncontrolled VOC emissions and the emission reduction achieved by a control device. Each monthly calculation would be considered a performance test. Equations for these calculations are provided in the proposed standards.

The proposed standards would require the owner or operator to install a monitoring device to continuously record the combustion (firebox) temperature of effluent gases that are incinerated to comply with the emission limit. The owner or operator would be required to report quarterly any 3-hour period when the average combustion temperature is more than 28° C below the most recent level that demonstrated compliance. If catalytic incineration is used, the owner or operator would be required to install a device to continuously record the gas temperature both upstream and downstream of the catalyst bed. A quarterly report would be required for any 3-hour period when the average temperature upstream of the catalyst bed is more than 28° C below the most recent level that demonstrated compliance. A quarterly report would also be required for any 3-hour period when the average difference between the gas temperature upstream and downstream of the catalyst bed is less than 80 percent of the most recent temperature difference that demonstrated compliance.

The proposed standards also contained performance test provisions for an affected facility that uses an organic-solvent recovery system to attain compliance. The owner or operator would be required to calculate, by the equations contained in the proposed standards, the uncontrolled VOC emissions from each affected facility and the emissions reduction achieved by the recovery device. The owner or operator would also be required to record daily the amount of organic solvent recovered by the system.

The proposed standards would also require the owner or operator to maintain at the source all records, data, calculations, test results, or other material supporting each calculation of VOC emissions for a minimum of 2 years.

Summary of Environmental, Energy, and Economic Impacts

Environmental, energy, and economic impacts of standards of performance are normally expressed as incremental differences between a facility complying with the proposed standards and a facility complying with a typical State Implementation Plan (SIP) emission standard. Most existing large appliance surface coating operations are located in localities that are considered nonattainment areas for achieving the National Ambient Air Quality Standard (NAAQS) for ozone. New facilities are expected to locate in similar areas. States are in the process of revising their SIPs for these areas and are expected to revise emission limitations for large appliance surface coating operations. In revising their SIPs, most of the States rely on the Control Techniques Guideline (CTG) Document, "Control of Volatile Organic Emissions from Existing Stationary Sources—Volume V: Surface Coating of Large Appliances" (EPA-450/2-77-034 [CTG]). The true incremental impact of the proposed standards of performance cannot be determined because the CTG recommendations do not place minimum requirements on the efficiency of the application equipment, and it appears that most of the revised SIPs will incorporate the CTG-recommended coating limit. Therefore, the CTG-recommended limit plus an assumed 60-percent industry average transfer efficiency form the basis for estimating the impacts of the proposed standards. Based on this estimated baseline, the proposed standards of performance would have little environmental, energy, or economic impact. This baseline may be somewhat conservative, however, because plants that are located in attainment areas may be subject to regulations that are less strict than the assumed limit. The effect of this assumption is that the actual emissions reduction and other impacts attributable

to the NSPS will be somewhat greater than that calculated.

As enumerated in the supporting documentation, the environmental, energy, and economic impacts that would result from imposition of this standard on the manufacturers of appliances not traditionally considered to be large household appliances are expected to be practically identical to those projected for the more traditional appliances. Additionally, because the proposed standards can be achieved with existing coatings technology and application methods, the economic impact is not expected to be greater on manufacturers located in attainment areas than on those situated in nonattainment areas.

Standards of performance have other benefits in addition to achieving reductions in emissions beyond those required by a typical SIP. They establish a degree of national uniformity, which precludes situations in which some States may attract industries by relaxing air pollution standards relative to other States. Further, standards of performance improve the efficiency of case-by-case determinations of best available control technology (BACT) for facilities located in attainment areas, and lowest achievable emission rates (LAER) for facilities located in nonattainment areas, by providing a starting point for the basis of these determinations. This starting point results from the process of developing a standard of performance, which involves a comprehensive analysis of alternative emission control technologies and an evaluation and verification of emission test methods.

Because compliance with the proposed standards would not require changes in coatings technology or application methods, the water pollution, solid waste, and energy impacts of these standards will be minimal. The proposed standards would have no impact on the capital or operating costs of new surface coating operations within appliance assembly plants because compliance can be achieved with existing coatings and application methods. Detailed cost and economic analysis of various regulatory alternatives are presented in the Background Information Document for the proposed standards of performance.

Rationale

Selection of Source and Pollutants

Studies have been conducted to investigate the effect standards of performance would have on nationwide VOC emissions from stationary sources In the "Priority List and Additions to the List of Categories of Stationary Sources" published August 21, 1979 (44 FR 49222), source categories are ranked according to three specific criteria established by the Clean Air Act Amendments of 1977: (1) the quantity of emissions, (2) the extent to which each pollutant may reasonably be anticipated to endanger pubic health or welfare, and (3) the mobility and competitive nature of the source category. In this study, large appliance surface coating operations are ranked 28th out of 59 source categories considered for regulation.

Volatile organic compound (VOC) means any organic compund that participates in an atmospheric photochemical reaction or is measured by the applicable reference method or specified under any subpart. Photochemical oxidants result in a variety of adverse impacts on health and welfare, including impaired respiratory function, eye irritation, necrosis of plant tissue, and deterioration of selected synthetic materials, such as rubber. Further information on these effects can be found in the U.S. Environmental Protection Agency (EPA) document entitled "Air Quality Criteria for Ozone and Other Photochemical Oxidants" (EPA-600/8-78-004).

Industrial surface coating operations are a significant source of VOC emissions, accounting for over 2 million metric tons of VOC emissions each year. In 1976 the large appliance industry contributed an average of 90 metric tons of VOC emissions per plant, accounting for annual nationwide industry emissions of more than 15,000 metric tons. Most of the coatings used contain organic solvents that evaporate when the coating dries, resulting in VOC emissions. Typical coatings applied to appliance products include epoxies, epoxy-acrylics, acrylics, and polyester enamels. These coatings generally contain organic-based solvents such as ketones, esters, ethers, and aromatics. The surface coating operations is an intergral part of a large appliance assembly plant, accounting for about one-quarter to one-third of the total space occupied by a typical plant.

VOCs are the major air pollutants emitted from the appliance industry and result primarily from the use of organic-based solvents. Particulate matter emitted from the paint in this coating industry is minimal. Technology is currently available to reduce VOC emissions from appliance surface coating operations, thereby decreasing the formation of ozone in the atmosphere. Consequently, VOC emissions from appliance surface coating operations have been selected for regulation under a new source standard of performance.

Selection of Affected Facilities

Applicances are coated in two main steps: prime coat and topcoat. In 1976, prime coat operations accounted for 6,800 metric tons of VOC emissions, and topcoat operations accounted for 8,300 metric tons.

Prime coats may be waterborne or organic-solvent-borne. Waterborne coatings use water as the main carrier for the coating solids, although these coatings normally contain a small amount of organic solvent. Where a water-based prime coating is used, it is usually applied by EDP or flow coat. Organic-solvent-based prime coatings use organic solvent as the coating solids carrier and are usually applied by one of the conventional spray techniques.

The large appliance top coats presently used are almost entirely organic-solvent-based. One or more top coats may be applied to ensure sufficient coating thickness. An oven bake may follow each topcoat application, or the coating may be applied wet on wet (two or more layers with no intermediate cure).

The coating application station is the source of about 40 percent of total VOC emissions from the surface coating process. Coated parts then enter a flashoff tunnel that allows the organic solvent in the coating to evaporate slowly, preventing cracking during the baking process. Approximately 40 percent of VOC emissions originate from the flashoff area. The cases, doors, lids, panels, and other interior or exterior parts are then baked in a multipass oven, which accounts for about 20 percent of total VOC emissions from the surface coating process.

Prime coating and topcoating operations account for the majority of the VOC emissions in appliance assembly plants. The remaining VOC emissions result from final topcoat repair and equipment cleanup. Because of the very small quantity of coating used for final topcoat repair (touchup), the emissions from this source are not considered significant. Emissions from the organic solvents used in the cleanup operations are difficult to control because these operations occur intermittently and at many points along the surface coating line. Therefore, control devices such as incinerators cannot be used efficiently on these cleanup operations. Because prime coat and topcoat operations account for the bulk of VOC emissions from appliance manufacturing plants and control techniques for reducing VOC emissions

from these operations have been demonstrated, these operations have been selected for control by standards of performance.

The proposed standards would apply to each surface coating operation (prime coat and topcoat) in an appliance assembly plant. Each surface coating operation consists of the coating application station (spray booth(s), dip tank, or flow coating unit), flashoff area, and curing oven. The use of organic solvent as a dilution agent would be subject to the proposed standards, but the VOC emissions resulting from the use of organic solvent in cleanup or touchup operations would not.

Two other definitions of affected facilities were considered but eliminated in favor of the coating operation definition selected. They were: all prime coat (or topcoat) operations in a product line, and all prime coat (or topcoat) operations within an assembly plant. Because of the possibility of adopting different standards for prime coat and topcoat operations, these operations were treated separately. The product line definition would have reduced the number of affected facilities but would have permitted tradeoffs between different coatings and application technologies. These tradeoffs could have included the use of some systems with relatively high emissions in combination with, for instance, a powder station. Likewise, defining all prime coating (or topcoating) operations within a plant as the affected facility would have reduced the affected facilities and consequently the associated recordkeeping and compliance calculations. However, such a definition would have allowed the use of some coatings and application methods that do not meet the best demonstrated system of continuous emissions reduction criterion.

Control Technologies

For prime coat operations, most new or existing plants will comply with revised SIP requirements by applying waterborne coatings through EDP or low-organic-solvent-content coatings through conventional spraying methods. For topcoat operations, most of these plants will achieve compliance by applying low-organic-solvent-content coatings through conventional spraying methods. Emission control devices such as an incinerator or a carbon adsorption system could also be used in combination with organic-solvent-based coatings, but their use is not expected for economic reasons.

Transfer efficiency is the ratio of the coating solids that adhere to a part to the total amount of solids used. Improving transfer efficiency is a control technology that, in combination with the coating selected, can reduce emissions. The total quantity of coating needed for a given product is directy correlated with the resulting emissions, and an improvement in transfer efficiency will decrease emissions proportionately. Each type of application equipment has a different transfer efficiency, but not every type of equipment can be used with every type of coating. Transfer efficiencies in this industry range from 40 percent for air-atomized spray application to well over 90 percent for some recycling systems such as EDP and powder. Electrostatic spray equipment imparts a charge to the paint particles and relies on an opposite charge on the part to be coated to attract those particles. The transfer efficiency of this equipment is greater than that of spray systems that use air or hydraulic pressure to propel the coating toward the part.

Application of a coating by EDP involves dipping the appliance part or product to be coated into a bath containing a dilute water suspension of the coating material. Coatings in the EDP tank usually consist of about 90 percent (vol.) water, 4 percent (vol.) organic solvent, and 6 percent (vol.) paint solids. When charges of opposite polarity are applied to the dip tank and the part to be coated, the coating material deposits on the part. Because of the low-organic-solvent content and the high transfer efficiency, this control technology is the most effective control method for prime coating operations per volume of solids applied. However, the overall effectiveness of EDP as a means of control is mitigated because the method may result in deposition of a greater volume of solids on the part than is actually needed.

Waterborne coatings can also be applied by dip coating, flow coating, or spray coating. These waterborne coatings are usually comprised of about 56 percent (vol.) water, 14 percent (vol.) organic solvent, and 30 percent (vol.) paint solids. These coatings contain less organic solvent per volume of solids than do conventional organic-solvent-borne coatings and, depending upon the transfer efficiency of the application equipment used, can effectively reduce VOC emissions. Because they contain only a small amount of organic cosolvent, these coatings are less flammable than conventional organic-solvent-borne coatings. Waterborne coatings can also be applied by electrostatic spray. However, because of the costly electrical isolation and safety requirements, electrostatic spraying of waterborne coatings is not common in the large appliance industry.

The application of low-organic-solvent-content liquid coatings by conventional spray techniques has also been demonstrated for topcoat operations in the large appliance surface coating industry. These coatings are commonly referred to as "high-solids" coatings. The CTG for large appliance surface coating operations defines a high-solids coating as containing 0.34 kilogram of organic solvent per liter of coating (less water) (2.8 lb/gal), which is equivalent to a coating containing 62 percent (vol.) solids. Coating formulations of 62 percent (vol.) solids that meet most performance specifications are currently available to the manufacturers of appliances. As with waterborne coatings, when high-solids coatings are applied at high transfer efficiencies, VOC emissions are reduced to levels significantly below those resulting from the use of conventional organic-solvent-borne coatings.

Powder coatings are a special class of low-solvent coating in that they contain no organic solvent and emit few or no VOCs. They are an economically attractive coating alternative in large part because of the near absence of waste. Spray booths are equipped with ventilation and fabric filtration equipment that removes the powder overspray from exhaust air and returns it to the coating feed tank. Unlike conventional liquid coatings, however, powder coatings are completely intolerant of cross color contamination. Even one particle of a contrasting colored powder entrained onto an applicance part will be visible after cure. Powder coatings are ideally suited for applying a single color on a product line. Provisions for applying multiple colors directly affect the cost of powder systems.

Unlike other low-solvent coatings, emissions from powder coatings are so low that there is no equivalent control system. Control devices such as an incinerator or carbon adsorber cannot achieve a comparable emission level. As a consequence, basing the proposed standard on powder coatings would be more restrictive than using a coating having a typical or even low-VOC content with a capture system and control device. Moreover, since powder coatings have not been adequately demonstrated for all appliances under all conditions, under such a standard, any appliance for which no satisfactory powder coating is available could no longer be produced.

Process designs in other coating industries allow VOC emissions to be

more easily contained and delivered to control devices such as incinerators or organic-solvent recovery systems (i.e., carbon adsorption systems) than is possible in the appliance industry. A unique characteristic of this industry is the long flashoff time required to allow slow evaporation of the organic solvent and prevent subsequent cracking of the coating in the cure oven. As much as 40 percent of VOC emissions from the coating process may occur in the flashoff area, which may be either open or enclosed in a tunnel. To hood and vent a flashoff area that may be several hundred feet long and might otherwise be open would be impractical in most cases.

Although thermal incinerators could be applied to the spray booth, the spray booth exhaust stream is typically a high-volume stream with low VOC concentrations, and the control of VOC emissions from this exhaust stream would require a large amount of supplemental fuel. VOC emissions from the curing oven could also be captured for incineration, but curing oven emissions account for only about 20 percent of total VOC emissions from surface coating operations.

Catalytic incineration permits lower incinerator operating temperatures and requires less fuel than thermal incineration but still represents a significant increase in energy consumption over other control techniques. In addition, because oil firing tends to foul or mask the catalyst, the fuel used to preheat the exhaust gases must be a clean fuel such as natural gas or liquefied petroleum gas (LPG).

Generally, incineration techniques would be more costly than the techniques previously described. While these control methods have not been demonstrated in the large appliance sector, they have been used in other segments of the industrial finishing industry. Even though their use is not expected, an incineration control option has been analyzed with one of the regulatory alternatives discussed below.

Carbon adsorption has been used successfully to control VOC emissions in a number of industrial applications. However, its ability to control VOC emissions from curing ovens in appliance surface coating operations is uncertain because the high temperature of the exhaust stream would require that the gas stream be cooled before passage through the carbon bed. The high humidity of the exhaust stream from a water-wash spray booth would necessitate pretreatment to lower the relative humidity before a carbon adsorber could be effective. For these reasons, carbon adsorption has not been used in this industry, and it is not expected that it will be selected as a control technique for reducing VOC emissions. Nonetheless, the proposed standards would not preclude the use of carbon adsorption to comply with emission limitation.

Regulatory Alternatives

Low-organic-solvent-content or waterborne coatings, a change in application methods, capture systems and control devices, or combinations of the three can feasibly be used to control VOC emissions from appliance surface coating operations. Based on the use of these control methods, the following regulatory scenarios have been evaluated. Three regulatory alternatives were developed for prime coating operations, and four were established for topcoating operations.

Regulatory Alternative A–I for prime coating operations is to forego the development of an NSPS. In this case, prime coating operations would be subject only to regulations contained in revised SIPs. These new or revised regulations would be based mainly upon the CTG recommendations for controlling VOC emissions from large appliance surface coating operations. The CTG recommends a limit of 0.34 kilogram of organic solvent per liter of coating (minus water) (2.8 lb/gal), which is equivalent to a prime coat containing 62 percent solids by volume. However, the CTG does not stipulate a transfer efficiency, and consequently the no NSPS baseline is not known exactly. The estimated industry-average transfer efficiency is 60 percent. For this analysis, a 60-percent transfer efficiency has been assumed, and the no NSPS baseline is an emissions limit equal to that resulting from the application of a coating containing 62 percent (vol.) solids applied at a transfer efficiency of 60 percent.

Regulatory Alternative A–II for prime coating operations is the promulgation of an NSPS equivalent to the assumed CTG limit. This option would restrict VOC emissions from each prime coat operation to the level equivalent to that resulting from the application of a 62-percent (vol.) solids coating at a transfer efficiency of 60 percent. This level of emissions could be achieved through the use of a waterborne coating, or through a number of combinations of solids content and transfer efficiencies yielding an equivalent amount of emissions; e.g., 52 percent (vol.) solids applied at 90 percent transfer efficiency. Although lower than the rated efficiencies of some of the application equipment that will be used in new sources, the 60-percent transfer efficiency also approximates the efficiency of hand-held electrostatic equipment and can therefore be economically attained by all facets of the industry. Additionally, use of this transfer efficiency will allow appliance coaters some freedom in their approach to meeting the proposed standards. That is, if they have a higher transfer efficiency, they may apply a coating with a higher organic-solvent content.

Regulatory Alternative A–III for prime coat operations is a 55-percent (per volume of solids applied) reduction in VOC emissions from the assumed no NSPS baseline (Alternative A–I). This alternative is equivalent to the use of an EDP process containing 0.38 kilogram of VOCs per liter of solids in the input stream applied at a transfer efficiency of 95 percent.

Regulatory Alternative B–I for topcoat application, like Regulatory Alternative A–I, presumes that no NSPS is promulgated. The CTG makes no distinction between topcoat and prime coat operations, and the recommended limit is therefore 0.34 kilogram of organic solvent per liter of coating (minus water). Without the stipulation of a transfer efficiency, the topcoat no NSPS baseline, like the prime coat no NSPS baseline, is not known exactly. For this analysis, the no NSPS baseline is an emissions limit equal to that resulting from the application of a 62-percent (vol.) solids coating applied at an assumed 60-percent transfer efficiency.

Regulatory Alternative B–II for topcoat operations, like Regulatory Alternative A–II, is the promulgation of an NSPS equivalent to the assumed CTG limit. This alternative would restrict VOC emissions to the level equivalent to that resulting from the application of a 62-percent (vol.) solids top coat at a transfer efficiency of 60 percent. This emissions level could be achieved through the use of a number of combinations of solids content and transfer efficiency of organic-solvent-borne coatings or through the use of powder coatings.

Regulatory Alternative B–III for topcoat operations is a 30-percent reduction of VOC emissions (per volume of solids applied) from the no NSPS baseline (Alternative B–I). This alternative is equivalent to the use of a 70-percent (vol.) solids top coat applied at a transfer efficiency of 60 percent, although this emissions level could also be achieved through the use of a number of other combinations of solids content and transfer efficiency of organic-solvent-borne coatings or through the use of powder coatings. We believe

incineration of the oven exhaust is feasible in the appliance industry. Therefore, a control option consisting of a 65.5-percent (vol.) solids top coat applied at a transfer efficiency of at least 60 percent, coupled with an incinerator or other control device on the topcoat oven, has also been analyzed for this alternative.

Regulatory Alternative B–IV for topcoat operations would essentially eliminate VOC emissions and could only be achieved through the use of powder coatings (100 percent [vol.] solids).

Environmental, Energy, and Economic Impacts

Regulatory Alternative A–I (no NSPS) for prime coating operations represents the status quo and would create no incremental environmental impact, either beneficial or adverse. Because most States will be promulgating or revising regulations based on this CTG-recommended limit (0.34 kilogram of organic solvent per liter of coating, minus water), this level of emissions represents the baseline from which the environmental impact of other regulatory alternatives is assessed. Because the CTG-recommended limit does not specify a transfer efficiency, a transfer efficiency had to be assumed to complete a meaningful analysis. The estimated industry-average transfer efficiency of 60 percent was used for this purpose. Annual VOC emissions from prime coat operations totaled about 6,800 metric tons in 1976. By 1981, annual VOC emissions from prime coat operations will have been reduced to 1,700 metric tons. Anticipated growth in the industry will cause emissions to increase to 1,900 metric tons by 1986.

Regulatory Alternative A–II would restrict emissions to a level equivalent to that resulting from the use of a 62-percent (vol.) solids coating applied at a transfer efficiency of 60 percent. To the extent that the assumed 60-percent transfer efficiency used to calculate the baseline is correct, this alternative will have a negligible impact upon emissions. Adoption of this alternative would, however, permit tradeoffs between the solids content of the coating and the transfer efficiency of the application equipment.

Regulatory Alternative A–III for prime coat operations would hold VOC emissions to an increase of 4 percent between 1981 and 1986. If waterborne prime coats were applied by EDP, VOC emissions would total about 1,800 metric tons per year by 1986, a reduction of 100 metric tons per year from the no NSPS baseline.

Regulatory Alternative B–I for topcoat operations (no NSPS) is an assumed baseline for topcoat operations and is equivalent to a level that would result from the application of a 62-percent (vol.) solids coating at an assumed transfer efficiency of 60 percent. Annual VOC emissions from topcoat operations totaled about 8,300 metric tons in 1976. By 1981, annual emissions from topcoat operations will have been reduced to 2,100 metric tons. Anticipated growth in the industry will cause emissions to increase to 2,400 metric tons by 1986.

Regulatory Alternative B–II for topcoat operations, like Alternative A–II for prime coating, would restrict emissions to a level equivalent to that resulting from the use of a 62-percent (vol.) solids coating applied at a transfer efficiency of 60 percent. To the extent that the assumed 60-percent transfer efficiency used to calcuate the baseline is correct, this alternative will have a negligible impact upon emissions.

Regulatory Alternative B–III for topcoat operations, equivalent to the use of 70 percent (vol.) solids top coats applied at a transfer efficiency of 60 percent, would reduce topcoat emissions 200 metric tons per year by 1986. An equivalent decrease in VOC emissions would also result from the use of a 65.5-percent solids coating with an incinerator on the topcoat oven. This alternative would hold industrywide VOC emissions to an increase of 5 percent (100 metric tons per year) between 1981 and 1986.

Regulatory Alternative B–IV for top coating, the virtual elimination of VOC emissions, could only be achieved with a powder top coat and would reduce industrywide topcoat VOC emissions by 30 percent (about 750 metric tons) by 1986. However, because powder coatings are often used direct-to-metal (i.e., without a prime coat), the impact on total emissions would be considerably greater. The combination of Regulatory Alternative A–I or A–II and powder would reduce total emissions by 1,700 metric tons per year. Used in combination with Regulatory Alternative A–III, total emissions would be reduced by 1,850 metric tons per year.

Standards based on any of the regulatory alternatives for prime coat or topcoat operations would have little impact on water quality. All of the alternatives assume the greater use of waterborne or low-organic-solvent-content coatings. The greater use of waterborne coatings would increase the COD of the wastewater discharged from appliance surface coating operations. This increase results from the water-soluble organic solvents contained in the waterborne coatings. However, the COD increase would be minimal compared to current COD levels at plants using organic-solvent-based coatings and meeting existing State regulations. This increase would not require the installation of additional wastewater treatment facilities. However, these coating operations may be subject to regulations covering the discharge of wastewater from coating operations (Metal Finishing Point-Source Category) under the Federal Water Pollution Control Act that are now scheduled for proposal in early 1981.

The efficiency of paint application is a significant factor in the quantities of water pollutants discharged because most paint solids not applied to the product (overspray) are trapped in the water curtain designed for this purpose. Because the transfer efficiency of spray painting would not decrease with the spraying of higher solids content coatings, no greater amounts of solids would be entrapped in spray booth water.

The incremental solid waste impact of any of the regulatory alternatives would also be negligible because the volume of paint sludge generated is approximately equal for all alternatives. However, these wastes have been defined as hazardous (40 CFR Part 261) and therefore must be disposed of in accordance with the regulations in 40 CFR Part 262.

Total energy requirements of the large appliance surface coating industry are estimated as 6.4 million GJ/yr (6.0×10^{12} Btu/yr) in 1981. Because approximately 80 percent of this energy is consumed during pretreatment, a process not affected by any of the regulatory alternatives, the net energy impact of each of the regulatory alternatives is minor. There are three regulatory alternatives with a noticeable impact: A–III (waterborne prime coat by EDP), B–IV (powder), both of which would reduce energy consumption, and B–III (incineration option), which would increase consumption. The dryoff oven between pretreatment and prime coat application is not needed when a waterborne prime coat is used. Therefore, a 75,000-GJ annual savings is possible under Regulatory Alternative A–III. Because the application of powder often eliminates the need for a prime coat, adoption of that alternative (B–IV) would result in an annual savings of 145,000 GJ. With 60 percent heat recovery, an incinerator on the topcoat oven (B.–III) would increase energy consumption by 70,000-GJ annually.

The economic impacts for each regulatory alternative were estimated using cost data for four model line configurations developed to be representative of those that would be

constructed during the 1981–1986 period in the absence of further air pollution regulations. Two line sizes correspond to small and large facilities in the household cooking equipment sector (Model plants 1 and 2) with annual production rates of 13,000 and 107,000 units per year, respectively. The remaining two line sizes represents facilities in the laundry equipment sector (Model plant 3; 657,000 units per year) and in the refrigerator/freezer sector (Model plant 4; 392,000 units per year).

A discounted cash flow approach was used to analyze the model plant costs and to determine the price impacts of each of the regulatory alternatives. This analysis was based on data consisting of the capital, installation, operating, and maintenance costs of the equipment that could be used to achieve compliance with each of the baseline levels of control and each of the regulatory alternatives. These cost data were obtained from manufacturers and vendors of coating equipment for the large appliance industry.

Regulatory Alternatives A–I and B–I—not promulgating an NSPS—would have no economic or price impacts on plants subject to revised SIP limitations based on CTG-recommended limits. Regulatory Alternatives A–II and B–II—promulgating an NSPS equivalent to the assumed CTG limit for both prime coats and top coats—would also have no economic or price impacts. Current total installed capital costs for a new plant meeting Regulatory Alternatives A–I and B–I or A–II and B–II are $397,000 for Model plant 1, $922,000 for Model plant 2, $2,930,000 for Model plant 3, and $2,305,000 for Model plant 4. The annualized operating costs for these plants are $488,000 for Model plant 1, $738,000 for Model plant 2, $2,700,000 for Model plant 3, and $2,100,000 for Model plant 4.

The capital costs for a new plant increase with Regulatory Alternatives A–III—a water-based coating applied by EDP—or B–III—either a 70-percent solids coating or a 65.5-percent solids coating with incineration of a topcoat oven. These increases range from 3.5 to 36.2 percent, depending on the combination. The capital costs of a new plant decrease from 5 to 40 percent with Regulatory Alternative B–IV—100 percent solids coatings. Annualized operating costs for Regulatory Alternative A–III decrease in Model plants 1 and 3 and increase in Model plants 2 and 4. The decrease in Model plant 1 results from the substitution of an automated process for a process that is labor intensive because of the structure of this model plant. Model plant 3, which produces laundry equipment and for which a prime coat is desired on interior as well as exterior surfaces, is ideally suited for EDP, and Regulatory Alternative A–III would therefore reduce annualized operating costs. Costs increase in Model plants 3 and 4 because of the additional coating deposited on interior surfaces; this additional coating is not desired and is not represented in the base case.

The powder topcoat alternative appears to have the lowest capital cost, giving firms an economic incentive to adopt this relatively new technology even in the absence of regulations. However, powder coatings have not been demonstrated for all appliance products that will be covered by this standard. If powder coatings were excluded for this reason, Model plants 1 and 3 could coat their appliances for the lowest cost with an EDP prime coat and a 62-percent or 70-percent solids top coat. Model plant 2 would be most profitable with a 62-percent solids prime coat and either a 62-percent or 70-percent solids top coat. The most profitable line configuration for Model plant 4 is a 62-percent solids prime coat and a 62-percent solids top coat.

The additional capital required to meet regulatory alternatives ranges from 0 to 36 percent of the baseline investment. If producers absorb the additional costs, the return on investment will fall by 0 to 7 percentage points from the baseline rate of return of 19 percent. If consumers absorb the additional costs, a product price increase of 0 to 1 percent is expected. In all cases EDP prime coat costs or incineration costs caused these impacts. The proposed standards, Regulatory Alternatives A–II and B–II, will cause no economic impact.

Best System of Emission Reduction

Promulgation of a prime coat standard equivalent to the assumed CTG limit (Regulatory Alternative A–II) would not significantly reduce VOC emissions. The energy and economic impacts would also be minimal. Even without dramatically decreasing emissions, however, this alternative has benefits. Standards of performance establish a degree of national uniformity that prevents States from attracting industries by relaxing air pollution standards relative to other States. They also improve the efficiency of case-by-case determinations of best available control technology (BACT) for facilities located in attainment areas and lowest achievable emission rates (LAER) for facilities located in nonattainment areas, by providing a starting point for these determinations. This improvement results from the process of developing standards of performance, which involves a comprehensive analysis of alternative emission control technologies and an evaluation and verification of emission test methods. This alternative is also advantageous because a minimum transfer efficiency dependent upon the solids content of the coating would be prescribed and tradeoffs between solids content and transfer efficiency permitted. Prime coat formulations of 62 percent (vol.) solids are available to manufacturers of all the affected appliance parts and products.

Alternatively, the application of a waterborne prime coat by EDP (Alternative A–III) would reduce VOC emissions from prime coat operations by 55 percent per volume of solids applied. However, as a dip process, it automatically coats all surfaces of the part and may result in the application of more solids than desired. Manufacturers of refrigerators, for example, commonly apply a prime coat to exterior surfaces only. As a result, even though EDP is the most effective control technology per volume of solids applied, adoption of this technology industrywide would decrease emissions by less than 200 metric tons per year by 1986 and would be more costly than techniques that would be used to meet Regulatory Alternative A–II and would yield only slightly lower levels of control. Another factor in the rejection of this alternative was the economic impact on small existing facilities that might become subject to the NSPS because of the reconstruction of a prime coat operation. EDP is expected to be adopted voluntarily in the laundry sector, where interior corrosion protection, and hence an interior prime coat, is desired and where this technique is an effective control technology.

The promulgation of an NSPS for topcoating operations equivalent to the assumed CTG limits (Regulatory Alternative B–II) would have a limited effect on VOC emission reduction beyond the no NSPS baseline. The benefits of the selection of this alternative are the same as those described for Regulatory Alternative A–II. The energy, environmental, and economic impacts of this alternative would be very similar to the impacts of the no NSPS alternative. Topcoat formulations of 62 percent solids that meet most performance specifications are currently available to manufacturers of appliance parts and products.

Regulatory Alternative B–III for topcoat operations is not achievable by all segments of the industry. Coatings

containing 70 percent (vol.) solids are available, but their use is restricted to specific applications. Among liquid coatings, the more stringent corrosion- and detergent-resistance requirements for dishwashers and laundry equipment can currently be met only through lower solids content coatings. Another means to achieve this level of control would be to use a 65.5-percent (vol.) solids top coat applied at a 60-percent transfer efficiency coupled with an incinerator on the topcoat oven. However, the costs of incineration are seen as excessive in light of the very small incremental emissions reduction achieved.

A powder top coat (Alternative B–IV) appears to achieve the highest reduction with the fewest energy requirements and least economic impact. Although powder coatings are available and have been demonstrated in many installations, it is the Administrator's judgment that powder coatings have not been adequately demonstrated for all appliances under all conditions; therefore, powder coatings were not selected as the best system of continuous emission reduction. Over the longer term, powder coatings appear to be a very attractive air pollution control alternative. The proposed standard would allow powder coatings to be used, because their VOC emissions are fewer than the proposed emission limitations.

Consideration of the environmental, energy, and economic impacts of each regulatory alternative, as discussed above, indicates that the best demonstrated system of continuous emission reduction achievable for all prime coat and topcoat operations is the application of a 62-percent solids coating applied at a transfer efficiency of 60 percent (A–II and B–II) or an equivalent combination of solids content and transfer efficiency. Unlike the control techniques capable of meeting the levels of Regulatory Alternatives A–III, B–III, and B–IV, the use of combinations of coatings and application equipment that will meet Regulatory Alternatives A–II and B–II has been demonstrated for all segments of the appliance surface coating industry with reasonable economic and other impacts.

Selection of Format for the Proposed Standards

A number of different formats could be selected for the proposed standards. The format selected should be compatible with any of the control systems that may be used to comply with the proposed standards; i.e., waterborne, solvent-borne, or powder coatings applied by several different methods and with control devices.

The formats considered were emission limits expressed by the mass of VOCs per volume of coating (less water), the mass of VOCs per unit of surface area coated at a specific coating thickness, and the mass of VOCs per volume of coating solids applied to the part.

For determination of compliance with a prescribed mass of VOCs per volume of coating (less water), the following data would be required: volume of coating used during a specified interval, organic-solvent content of the coating, and density of organic solvent. These data can be obtained from company records or the coating manufacturer. By specifying only the maximum organic-solvent content of the coating, however, this format allows no transferability between organic-solvent content and transfer efficiency. That is, no allowance is made for the reductions in VOC emissions gained from improved transfer efficiency.

The format, mass per unit area at a specific film build, would require the following data to determine compliance: volume of coating used during a specified interval, organic-solvent content of the coating, density of organic solvent, and area coated during the specified interval. The volume of coating used and the number of appliances produced are available from company records. The area coated can be determined by multiplying the number of appliances produced by the area coated per appliance. Because appliances have rather simple configurations, surface area can be determined easily. The mass-per-unit-area format is advantageous primarily because knowledge of transfer efficiency is not necessary to determine compliance. In addition, this format would allow the owner or operator at least as much flexibility as any other in selecting a control method. This format may be disadvantageous primarily because it requires specification of film thickness. Appliances are coated at different thicknesses depending upon the need for durability and detergent resistance of the unit. Selection of a single film thickness may not be equitable to all segments of the industry, while selection of two or more film thicknesses would result in an unnecessarily complicated standard.

The problems associated with a format that specifies a film thickness could be overcome with a format that allows emissions proportional to the thickness of the coating. Mass of VOCs per unit of surface area coated per unit of film thickness is an example of this format. The only additional information required to determine compliance would be the film thickness. Variations in thickness, however, would necessitate the use of complex statistical methods to determine average film thickness with a reasonable degree of reliability. Recordkeeping would be burdensome, and enforcement would be difficult.

A format of mass of VOCs per unit volume of applied coating solids would require the following data to determine compliance: volume of coating used, organic-solvent content of the coating, density of the organic solvent, solids content of the coating, and the transfer efficiency of the application method. With this format, a transfer efficiency must be measured or designated for each application method. With a specified transfer efficiency, the remaining data can be determined from company records from coating analyses, or from the coating manufacturer. Because of the relative simplicity, universal applicability, and ease in determining compliance, this format was selected for the proposed standards.

Selection of Numerical Emission Limits

The selection of the numerical emission limits in the proposed standards directly follows the selection of Regulatory Alternatives A–II and B–II as the best systems of continuous emissions reduction for prime coating and topcoating operations, respectively. The proposed standards would limit VOCs emissions to 0.90 kilogram per liter of coating solids applied to an appliance part. The limit was calculated as follows:

Coating formulation: 62 percent (vol.) solids
38 percent (vol.) organic solvent

Average organic-solvent density: 0.88 kg/ℓ (7.36 lb/gal)

Transfer efficiency: 60 percent

$$\text{Mass of VOCs per unit volume solids} = \frac{0.38 \times 0.88}{0.62} = 0.54 \text{ kg/ℓ}$$

$$\text{Mass of VOCs per unit volume of solids applied} = \frac{0.54}{0.60} = 0.90 \text{ kg/ℓ of coating solids applied}$$

Method of Determining Compliance

The procedure for determining compliance with the proposed standard is complicated because of the different control techniques that may be used by the plant owner or operator. The following multistep procedure would be used.

1. Determine the VOC emissions from each prime coat and topcoat operation during 1 calendar month. The owner or operator may obtain the data necessary to determine VOC emissions from company records, from formulation data supplied by the manufacturer of the coating, or through an analysis of each coating or input stream, using Reference Method 24.

2. Select the appropriate transfer efficiency for each surface coating operation.

3. Calculate the mass of VOC emissions per unit volume of applied coating solids for each surface coating operation. If after a 1-month period, the value obtained is equal to or less than specified emission limit for that surface coating operation, the owner or operator would be in compliance. Following the initial compliance test period, the owner or operator would repeat this calculation monthly. However, if the VOC content per unit volume of coating solids of each coating, as applied, is less than the maximum allowed for the lowest transfer efficiency in the affected facility, the calculation will not be required.

4. If incineration is used to comply with the standard, calculate monthly the uncontrolled VOC emissions as in (3) above. Calculate the destruction efficiency of the incinerator(s) by sampling upstream and downstream of the control device, as described in the proposed standard. Determine the capture efficiency, as described in the proposed standard. The product of the two efficiencies gives the reduction efficiency of the control system. The value of the reduction efficiency determined during the initial compliance testing period need not be recalculated each month, as long as no pertinent conditions change. The actual controlled emissions are determined by using the uncontrolled emissions and the reduction efficiency, as shown in the equation in the proposed standard.

5. If an organic-solvent recovery system is used, calculate monthly the uncontrolled VOC emissions as in (3) above. Then calculate the mass of VOCs recovered by the system. The ratio of recovered emissions to uncontrolled emissions is the reduction efficiency for the control system. The actual controlled emissions are determined using the uncontrolled emissions and the reduction efficiency, as shown in the equation in the proposed standard.

Two types of violations may occur at a source that complies by using incineration in conjunction with low-organic-solvent coatings. The first is an increase in coating VOC content above the level the incinerator can handle, and the second is improper operation and maintenance of the incinerator. These two types of violations are discussed below.

When incineration is used as the method of compliance, the performance test consists of determining the mass of controlled VOC emissions per unit volume of applied coating solids for the preceding 30 days. If these emissions exceed 0.90 kg VOC per liter of coating solids applied, the source will be in violation of Section 60.452. The source may demonstrate, through another compliance test, that its incinerator(s) can achieve a higher destruction efficiency than has been previously demonstrated, if it wishes to apply a coating with a higher organic-solvent content.

A second type of violation may be triggered by a repeated pattern of incinerator temperature fluctuations. The initial compliance test will establish the combustion temperature needed to achieve a particular destruction efficiency. If during the coating operation continuous monitoring data or reports show repeated drops in temperature of more than 3 hours duration, the source could be in violation of 40 CFR 60.11(d), which requires proper operation and maintenance of control equipment. If a source's continuous monitor shows a drop in temperature, the Administrator may require that a performance test be conducted at the lower temperature.

Selection of Performance Test Methods

Reference Method 24, "Determination of Volatile Matter Content, Water Content, Density, Volume Solids, and Weight Solids of Surface Coating" (45 FR 65956), leads to a determination of VOC content of coating material measured as mass of volatile organics per unit volume of coating solids. For each surface coating operation, Reference Method 24 would be used to analyze the VOC content of each coating. However, the owner or operator is provided the alternative of obtaining these data from formulation data supplied by the manufacturer of the coating. Additional data may be required from company records. Equations provided in the proposed standards would enable the owner or operator to calculate the VOC emissions. Reference Method 25, "Determination of Total Gaseous Nonmethane Organic Emissions as Carbon" (45 FR 65956), is included in the proposed standards and is used in determining the destruction efficiency achieved by an incinerator.

Modification/Reconstruction Considerations

A modification is defined as any physical or operational change to an existing facility that results in an increased emission rate of any pollutant to which the standard applies (40 CFR 60.14). Upon modification, an existing facility becomes an affected facility and, therefore, subject to the standard. Aproximately 160 affected facilities are expected to be subject to the proposed standards in the first 5 years after promulgation. It is anticipated that 50 percent of the 160 affected facilities will be coating operations that have been modified or reconstructed. Alterations characteristic of the appliance industry that could increase emissions may include an added coating station, changes in coating specifications, a change from high- to low-solids coatings, the use of a higher density organic solvent, increased film thickness, or an increase in production capacity. Any such change might cause a facility to be subject to the standard unless emissions were concurrently reduced elsewhere in the plant.

A reconstruction is defined in 40 CFR 60.15 as any replacement of components of an existing facility to the extent that: (1) the fixed capital cost of the new components exceeds 50 percent of the fixed capital cost of a comparable new facility, and (2) it is technologically and economically feasible to meet the applicable standards. An existing facility designated by the Administrator as reconstructed is subject to the standard. Reconstructions characteristic of the appliance industry would probably result from changes in application equipment to accommodate a change in coating; e.g., conventional to high-solids, waterborne, or powder coatings.

The proposed standards contain no

exemptions due to the modification or reconstruction of existing coating lines, which are expected to be the focus of industry growth during the coming years. Because the proposed standards are based on the use of coatings that are demonstrated and applicable throughout the industry and could be achieved by a wide combination of conventional methods or techniques, the impact of modification and reconstruction provisions has been significantly lessened.

Selection of Monitoring Requirements

Monitoring requirements are normally included in standards of performance to ensure that emission control requirements are met and that control devices are properly operated and maintained.

The owner or operator would be required to calculated and record the VOC emissions per unit volume of applied solids from each affected facility for each calendar month. Each monthly calculation would be considered a performance test. Where direct incineration is used to comply with the proposed standards, a monitoring device would be required to continuously record the combustion temperature of the control device. If catalytic incineration is used, the owner or operator would install a monitoring device to continuously record the gas temperature both upstream and downstream of the catalyst bed to verify the activity of the catalyst.

Impact of Reporting Requirements

A reports impact analysis for the appliance surface coating industry was prepared in response to the U.S. Environmental Protection Agency (EPA) guidelines for implementing Executive Order 12044 (44 FR 30988, May 29, 1979). The purpose of the analysis is to estimate the economic impact of the reporting and recordkeeping requirements that would be imposed by the proposed standards and by those appearing in the General Provisions of 40 CFR Part 60. Included in the analysis are the rationale for the selection of the proposed requirements, an evaluation of the major alternatives considered prior to the selection of the proposed requirements, and a description of the information required by the General Provisions and by the proposed standards. A copy of the reports impact analysis is included in Subcategory II–I of the appliance surface coating docket (EPA Docket No. OAQPS A–80–6).

Based on the reports impact analysis, a total of 40 industry person-years would be required to comply with the recordkeeping and reporting requirements through the first 5 years of applicability.

Public Hearing

A public hearing will be held to discuss the proposed standards in accordance with Section 307(d)(5) of the Clean Air Act. Persons wishing to make oral presentations should contract EPA at the address given above (see **ADDRESSES** section). Oral presentations will be limited to 15 minutes each. Any member of the public may file a written statement before, during, or within 30 days after the hearing. Written statements should be addressed to the Central Docket Section address given in the **ADDRESSES** section.

A verbatim transcript of the hearing and written statements will be available for public inspection and copying during normal working hours at EPA's Central Section, West Tower Lobby, Gallery 1, Waterside Mall, 401 M Street, SW., Washington, DC 20460.

Docket

The docket is an organized and complete file of all the information submitted to or otherwise considered by EPA in the development of this proposed rulemaking. The principal purposes of the docket are (1) to allow interested parties to readily identify and locate documents so they can intelligently and effectively participate in the rulemaking process, and (2) to serve as the record in case of judicial review.

Miscellaneous

As prescribed by Section 111 of the Clean Air Act, establishment of standards of performance for large appliance surface coating operations was preceded by the Administrator's determination (44 FR 49222, August 21, 1979) that these sources contributed significantly to air pollution that may reasonably be anticipated to endanger public health or welfare. In accordance with Section 117 of the Act, publication of these standards was preceded by consultation with appropriate advisory committees, independent experts, and Federal departments and agencies. The Administrator welcomes comments on all aspects of the proposed standards including technological issues, monitoring requirements, and proposed test methods.

One of the issues to be resolved during promulgation of a final rule concerns the definition of an appliance part or product that would be subject to the proposed standards. The proposed standards were based upon analyses of data pertaining to the surface coating of traditional household appliances such as cooking equipment, laundry equipment, refrigerators, freezers, dishwashers, water heaters, and trash compactors. Recent analyses of industry data indicate that other appliances may be surface coated by the same methods as these traditional large appliance products. The other products include items such as fans, air purifiers, humidifiers, dehumidifiers, water softeners, baseboard and room heaters, furnaces, air-conditioning equipment, dry cleaning equipment, vacuum cleaners, and interior lighting fixtures. Because there is no apparent technical reason to exclude these products from the proposed standards and because these products would not be subject to other standards under development by the Agency, the definition of appliance has been expanded to include these products. Comments are specifically invited on the following:

- The method(s) of coating application traditionally used to coat these appliances,
- Other product(s) to be included or excluded from the standards because of significant differences in coating application equipment or formulations, and
- The economic impact of the proposed standards and whether it would result in any plant closure.

Information regarding the number of manufacturers producing these products, differences in coating formulations or equipment, and present and forecasted production is particularly invited.

In addition, the Administrator specifically invites comments concerning the reporting requirements of the proposed standards. Any comment submitted to the Administrator should contain specific information and data pertinent to an evaluation of the magnitude and severity of any adverse impact and should suggest alternative courses of action to avoid this impact. Recommended alternative reporting requirements should contain complete instructions and should state all the reasons why the recommended requirements would be considered an improvement.

It should be noted that standards of performance for new sources established under Section 111 of the Clean Air Act reflect:

"* * * application of the best technological system of continuous emission reduction which (taking into consideration the cost of achieving such emission reduction, and any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated [Section 111(a)(1)].

Although emission control technology may be available to reduce emissions below levels required to comply with standards of performance, this technology might not be selected as the basis of standards of performance due to costs associated with its use. Accordingly, standards of performance should not be viewed as the ultimate in achievable emission control. In fact, the Act requires (or has the potential for requiring) imposition of a more stringent emission standard in several situations.

For example, applicable costs do not necessarily play as prominent a role in determining the "lowest achievable emission rate" (LAER) for new or modified sources located in nonattainment areas; i.e., areas where statutorily mandated health and welfare standards are being violated. In this respect, Section 173 of the Act requires that new or modified sources constructed in an area where ambient pollutant concentrations exceed the National Ambient Air Quality Standard (NAAQS) must reduce emissions to the level that reflects LAER, as defined in Section 171(3) for such category of source. The statute defines LAER as the rate of emissions based on the following, whichever is more stringent:

(A) The most stringent emission limitation contained in the implementation plan of any State for such class or category of source, unless the owner or operator of the proposed source demonstrates that such limitations are not achievable, or

(B) The most stringent emission limitation achieved in practice by such class or category of source.

In no event can the emission rate exceed any applicable new source preformance standard.

A similar situation may arise under the prevention of significant deterioration air quality provisions of the Act (Part C). These provisions require that certain sources (referred to in Section 169(1) employ BACT as defined in Section 169(3) for all pollutants regulated under the Act. BACT must be determined on a case-by-case basis, with energy, environmental, and economic impacts, and other costs taken into account. In no event, may the application of BACT result in emissions of pollutants that exceed the emissions allowed by any applicable standard established pursuant to Section 111 (or 112) of the Act.

In all events, SIPs approved or promulgated under Section 110 of the Act must provide for the attainment and maintenance of the NAAQS designed to protect public health and welfare. For this purpose, SIPs must, in some cases, require greater emission reduction than those required by standards of performance for new sources.

Finally, States are free under Section 116 of the Act to establish even more stringent emission limits than those established under Section 111 or those necessary to attain or maintain the NAAQS under Section 110. Accordingly, new sources may in some cases be subject to limitations more stringent than standards of performance under Section 111, and prospective owners and operators of new sources should be aware of this possibility in planning for such facilities.

This regulation will be reviewed 4 years from the date of promulgation as required by the Clean Air Act. This review will include an assessment of such factors as the need for integration with other programs, the existence of alternative methods, enforceability, emission control technology improvements, and reporting requirements. The reporting requirements in these standards will be reviewed as required under EPA's sunset policy for reporting requirements in standards.

Section 317 of the Clean Air Act requires the Administrator to prepare an economic impact assessment for any new source standard of performance under Section 111(b) of the Act. An economic impact assessment was prepared for the proposed regulations and for other regulatory alternatives. All aspects of the assessment were considered when the proposed standards were formulated to ensure that they would represent the best system of emission reduction, considering costs. The economic impact assessment is included in the Background Information Document.

Dated: December 18, 1980.

Douglas M. Costle,

Administrator.

It is proposed to amend 40 CFR Part 60 by adding a new subpart SS as follows:

Subpart SS—Standards of Performance for Industrial Surface Coating: Appliances

Sec.

60.450 Applicability and designation of affected facility.
60.451 Definitions.
60.452 Standards for volatile organic compounds.
60.453 Performance test and compliance provisions.
60.454 Monitoring of emissions and operations.
60.455 Reporting and recordkeeping requirements.
60.456 Test methods and procedures.

Authority: Secs. 111 and 301(a) of the Clean Air Act, as amended (42 U.S.C. 7411, 7601(a)), and additional authority as noted below.

Subpart SS—Standards of Performance for Industrial Surface Coating: Appliances

§ 60.450 Applicability and designation of affected facility.

(a) The provisions of this subpart apply to each surface coating operation in an appliance surface coating line.

(b) The provisions of this subpart apply to each affected facility identified in paragraph (a) of this section that commences construction, modification, or reconstruction after December 24, 1981.

§ 60.451 Definitions.

(a) All terms used in this subpart not defined are given meaning in the Act or in Subpart A of this part.

"Applied coating solids" means the coating solids that adhere to the surface of the appliance part being coated.

"Applicance part" means any organic surface-coated metal lid, door, casing, panel, or other interior or exterior metal part or accessory that is assembled to form an appliance product.

"Appliance product" means any organic surface-coated metal range, range hood, oven, microwave oven, refrigerator, refrigerated display case, freezer, washer, dryer, dry cleaning equipment, dishwasher, water heater, trash compactor, vacuum cleaner, ice maker, water softener, or interior lighting fixture manufactured for household, commercial, or recreational use. "Appliance product" also means any air purifier, room heater, baseboard heater, dehumidifier, humidifier, fan, furnace, window air conditioner, unitary air conditioner, or heat pump manufactured for household use.

"Appliance surface coating line" means that portion of an appliance part of product manufacturing or assembly plant engaged in the application and curing or organic surface coatings on appliance parts or products.

"Coating application station" means that portion of the appliance surface coating operation where a prime coat or a top coat is applied to the appliance part or product. The coating application station consists of the dip tank, spray booth(s), or flow unit.

"Curing oven" means a device that uses heat to dry or cure the coating(s) applied to appliance parts or products.

"Electrodeposition" (EDP) means a method of coating application in which the appliance part or product is submerged in a tank filled with coating material suspended in water and an electrical field is used to deposit the material on the part or product.

"Flashoff area" means the portion of an appliance surface coating line between the coating application station and the curing oven.

"Spray booth" means the structure housing automatic or manual spray application equipment where a coating is applied to appliance parts or products.

"Surface coating operation" means the system on an appliance surface coating line used to apply and dry or cure an organic coating on the surface of the appliance part of product. The surface coating operation may be a prime coat or a topcoat operation and includes the coating application stations(s), flashoff area, and curing oven.

"Transfer efficienty" means the ratio of the amount of coating solids deposited onto the surface of an appliance part of product to the total amount of coating solids used.

"VOC emissions" means the mass of volatile organic compounds (VOCs), expressed as kilograms of VOCs per liter of applied coating solids, emitted from an appliance surface coating operation.

(b) All symbols used in this subpart not defined below are given meaning in the Act or Subpart A of this part.

B = uncontrolled VOC emissions per unit volume of coating solids, in kilograms per liter.
C_a = the concentration of VOCs in a vent after a control device, in parts per million by volume (as carbon).
C_b = the concentration of VOCs in a vent before a control device, in parts per million by volume (as carbon).
C_f = the concentration of VOCs in a vent not routed to a control device, in parts per million by volume (as carbon).
D_c = density of coating (or input stream), in kilograms per liter.
D_d = density of organic solvent used for dilution, in kilograms per liter.
D_r = density of recovered organic solvent, in kilograms per liter.
E = the efficiency of a control device (fraction).
F = the capture efficiency of a control device (fraction).
G = uncontrolled VOC emissions per unit volume of applied coating solids, in kilograms per liter.
L_c = volume of coating used, in liters.
L_d = volume of organic solvent used for dilution, in liters.
L_r = volume of organic solvent recovered, in liters.
L_s = volume of solids consumed, in liters.
M_d = mass of VOCs in dilution solvent, in kilograms.
M_o = mass of VOCs in coating, in kilograms.
M_r = mass of VOCs recovered, in kilograms.
N = weighted average of actual VOC emissions per unit volume of solids applied, in kilograms per liter.
Q_a = the volumetric flow rate through a vent after a control device, in dry standard cubic meters per hour.
Q_b = the volumetric flow rate through a vent before a control device, in dry standard cubic meters per hour.
Q_f = the volumetric flow rate in a vent not routed to a control device, in dry standard cubic meters per hour.
R = the efficiency of a control device.
T = transfer efficiency.
V_s = volume fraction of nonvolatile matter in coating (or input stream) in liters per liter.
W_o = weight fraction of nonaqueous volatile matter of coating, in kilograms per kilogram.

§ 60.452 Standards for volatile organic compounds.

On or after the date on which the performance test required by § 60.8 is completed, no owner or operator of an affected facility subject to the provisions of this subpart shall discharge or cause the discharge of VOC emissions that exceed 0.90 kilogram of VOCs per liter of applied coating solids from any surface coating operation on an appliance surface coating line.

§ 60.453 Performance test and compliance provisions.

(a) Sections 60.8(d) and (f) do not apply to the performance test procedures required by this subpart.

(b) Except as provided in paragraph (c) of this section, each owner or operator shall determine compliance with § 60.452 by calculating and recording the weighted average of the VOC emissions per liter of applied coating solids from each affected facility during a calendar month. Following this initial performance test period, the owner or operator shall calculate and record the VOC emissions from each affected facility for each calendar month. For this subpart, each monthly calculation is considered a performance test. Where coating is applied by spray application, the owner or operator shall obtain the information necessary to calculate the weighted average from formulation data supplied by the manufacturer of the coating or by an analysis of each coating, by Reference Method 24 or by an alternative or equivalent method acceptable to the Administrator. Where a coating is applied by dip coating, flow coating, or EDP, the owner or operator shall obtain the information necessary to calculate the weighted average from formulation data supplied by the manufacturer of the coating or by an analysis of each input stream by Reference Method 24 or an alternative or equivalent method acceptable to the Administrator. Coating and organic-solvent usage data may be obtained from company records. If formulation data supplied by the manufacturer of the coating are used to determine VOC emissions from an affected facility, the Administrator may require an analysis of each coating (or input stream) by Reference Method 24. Where more than one application method is used within a single surface coating operation, the owner or operator shall determine the composition and volume of each coating applied by each method through a means acceptable to the Administrator.

(1) Select the transfer efficiency for the applicable method of coating application from Table 1. If the owner or operator can demonstrate to the satisfaction of the Administrator that other transfer efficiencies are appropriate, the Administrator will approve their use on a case-by-case basis.

(2) For each affected facility where the coating is analyzed prior to dilution.

(i) The mass of VOCs is calculated by the following equation:

$$M_o + M_d = \sum_{i=1}^{n} L_{c_i} D_{c_i} W_{o_i} + \sum_{j=1}^{m} L_{d_j} D_{d_j}$$

(ii) The volume of solids consumed is determined by the following equation:

$$L_s = \sum_{i=1}^{n} L_{c_i} V_{s_i}$$

(iii) The weighted average transfer efficiency is calculated by the following equation:

$$T = \frac{\sum_{i=1}^{n} \sum_{k=1}^{m} L_{c_{ik}} V_{s_{ik}} T_k}{L_s}$$

(iv) Compliance with § 60.452 is determined by the following relationships:

$$G = \frac{M_o + M_d}{L_s T}$$

$$N = G$$

$$N < 0.90 \text{ kg/}\ell ,$$

where

i denotes each coating (or input stream) before dilution.

j denotes each dilution solvent.

k denotes each application station.

n or m denotes the total number of summed components.

(3) For each affected facility where the coating is analyzed after dilution,

(i) The mass of VOCs is calculated by the following equation:

$$M_o + M_d = \sum_{i=1}^{n} L_{c_i} D_{c_i} W_{o_i} .$$

(ii) The volume of solids consumed is determined by the following equation:

$$L_s = \sum_{i=1}^{n} L_{c_i} V_{s_i} .$$

(iii) The weighted average transfer efficiency is calculated by the following equation:

$$T = \frac{\sum_{i=1}^{n} \sum_{k=1}^{m} L_{c_{ik}} V_{s_{ik}} T_k}{L_s} .$$

(iv) Compliance with § 60.452 is determined by the following relationships:

$$G = \frac{M_o + M_d}{L_s T}$$

$$N = G$$

$$N < 0.90 \text{ kg/}\ell ,$$

where

i denotes each coating (or input stream) as applied.

k denotes each application solvent.

n or m denotes the total number of summed components.

(c) For each affected facility where the VOC content per unit volume of coating solids (B_i) of each coating as applied is equal to or less than the maximum allowable VOC content specified in Table 2 for the lowest transfer efficiency of any method of application in the affected facility, the owner or operator is not required to calculate VOC emissions for each calendar month. The VOC content per unit volume of solids for each coating is calculated by the following equations:

$$B_i = \frac{D_{c_i} W_{o_i}}{V_{s_i}} ,$$

where

i denotes a coating (or input stream) to which no organic dilution solvent is added or which is analyzed after dilution,

or

$$B_i = \frac{\sum_{i=1}^{n} L_{c_i} D_{c_i} W_{o_i} + \sum_{j=1}^{n} L_{d_j} D_{d_j}}{\sum_{i=1}^{n} L_{c_i} V_{s_i}}$$

where

i denotes each coating (or input stream) before dilution.

j denotes each dilution solvent.

n or m denotes the total number of summed components.

Table 1.—*Transfer efficiencies*

Application method	Transfer efficiency (T_i)
Air-atomized spray	0.40
Airless spray	0.45
Manual electrostatic spray	0.60
Flow coat	0.85
Dip coat	0.85
Nonrotational automatic electrostatic spray	0.85
Rotating head automatic electrostatic spray	0.90
Electrodeposition	0.95
Powder	0.95

Table 2.—*Maximum allowable VOC content*

Transfer efficiency (T)	Maximum VOC content (B_i) (kg VOC/l solids)
0.40	0.36
0.45	0.40
0.50	0.45
0.55	0.50
0.60	0.54
0.65	0.58
0.70	0.63
0.75	0.68
0.80	0.72
0.85	0.76
0.90	0.81
0.95	0.86

(d) For each affected facility where compliance is achieved through the use of an add-on emission control system that reduces emissions through the destruction of VOCs, the owner or operator shall calculate the uncontrolled VOC emissions (G) from each such affected facility during each calendar month by the procedures specified in paragraph (b) of this section. The owner or operator shall also determine the controlled VOC emissions (N) and compliance with § 60.452 by the following procedures:

(1) Determine the destruction efficiency of a control device (E_z) using values of the volumetric flow rate of each of the gas streams and the VOC content (as carbon) of each of the gas streams in and out of the device by the following equation:

$$E_z = \frac{\sum_{i=1}^{n} Q_{b_i} C_{b_i} - \sum_{j=1}^{m} Q_{a_j} C_{a_j}}{\sum_{i=1}^{n} Q_{b_i} C_{b_i}}$$

In subsequent months, the most recently determined VOC destruction efficiency may be used for the performance test, providing control device and capture system operating conditions have not changed. Repeat this portion of the performance test when directed by the Administrator or when it is desirable to operate the control device at conditions different from the initial performance test.

(2) Determine the fraction of total VOCs emitted by an affected facility that enters a particular control device (F_z) by using the following equation:

$$F_z = \frac{\sum_{i=1}^{n} Q_{b_i} C_{b_i}}{\sum_{i=1}^{n} Q_{b_i} C_{b_i} + \sum_{k=1}^{m} Q_{f_k} C_{f_k}}$$

The values of Q_f and C_f for vents not routed to any control device shall be determined by a method acceptable to the Administrator.

(3) Determine the overall reduction efficiency of all control devices for one affected facility by the following equation:

$$R = \sum_{z=1}^{n} E_z F_z .$$

(4) Determine compliance with § 60.452 by the following relationship:

$N = G(1-R) < 0.90$ kg/l,

where

i denotes each vent before a control device.

j denotes each vent after a control device.

k denotes each vent not routed to a control device.

z denotes each control device.

n or m denotes the total number of components summed.

(e) For each affected facility where compliance is achieved through the use of a control device that reduces emissions through the recovery of organic solvent, the owner or operator shall calculate the uncontrolled VOC emissions (G) from each affected facility during each calendar month by the procedures specified in paragraph (b) of this section. The owner or operator shall also determine the controlled VOC emissions (N) and compliance with § 60.452 by the following procedure. For this subpart, each monthly calculation is considered a performance test. Where one organic-solvent recovery system serves more than one affected facility, the owner or operator shall apportion the organic solvent recovered among the affected facilities in direct proportion to the mass of uncontrolled VOCs emitted from each affected facility. Controlled VOC emissions are determined by the following procedures:

(1) Calculate the mass of VOCs recovered by the following equation:

$M_r = L_r D_r$.

(2) Determine the overall reduction efficiency for an affected facility:

$$R = \frac{M_r}{M_o + M_d}$$

(3) Determine compliance with § 60.452 by the following relationship:

$N = G(1-R) < 0.90$ kg/l.

§ 60.454 Monitoring of emissions and operations.

The owner or operator of an affected facility that uses a capture system and an incinerator to comply with the emission limits specified under § 60.452 shall install, calibrate, maintain, and operate temperature measurement devices as prescribed below:

(a) Where thermal incineration is used, a temperature measurement device shall be installed in the firebox. Where catalytic incineration is used, a temperature measurement device shall be installed in the gas stream immediately before and after the catalyst bed.

(b) Each temperature measurement device shall be installed, calibrated, and maintained according to the manufacturer's specifications. The device shall have an accuracy of the greater of 0.75 percent of the temperature being measured expressed in degrees Celsius or ±2.5° C.

(c) Each temperature measurement device shall be equipped with a recording device so that a permanent continuous record is produced.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414))

§ 60.455 Reporting and recordkeeping requirements.

(a) Each owner or operator subject to the provisions of this subpart shall include the following data in the report of the initial performance test required under § 60.8(a) and in the reports of all subsequent performance tests where either the capture efficiency or the destruction efficiency of an incineration system is determined:

(1) For each affected facility where the VOC content per unit volume of coating solids (B_i) of each coating as applied is equal to or less than the maximum allowable VOC content specified in Table 2 for the lowest

transfer efficiency of any application method in use in the affected facility:

(i) The minimum transfer efficiency of any coating application equipment used, and

(ii) The maximum VOC content per volume of coating solids, B_i, as calculated in § 60.453(c), of any coating applied during the month.

(2) Where compliance is achieved through the use of an incineration system:

(i) The average combustion temperature (or the average temperature upstream and downstream of the catalyst bed), and

(ii) A description of the method used to establish the amount of VOCs captured and sent to the incinerator.

(b) Following the initial performance test report, each owner or operator shall report within 10 calendar days each instance in which the weighted average of the mass of VOCs per unit volume of coating solids applied, N, from any affected facility is greater than the limit specified in § 60.452.

(c) Where compliance with § 60.452 is achieved through the use of an incineration system, the owner or operator shall report quarterly the following information:

(1) For thermal incinerators, all 3-hour periods of coating operation during which the average combustion temperature was more than 28° C. (50° F) below the average combustion temperature of the device during the most recent performance test at which destruction efficiency was determined.

(2) For catalytic incinerators, all 3-hour periods of coating operation during which the average temperature of the device immediately before the catalyst bed is more than 28° C (50° F) below the average temperature of the device during the most recent performance test at which destruction efficiency was determined. The owner or operator shall also report all 3-hour periods of coating 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 performance test at which destruction efficiency was determined.

(3) Negative reports are required quarterly if incinerator parameters remain within the limits outlined in paragraphs (i) and (ii), above.

(d) Each owner or operator subject to the provisions of this subpart shall maintain at the source, for at least 2 years, records of all data and calculations used to determine VOC emissions from each affected facility. Where compliance is achieved through the use of thermal incineration, each owner or operator shall maintain, at the source, daily records of the incinerator combustion chamber temperature. If catalytic incineration is used, the owner or operator shall maintain at the source daily records of the gas temperature, both upstream and downstream of the incinerator catalyst bed. Where compliance is achieved through the use of a solvent recovery system, the owner or operator shall maintain at the source daily records of the amount of solvent recovered by the system for each affected facility.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414))

§ 60.456 Test methods and procedures.

(a) The reference methods in Appendix A to this part, except as provided under § 60.8(b), shall be used to determine compliance with § 60.452 as follows:

(1) Method 24 or formulation data supplied by the manufacturer of the coating to determine the VOC content of a coating. Procedures to determine VOC emissions are provided in § 60.453.

(2) Method 25 for the measurement of the VOC concentration in the gas stream vent.

(3) Method 1 for sample and velocity traverses,

(4) Method 2 for velocity and volumetric flow rate,

(5) Method 3 for gas analysis, and

(6) Method 4 for stack gas moisture.

(b) For Method 24, the coating sample must be a 1-liter sample taken into a 1-liter container at a point where the sample will be representative of the coating material.

(c) For Method 25, the sampling time for each of three runs is to be at least 60 minutes and the minimum sample volume is to be at least 0.003 dscm except that shorter sampling times or smaller volumes, when necessitated by process variable or other factors, may be approved by the Administrator.

(d) The Administrator will approve testing of representative stacks on a case-by-case basis if the owner or operator can demonstrate to the satisfaction of the Administrator that testing of representative stacks yields results comparable to those that would be obtained by testing all stacks.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414))

[FR Doc. 80-40137 Filed 12-23-80; 8:45 am]

BILLING CODE 6560-24-M

40 CFR Part 60

[AD FRL 1625-8]

Standards of Performance for New Stationary Sources; Industrial Surface Coating; Appliances

Correction

In FR Doc. 80-40137, appearing on page 85085, in the issue of Wednesday, December 24, 1980, make the following corrections:

1. On page 85092, second column, the eighth line should have read: "thickness. the mass of VOCs per unit of surface area coated per unit of film thickness. and the mass of VOCs per".

2. On page 85095, third column;

a. The last line in the column, should have read, "booth(s), or flow coating unit."

b. In the ninth line from the bottom of the column, the word "or" should have read "of".

c. In the eleventh line from bottom of the column, the first word in the line reading "of" should have read "or".

3. On page 85098, second column, the formula in § 60.453(d)(4) should have appeared as set forth:

"$N = G(1-R) < 0.90$ kg/l,".

4. On page 85097, middle column, the line reading "k denotes each application *solvent.*" should have read "k denotes each application *station*".

BILLING CODE 1505-01-M

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 60

[AD-FRL-1844-1]

Standards of Performance for New Stationary Sources; Industrial Surface Coating: Appliances; Correction

AGENCY: Environmental Protection Agency (EPA).

ACTION: Correction of proposed rule.

SUMMARY: This notice is to correct a typographical error in FR Doc. 80-40137 (AD-FRL-1625-8), Wednesday, December 24, 1980, appearing on page 85095, third column, paragraph (b) of § 60.450 regarding performance standards for industrial surface coating for appliances.

EFFECTIVE DATE: June 4, 1981.

FOR FURTHER INFORMATION CONTACT: Mr. Gene W. Smith, Standards Development Branch, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5624.

Paragraph (b) of § 60.450 should be corrected to read as follows: "The provisions of this subpart apply to each affected facility identified in paragraph (a) of this section that commences construction, modification, or reconstruction after December 24, 1980."

Dated: May 28, 1981.

Edward F. Tuerk,

Acting Assistant Administrator for Air, Noise, and Radiation.

[FR Doc. 81-16652 Filed 6-3-81; 8:45 am]

BILLING CODE 6560-26-M

ENVIRONMENTAL PROTECTION AGENCY

■

STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

METAL COIL SURFACE COATING

SUBPART TT

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 60

[AD-FRL 1629-2]

Standards of Performance for New Stationary Sources; Metal Coil Surface Coating

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule and notice of public hearing.

SUMMARY: Standards of performance are proposed to limit emissions of volatile organic compounds (VOCs) from new, modified, and reconstructed metal coil surface coating operations. The proposed standards would limit VOC emissions to 0.28 kilogram per liter (kg/*l*) of coating solids applied for any prime or finish coat operation where low-VOC content coatings are used without a VOC capture system and emission control device. The proposed standards would limit VOC emissions to 0.14 kg/*l* of coating solids applied where higher VOC content coatings are used in conjunction with a VOC capture system and emission control device. As an alternative, the owner or operator would also be allowed to achieve compliance by demonstrating an overall VOC emission reduction of 90 percent or more prior to discharge to the atmosphere. The determination of average VOC content would be made for each calendar month for each affected facility. Reference Method 24 would be the reference method for determining the VOC content of coatings but the Administrator will allow the use of formulation data from the coating manufacturer except in cases where the validity of the formulation data is in doubt. Reference Method 25 would be used to determine the VOC concentration in the exhaust gas streams. Both reference methods were promulgated at 45 FR 65956, October 3, 1980.

The proposed standards implement Section 111 of the Clean Air Act and are based on the Administrator's determination that metal coil surface coating operations contribute significantly to air pollution that may reasonably be anticipated to endanger public health or welfare. The intent is to require new, modified, and reconstructed coil coating operations to use the best demonstrated system of continuous emission reduction, when costs, non-air-quality health, and environmental and energy impacts are considered.

A public hearing will be held to provide interested persons an opportunity for oral presentation of data, views, or arguments concerning the proposed standards.

DATES: *Comments.* Comments must be received on or before March 6, 1981.

Public Hearing. A public hearing will be held on Febuary 4, 1981 beginning at 9 a.m.

Request to Speak at Hearing. Persons wishing to present oral testimony should contact EPA by January 28, 1981 (1 week before hearing).

ADDRESSES: *Comments.* Comments should be submitted (in duplicate, if possible) to Central Docket Section (A-130), Attention: Docket Number A-80-5, U.S. Environmental Protection Agency, 401 M Street S.W., Washington, D.C. 20460.

Public Hearing. The public hearing will be held at OA Auditorium, R.T.P., North Carolina. Persons wishing to present oral testimony should notify Mrs. Naomi Durkee, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-533.

Background Information Document. The Background Information Document (BID) for the proposed standards may be obtained from the U.S. EPA Library (MD-35), Research Triangle Park, North Carolina 27711, telephone number (919) 541-2777. Please refer to *Metal Coil Surface Coating Operations, Background Information Document for Proposed Standards,* EPA-450/3-80-035a.

Docket. Docket No. A-80-5, containing supporting information used in developing the proposed standards, is available for public inspection and copying between 8:00 a.m. and 4:00 p.m., Monday through Friday, at EPA's Central Docket Section, West Tower Lobby, Gallery 1, Waterside Mall, 401 M Street, S.W., Washington, D.C. 20460. A reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: Mr. Gene W. Smith, Section Chief, Standards Development Branch, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5421.

SUPPLEMENTARY INFORMATION:

Proposed Standards

The proposed standards would apply to all new, modified, and reconstructed metal coil surface coating (coil coating) operations. Existing facilities would not be subject to the proposed standards unless they undergo a modification or a reconstruction as defined in 40 CFR 60.14 and 60.15. Compliance with the proposed standards could be achieved by any of three approaches for each affected facility. The owner or operator could use coatings whose average VOC content on a monthly basis is 0.28 kg/*l* of coating solids applied or less; or, the owner or operator could apply higher VOC content coatings if he reduces VOC emissions to 0.14 kg/*l* of coating solids applied or less; or, the owner or operator could comply by demonstrating an overall VOC emission reduction of 90 percent or greater prior to discharge to the atmosphere. These standards will be reviewed at 4-year intervals after their promulgation date.

The proposed standards would require each owner or operator to conduct monthly performance tests to demonstrate compliance with the proposed emission limits. Where coatings are used without a VOC capture system and emission control device to meet the proposed numerical limit of 0.28 kg/*l* of coating solids applied, the owner or operator would be required to calculate and record a weighted average of the VOC content of coatings applied (including dilution solvents) for each affected facility for each calendar month. Reference Method 24 would be used to determine the VOC content of coatings, but the Administrator will allow the use of manufacturer's formulation data for that purpose except where the validity of the formulation data is in doubt. For each affected facility, the owner or operator would be required to report each month for which the average VOC content of the coatings exceeded 0.28 kg/*l* of coating solids applied. These reports would have to be submitted within 10 days after the end of each such month.

Where higher VOC content coatings are used with a VOC capture system and emission control device to meet the proposed numerical limit of 0.14 kg/*l* of coating solids applied, the owner or operator would be required to calculate and record the weighted average of the VOC content (including dilution solvents) of coatings applied for each affected facility for each calendar month according to the equations contained in the proposed standards. The owner or operator would also have to calculate and record the overall VOC emission reduction required to meet the emission limit. In addition, during the first monthly test, the owner or operator would have to measure the actual overall VOC emission reduction achieved by the VOC capture system and emission control device. Reference

Method 25 and the equations provided in the proposed standards would be used for these determinations. Compliance would be demonstrated where the measured value of the actual overall VOC emission reduction is greater than or equal to the overall VOC emission reduction required to meet the emission limit. For each affected facility, the owner or operator would report each month for which the average VOC content of coatings applied, when reduced by the overall destruction rate of the VOC capture system and emission control device (as determined during the most recent measurement), exceeds the proposed numerical limit. These reports would have to be submitted within 10 days after the end of each such month.

Where compliance is achieved through the demonstration of a 90 percent overall reduction in VOC emissions, the owner or operator would conduct the first monthly performance test by using Reference Method 25 and the equations provided in the proposed standards to calculate the overall percent reduction achieved by the VOC capture system and control device. Compliance would be demonstrated where the overall percent reduction is equal to or greater than 90 percent. After the first monthly test, the owner or operator would monitor the operating parameters of the emission control device.

If thermal incineration is used, the owner or operator would be required to install and operate a device to continuously monitor and record the combustion temperature of the control device. The proposed standards would require the owner or operator to report quarterly all coating periods of more than 3 hours duration where the average combustion temperature fell 28° C (50° F) or more below the temperature at which compliance was demonstrated during the most recent measurement of incinerator efficiency. If catalytic incineration is used, the owner or operator would be required to install a device to continuously monitor and record the gas temperature both upstream and downstream of the incinerator catalyst bed. The owner or operator would report quarterly all coating periods in excess of 3 hours where the average difference between the temperatures upstream and downstream of the catalyst bed falls below 80 percent of the temperature difference at which compliance was demonstrated during the most recent measurement of incinerator efficiency or where the average inlet (or upstream) temperature falls 28° C (50° F) or more below the inlet temperature at which compliance was demonstrated during the most recent measurement of incinerator efficiency.

Summary of Environmental, Energy, and Economic Impacts

The environmental, energy, and economic impacts of proposed standards of performance are normally expressed as incremental differences between the impacts of complying with the proposed standards and those for complying with a typical State Implementation Plan (SIP). Many existing metal coil surface coating operations are located in areas that are considered nonattainment areas for purposes of achieving the National Ambient Air Quality Standard (NAAQS) for ozone. New facilities are expected to have the same geographic distribution as existing plants. States are in the process of revising their SIPs for these areas. In revision SIPs, States generally consider the recommendations contained in Control Techniques Guideline (CTG) documents. The CTG applicable to this source category is *Control of Volatile Organic Emissions From Existing Stationary Sources*, Volume II, *Surface Coating of Cans, Coil, Paper, Fabrics, Automobiles and Light-Duty Trucks* (EPA-450/2-77-088 [CTG]). Although the CTG documents are published for guidance only and are not legally binding on the States, most States are expected to revise their existing SIPs in accordance with the CTG recommendations or to retain their existing limits on VOC emissions.

Approximately 70 percent of the existing coil coating plants are located in States that currently require VOC emissions to be reduced by at least 85 percent prior to discharge except for plants that use waterborne or other low-VOC content coatings. This emission limit is more stringent than the CTG recommendations, and it appears that these States plan to maintain this level of control for VOC emissions. The remaining plants are located in States that use a permit system for controlling VOC emissions. These States are expected to revise their implementation plans to require VOC emission reductions to the CTG-recommended level, which is equivalent to a 64 percent reduction in the emissions from the average industry solvent-borne coating formulation of 60 percent VOCs and 40 percent solids by volume.

The proposed standards would reduce VOC emissions from a typical plant by approximately 33 percent in those States that currently control VOC emissions by a numerical limit (85 percent reduction) and would reduce emissions from a typical plant by approximately 72 percent in those States that adopt the CTG-recommended level of control (64 percent reduction). Nationwide VOC emissions would be reduced by about 3,600 megagrams (Mg) per year by 1986 from a projected level of 12,500 Mg with no New Source Performance Standard (NSPS).

Little or no water pollution or solid waste impact from new, modified, or reconstructed coil coating plants is expected to result from application of the proposed standards. None of the control techniques used by the coil coating industry generates either liquid or solid waste and, therefore, the proposed standards would have no impact in these areas.

Nationwide energy usage by the coil coating industry totaled about 6,600 terajoules (TJ) in 1978. The proposed standards would result in an energy usage increase of about 1 percent per year, which is equivalent to 200,000 barrels of crude oil in the fifth year. Plants that are located in States requiring an 85 percent reduction and that achieve compliance through the use of higher VOC content coatings in combination with an incinerator could be expected to decrease their energy consumption by about 5 percent. However, for those plants regulated to the CTG-recommended level of control, compliance with the proposed standards through the use of incineration could result in up to a 50 percent increase in energy consumption in some individual plants if one of the more energy-efficient systems identified as being capable of achieving the CTG-recommended limits is used as the baseline. Little or no impact in energy consumption would be expected to result from the proposed standards for plants meeting the proposed emission limits with the use of waterborne or other low-VOC content coatings without the use of incineration.

The proposed standards could increase both the capital and annualized costs of new coil coating plants. Based on a predicted industry growth rate of 12 percent per year through 1985, the increased capital cost of new plants that locate in States requiring an 85 percent reduction in VOC emissions could range from $110,000 for a small plant to $140,000 for a large plant. This capital outlay represents an increase in the total capital cost of a new plant of approximately 0.9 percent for a large plant and 1.4 percent for a small plant. The increase in total annualized costs could range from $11,000 for a small plant to $23,000 for a large plant. For plants that locate in States that adopt the CTG-recommended limits, capital

costs for a new plant could increase by $180,000 for a small plant and by $920,000 for a large plant, 2.3 and 6.6 percent increases, respectively, in the total capital costs of a new plant. Nationally, the cumulative capital costs over the first 5 years could reach $20 million. Total annualized costs could increase by $55,000 for a small plant and by $395,000 for a large plant. On an industry-wide basis, the increase in total annualized costs in the fifth year could be $7 million. Compliance with the proposed standards could result in increases in the price of coil coated metal ranging from 0.2 percent for a large plant in 85 percent reduction areas to 4.1 percent for a large plant in States that adopt the CTG-recommended limits. The effects for other plant sizes fall between these two values. In the fifth year, the average price of coil-coated metal could have increased by 2.6 percent.

Rationale

Selection of Source and Pollutants

The "Priority List and Additions to the List of Categories of Stationary Sources," promulgated at 44 FR 49222 on August 21, 1979, ranked sources according to the quantity of emissions, endangerment of health and welfare, and the mobility and competitiveness associated with each source. The coil coating industry ranked 22nd on this list of 59 sources to be controlled for air pollutants. Recent studies conducted by and for EPA estimate that current emissions from the coil coating industry in 1978 amount to 12,700 Mg (14,000 tons) annually.

Although coil coating plants were identified in 27 States, most plants are concentrated around industrial centers in the Northeast and Midwest. A total of 109 individual coil coating plants containing an estimated 147 coil coating lines were identified during this study. Of these plants, 42 are known to be located in areas designated as nonattainment areas for ozone.

VOC emissions from individual plants vary widely as a consequence of the wide variations in annual production. Estimated annual emissions for 60 of the 109 coil coating plants were found to be listed in emission inventory files maintained by individual States. A total of 40 of the 60 plants were identified as having annual uncontrolled (or potential) emissions of greater than 90 Mg (100 tons) per year, and 12 of these 40 plants had annual uncontrolled (or potential) emissions of greater than 900 Mg (1,000 tons) per year. Emission data for some coil coating plants are not contained in the emission inventory files, both because some States do not include companies with potential emissions of 45 Mg (50 tons) per year or less and because many of the coil coaters are captive operations in other industries that are identified by their major end products.

In the coil coating industry, VOC emissions result from the evaporation of organic solvents from the applied coating during the drying process. Typical coatings applied to coiled metal strip include epoxies, epoxyacrylics, acrylics, and polyester enamels. These coatings generally contain organic solvents such as ketones, esters, ethers, and aromatics. Coil coatings are applied in two main steps: prime coat and finish coat. Prime coat and finish coat operations both contribute to VOC emissions.

VOCs are the major air pollutants emitted from the coil coating industry. Particulate matter emitted from this industry is minimal. Technology is currently available to reduce VOC emissions from coil coating operations. The use of higher VOC content coatings with incineration or low-VOC content coatings was identified as having the potential for reducing nationwide industry emissions by as much as 46 percent from all new, modified, and reconstructed sources. Consequently, the coil coating industry has been selected for regulation of VOC emissions by new source standards of performance.

Selection of Affected Facilities

The choice of the affected facility for this standard is based on the Agency's interpretation of Section 111 of the Act, and judicial construction of its meaning.* Under Section 111, the NSPS must apply to "new sources"; "source" is defined as "any building, structure, facility, or installation which emits or may emit any air pollutant" [Section 111(a)(3)]. Most industrial plants, however, consist of numerous pieces or groups of equipment which emit air pollutants, and which might be viewed as "sources." EPA therefore uses the term "affected facility" to designate the equipment, within a particular kind of plant, which is chosen as the "source" covered by a given standard.

In choosing the affected facility, EPA must decide which pieces or groups of equipment are the appropriate units for separate emission standards in the particular industrial context involved. The Agency must do this by examining the situation in light of the terms and purpose of Section 111. One major consideration in this examination is that the use of a narrower definition results in bringing replacement equipment under the NSPS sooner; if, for example, an entire plant were designated as the affected facility, no part of the plant would be covered by the standard unless the plant as a whole were "modified." If, on the other hand, each piece of equipment were designated as the affected facility, then as each piece was replaced, the replacement piece would be a new source subject to the standard. Since the purpose of Section 111 is to minimize emissions by the application of the best demonstrated control technology (considering cost, other health and environmental effects, and energy requirements) at all new and modified sources, there is a presumption that a narrower designation of the affected facility is proper. This ensures that new emission sources within plants will be brought under the coverage of the standards as they are installed. This presumption can be overcome, however, if the Agency concludes that the relevant statutory factors (technical feasibility, cost, energy, and other environmental impacts) point to a broader definition. The application of these factors is discussed below.

The metal coil coating process is a continuous operation that begins with a roll or coil of bare sheet metal and ends with a roll or coil of sheet metal that has a surface finish on one or both sides. A typical coil coating line consists of an inlet station, where the metal strip is unrolled from the coil and enters the process; a metal cleaning and pretreatment section, where the metal is prepared for the coating application; a coating section, which may consist of a single coating station and curing oven or may consist of a prime coating station and curing oven and a finish coating station and curing oven; and an exit station, where the finished metal strip is repackaged into a roll or coil.

Significant quantities of VOC emissions are generated from the application and curing of each prime coat and each finish coat on the metal strip. The application and curing of each coating is accomplished by three devices in series: a coating application station, a curing oven, and a quench station. Existing reports on industry studies indicate that, of the total VOC content of the coatings, approximately 90 percent evaporates in the ovens, 8 percent evaporates at the application station, and about 2 percent evaporates during the quench operation.

Consideration was given to the following alternatives in the selection of affected facilities for proposed

*The most important case is *ASARCO, Inc. v. EPA*, 578 F.2d 319 (D.C. Cir. 1978).

regulation: (1) including all of the coating operations on a coil coating line (from unwind to rewind) as a single affected facility; (2) designating each application station, oven, and quench station as separate facilities; and (3) treating each coating operation—consisting of the application station, oven, and quench station—as separate affected facilities.

The first alternative, consideration of all coating operations on the line as a single affected facility, was rejected because of the diversity of coating formulations used throughout the industry. A large segment of the industry coats metal coil according to the needs or specifications of the purchaser or owner of the metal. In some cases, a low-VOC content (waterborne) prime coating may be followed by a higher VOC content finish coating. In such a situation, if the low-VOC content coating has emissions much lower than the limit required, the reduction required for the emissions from the higher VOC content coating would be less than optimum because the emissions from both coatings would be considered in combination. A similar situation could occur if a modification resulted in a decrease in emissions from one coating application and an increase in emissions from the other coating application. The net result may be no change in emissions if the entire line is considered a single affected facility, and the line would not become subject to the NSPS. This could lead to higher emissions than the case where the best system of control is used on each emission source. Therefore, this alternative was rejected.

Consideration was also given to treating each application station, oven, and quench station as separate affected facilities. However, the operations are so closely associated, both physically and operationally, that their treatment as separate affected facilities appears inappropriate. Many modern coil coating lines have the coating station enclosed in a room so that a large fraction of the emissions occurring during application of the coating is captured by the flow of air into the ovens. The quench station is also located immediately adjacent to the oven. Emission test data in existing reports of industry studies indicate that VOC emissions at the quench station may account for up to 2 percent of total emissions. However, a large fraction (and possibly all) of these emissions is captured by the flow of ventilating air into the oven. Designation of the quench station as a separate affected facility would require the application of an emission limit, method of control, and compliance testing for any fugitive emissions that escape from the quench area. Because of the close relationship among the three emission points and the fact that all of the emissions come from the same coating, this alternative was concluded to be impractical. Therefore, this alternative was rejected.

The third alternative is the designation of each coating operation—consisting of a coating application station, a curing oven, and a quench station—as separate affected facilities. This alternative would provide plant owners or operators with flexibility in their choice of coating formulations, and compliance with the proposed standards could be achieved by different techniques for each coating application. Therefore, each prime coat operation and each finish cost operation have been selected as the affected facilities for control in the proposed standards of performance.

The proposed standards would apply to each prime coat operation and each finish coat operation on all new, modified, or reconstructed coil coating lines and would include emissions that result from the use of VOCs (solvent) as a dilution agent. Cleanup operations may entail equipment flushing or cleaning. The cleanup solvent is typically recovered by a commercial recovery facility. The proposed standards would not include VOC emissions that result from the use of solvent in cleanup operations or activities that do not generate VOC emissions, such as metal cleaning, pretreatment, pickling, galvanizing, and physical handling of materials. Although some fugitive emissions from paint mixing stations may occur, the quantity of these emissions is considered insignificant and would not be subject to the proposed standards.

Although some flashoff occurs between the coating applicator rolls and the oven, the flashoff area is not considered a separate operation but, instead, part of the application process. Most coil coating lines have two separate coating sections—one for the application and curing of the prime coat and another for the application and curing of the finish coat. These lines are referred to as tandem lines and would contain two affected facilities. Lines that apply a one-coat finish to the metal and, consequently, have a single coating section are considered as a single affected facility. One coil coating line was identified that uses electrodeposition (EDP) to apply a prime coat, followed immediately with a wet-on-wet application of the finish coat by conventional roller coating. Both coats are then cured simultaneously by a single oven. Because of the wet-on-wet application and the single curing oven, this type of operation would be considered a single affected facility.

Controls Technologies

The normal technique by which coatings are applied in the coil coating industry is roll coating. In this technique, a roller, wet with the coating, contacts the moving metal strip and transfers the coating to the metal surface. A major advantage of this application technique is that the transfer efficiency consistently approaches 100 percent. Because of this characteristic, applied coating solids are assumed to be equal to consumed coating solids for all coatings. In coil coating operations, prime and finish coats may be applied to one or both sides of the metal in one or two applications. After the prime coat application, the strip generally passes through an oven, where the prime coating is dried and cured; after the finish coat application, the metal strip passes through an oven, which dries and cures the finish coatings. Air is passed through the ovens to carry off the volatile solvent vapors that are released when the volatile portion of the applied coatings evaporates. This exhaust gas stream, in combination with the exhaust gas streams from the application and quench process, is the source of VOC emissions to the atmosphere. It is these gas streams that are treated when emission control devices are installed.

There are two general techniques for reducing VOC emissions from coil coating operations. The first is to pass the exhaust gas stream through a VOC emission control device, and the second is to reduce the amount of VOCs in the coating.

The only emission control device that has been identified as effective in controlling VOC emissions from coil coating operations is an incinerator. Both thermal and catalytic incinerators have been successfully used in the industry. The results of seven emission tests indicate that thermal incinerators can achieve greater than 95 percent reduction in VOC emissions when they are operated at temperatures of 760° C (1,400° F) or greater; however, large amounts of supplemental fuel are frequently required to raise the exhaust gases from oven temperatures in the range of 260° to 426° C (500° to 800° F) to incineration temperature. If heat recovery units are installed along with the incinerator, the energy consumption can be dramatically reduced. The recovered heat can be used to produce steam or hot water for the wet section of the line or to preheat the oven air. In many existing installations, the use of a

thermal incinerator with heat recovery has resulted in an overall energy savings relative to a coil coating line with no emission control.

Thermal incinerators were identified in several configurations. In some configurations, the internal oven burners are replaced with incinerators (zone incinerators) that pull air and VOC's from the oven atmosphere, burn the VOC's and exhaust directly back into the oven to supply both heat and "cleaned" oven ventilating air. These units reportedly reduce VOC emissions by 50 to 70 percent and reduce the amount to external oven ventilation needed. An external incinerator can be used in conjunction with the zone incinerators to further reduce VOC emissions. When this is done, the external incinerator can be smaller that when and external incinerator is used alone because the volume of external oven ventilation required is reduced. The zone incinerators are not widely used without an external after burner because alone they may not achieve compliance with the numerical limits of existing SIPs, and, in some cases, may not achieve adequate odor control. Other configurations of incinerators use a single external incinerator and return a portion of the incinerator exhaust back to the oven to supply heat. These units are used with various forms of additional heat recovery systems, such as regenerative or recuperative units that heat the oven exhaust before it enters the incinerator and remove heat from the incinerator exhaust before it is returned to the oven.

Vendors of catalytic incinerators indicate that these devices are also capable of achieving VOC emission reductions in excess of 95 percent, and their use requires substantially less energy than the thermal incinerator because of the lower incineration temperature. If heat recovery is used in conjunction with the catalytic units, they become even more attractive economically. However, literature and industry sources also indicate that there are restrictions on the applicability of catalytic incinerators because many of the coatings used in the coil coating industry contain ingredients that may foul or mask the catalyst. If this happens, the active catalyst life is greatly reduced, resulting in higher operating costs for the incinerator because of the more frequent catalyst replacement. Consequently, the use of catalytic incinerators is normally restricted to those plants that use only a few different coating formulations in which the ingredients are accurately known. Plants of this type are usually captive coaters.

Although carbon adsorption has been used to control VOC emissions from many industrial processs, none was identified on coil coating operations. The high temperature of the oven exhaust has been cited by industry sources as the reason that these systems are not used in coil coating. For this reason, carbon adsorption systems were not described in the Background Information Document (BID) as a control technique for the coil coating industry, although their use would not be precluded if desired by the plant owner or operator.

When control devices are used to reduce VOC emissions, capture efficiency must also be considered. Capture efficiency in excess of 95 percent is achievable by the judicious application of hoods and/or enclosures at the coating application station.

Industry has estimated that 90 percent of the VOC emissions from coil coating operations occur in the oven. Of the remaining 10 percent, 8 are emitted at the coating application station, and 2 are emitted in the quench area. During the background study for these proposed standards, a number of coil coating lines were observed in which the coating application stations were enclosed in coating rooms. The normal design practice for these rooms has oven ventilating air entering from the side of the room opposite the oven. The oven ventilating air then flows across the room, the coating application equipment, and the wet metal strip before entering the oven. The installation of a hood that extends from the oven entrance over the wet metal strip to the coating application equipment further contains the VOCs emitted in the coating application station. This hood, when properly placed as close to the wet metal strip as feasible, helps direct the oven make-up air drawn from the coating room through the coating application equipment and over the wet metal strip. Although all coating room ventilation air cannot normally be used as oven make-up air, EPA's study of coating room air flow indicates that the pattern of air flow normally used would entrain almost all of the VOCs emitted at the coating application station. Coating rooms were determined to be applicable at all new, modified, and reconstructed coil coating plants.

When the coated metal coil exits the oven, it is immediately cooled at the quench station. Because of the enclosed nature of the quench operation and its proximity to the oven exit, most of the quench area VOC emissions are entrained in the ventilating air that passes through the quench area into the exit end of the oven. By drawing oven ventilation air from the coating room and quench area in this manner an overall capture efficiency of at least 95 percent is achievable.

Low-VOC content coatings include organosols, plastisols and other high-solids coatings, waterborne coatings, and powder coatings. Some of these low-VOC content coatings are successfully used in coil coating processes, but their use is generally restricted to certain specialized applications. Organosols and plastisols are used to coat some products, but their use is not expected to expand to general applications because they are costly and because thin film thicknesses are difficult to achieve with high speed application equipment. Radiation cured waterborne coatings are also in limited use in the industry. However, installations known to use radiation cured coatings are restricted to single coat processes, and the single coat process is not expected to have more general applications in the foreseeable future.

Waterborne coatings are the most widely used low-VOC content technology in the industry. Approximately 15 percent of all coil coating is currently done with waterborne coatings. However, waterborne coatings are limited in their application because they have not been developed with the wide range of finish characteristics that is needed for the many products for which coil coated metal is used. Data submitted by coating manufacturers indicate that the VOC content in the waterborne coatings now used by the industry ranges from 0.07 to 0.54 kg/l of solids and that most are in the range of 0.11 to 0.28 kg/l of solids. Several manufacturers indicate that, within the next 5 to 8 years, the VOC content of most waterborne coatings could be reduced to the range of 0.10 to 0.18 kg/l of solids. The use of waterbornes is expected to increase in proportion to the general growth of the industry, but their use is not expected to expand rapidly into areas where solvent-borne coatings are now required. Although waterborne coatings cannot be considered a universal control technique for all coil coating operations, they have proved effective in some installations. Therefore, incineration and waterborne coatings have been determined to be the most widely applicable control techniques for all segments of the industry. Based on the use of these control techniques, the following five regulatory alternatives were considered. These alternatives

differ from those in the BID and are based on new data submitted by the industry at the National Air Pollution control Techniques Advisory Committee (NAPCTAC) meeting.

Regulatory Alternatives

Regulatory Alternative I is no NSPS for prime coat and finish coat operations in the coil coating industry (no NSPS). Under this alternative, VOC emissions from the coating process would be controlled through existing and revised SIPs.

Regulatory Alternative II is an overall VOC emission reduction of 85 percent, or an emission limit equivalent to an 85 percent overall reduction in the emissions from the average coating formulation used by the industry. Based on data obtained from coil coaters and from coating manufacturers, the average coating formulation is estimated to consist of 40 percent solids and 60 percent VOCs by volume. Regulatory Alternative II (85 percent) is based on the use of an incinerator with up to a 95 percent destruction efficiency and a capture efficiency of at least 90 percent.

Regulatory Alternative III is different from that described in the BID and is similar to Regulatory Alternative II, with the addition of a separate emission limit for users of low-VOC content coatings. This alternative is an overall VOC emission reduction of 85 percent, or an emission limit equivalent to an 85 percent overall reduction in the emissions from the average industry coating formulation when higher VOC content coatings are used in conjunction with an emission control device. When low VOC content coatings are used without an emission control device, this alternative would require that emissions be limited to the equivalent of an 80 percent reduction in the emissions from the average industry coating formulation.

Regulatory Alternative IV is similar to Regulatory Alternative III in the BID but has a slightly less stringent capture requirement. This alternative is an overall VOC emission reduction of 90 percent, or an emission limit equivalent to a 90 percent overall reduction in the emissions from the average coating formulation used by the industry. Regulatory Alternative IV (90 percent) is based on the use of an incinerator with up to a 95 percent destruction efficiency and a capture efficiency of 95 percent of VOC emissions.

Regulatory Alternative V is similar to Regulatory Alternative IV, with the addition of a separate emission limit for users of low-VOC content coatings. This alternative is an overall VOC emission reduction of 90 percent, or an emission limit equivalent to a 90 percent overall reduction in the emissions from the average industry coating formulation when higher VOC content coatings are used in conjunction with an emission control device. When low-VOC content coatings are used without an emission control device, this alternative would require that emissions be limited to the equivalent of an 80 percent reduction in the emissions from the average industry coating formulation.

Environmental, Energy, and Economic Impacts

The environmental impact of each regulatory alternative was computed as the VOC emission reduction that could be achieved relative to the emissions allowable under existing and projected State regulations. A study of the geographic distribution of existing coil coating plants revealed that 70 percent of the plants are located in States that impose numerical limits on VOC emissions. On the average, these States require that VOC emissions be reduced by 85 percent prior to their discharge to the atmosphere, except for plants that use waterborne or other low-VOC content coatings. The remaining 30 percent of existing plants are located in States that use a permit system to control VOC emissions.

States are currently revising their SIPs for nonattainment areas. To evaluate the impacts of the regulatory alternatives, a baseline level of control must be established from which the impacts can be calculated. Because of the revisions that are being made in the SIPs, a choice had to be made between the use of the existing SIP requirements and the revised SIP requirements as the baseline level of control. Because many of the coil coating plants are located in nonattainment areas, it is expected that many States that now use the permit system will adopt the emission limits recommended by the CTG on coil coating operations even though the CTG document does not legally bind the States. This recommended limit is 0.31 kg VOC/l of coating minus water (0.48 kg/l of coating solids) and is equivalent to a 64 percent reduction in the emissions from the average industry coating formulation. It is further anticipated that those States that already have numerical limits in their SIPs will continue to impose those limits. Therefore, these two baselines—an 85 percent reduction for 70 percent of the plants and the CTG-recommended limits for 30 percent of the plants—were used to estimate the environmental impact of the regulatory alternatives for the proposed NSPS. Inherent in the estimates are the assumptions that plants that become subject to the proposed NSPS will have the same geographic distribution as existing plants and that all plants now covered by a permit system will be subject to the CGT-recommended limits.

Regulatory Alternative I, no NSPS, would have no impact on VOC emissions from coil coating operations. A total of 70 percent of existing plants would continue to reduce emissions by 85 percent prior to their discharge or use low-VOC content coatings, while the remaining 30 percent would be subject to revised SIP regulations based on the CTG-recommended limits. The current or baseline level of VOC emissions from existing plants would be maintained. Total VOC emissions from new and existing plants located in States imposing numerical limits are estimated to be about 6,500 Mg in the fifth year, a 58 percent increase from current levels of 4,100 Mg. VOC emissions from plants located in States subject to revised SIP regulations based on the CTG-recommended limitations would also increase approximately 58 percent from the current emission level of 3,800 Mg per year to 6,000 Mg per year. Total nationwide emissions in the fifth year are expected to be about 12,500 Mg.

Regulatory Alternative II would have no effect relative to Alternative I on the VOC emissions from new and modified plants that locate in States that now impose numerical limits and use higher VOC content coatings and incineration. In the absence of any additional standards, some plants would use currently available low-VOC content coatings. It is unlikely that these plants would be able to meet the emission limit of Regulatory Alternative II by using these coatings alone. If it is assumed that these plants would switch to higher VOC-content coatings and incineration, their VOC emissions would be reduced by about 70 MG (75 tons).

Alternative II would result in an average reduction of 30 percent from new and modified plants that locate in States that adopt the CTG-recommended limits. Emission reductions from plants that use higher VOC content coatings and incineration would amount to 1,800 Mg (2,000 tons), and emission reductions from plants that use low-VOC content coatings would amount to about 25 Mg (30 tons) if they switched from low-VOC content coatings to higher VOC content coatings and incineration. The fifth year impact on overall emissions would amount to a reduction of 1,900 Mg (2,100 tons) relative to the baseline levels. In this case, total emissions in the fifth year would decrease to 10,600 Mg (11,700

tons) from the baseline level of 12,500 Mg (13,800 tons).

Regulatory Alternative III would have no impact on the VOC emissions from plants in areas that now impose numerical limits but would lead to a reduction of 1,800 Mg (2,000 tons) relative to the baseline from plants in areas that adopt the CTG-recommended limits. Total emissions in the fifth year would decrease to 10,700 Mg (11,800 tons) from the baseline level of 12,500 Mg (13,800 tons).

An NSPS based on Regulatory Alternative IV would result in an average 33 percent reduction relative to the baseline in the emissions from new and modified plants that locate in States that now impose numerical limits and an average 72 percent reduction from new and modified plants that locate in States that adopt the CTG-recommended limits. The effect of these reductions on overall emissions in the fifth year would amount to a decrease of approximately 3,600 Mg (4,000 tons). Emissions in the fifth year would decrease from 12,500 Mg (13,800 tons) to 8,900 Mg (9,800 tons).

An NSPS based on Regulatory Alternative V would reduce emissions the same as Regulatory Alternative IV for plants that use higher VOC content coatings and incineration but would result in an increase in emissions, relative to Regulatory Alternative IV, of approximately 400 Mg (400 tons) in the fifth year from plants that use waterborne coatings. The overall emission reduction in the fifth year would amount to 3,200 Mg (3,500 tons). Emissions in the fifth year would decrease from the baseline level of 12,500 Mg (13,800 tons) to 9,300 Mg (12,300 tons).

Each of the regulatory alternatives is based on the use of incineration as the primary means of VOC emission control. Incinerators do not generate either solid or liquid wastes, and, consequently, no impact on water pollution and solid waste disposal is expected to occur from either of the regulatory alternatives when incineration is used. If compliance is achieved by the use of low-VOC content coatings, no changes in liquid or solid waste discharge would be expected.

Energy Impacts

To estimate the energy impacts of the regulatory alternatives, specific control systems were defined that could be used to achieve compliance with existing regulations and with the regulatory alternatives. The equipment identified as being capable of meeting the CTG-recommended limits is an energy efficient system that consists of a series of incinerators inside the ovens that recycles the hot exhaust gases back to the oven. This system is not widely used at present without an external afterburner. The control technology identified as capable of achieving compliance with the numerical limits of existing SIPs and to achieve the numerical limits of the regulatory alternatives when higher VOC content coatings are used is incineration with a VOC destruction efficiency of 95 percent used in conjunction with up to a 95 percent capture efficiency. The control technology identified as being capable of achieving the numerical limits established for low-VOC content coatings is the use of waterborne coatings.

Regulatory Alternative I would have no impact on energy consumption compared to current levels. New plants that locate in States requiring an 85 percent reduction would continue to consume in the range of 27 TJ/yr for small plants to 170 TJ/yr for large plants. Plants that locate in States subject to revised SIP limitations would continue to consume from 17 TJ/yr in small plants to 120 TJ/yr in large plants. In the fifth year, total energy consumption by the industry is estimated to increase by about 3,500 TJ over current levels.

Regulatory Alternative II would have very little effect on fuel consumption for plants that locate in States that now impose numerical limits; fuel and electrical energy consumption would remain at about the current level of 27 to 170 TJ per year for small and large plants, respectively. For plants that locate in States imposing the CTG-recommended limits, fuel consumption could increase in a range from 42 percent for a large plant to 60 percent for a small plant. In a small plant, annual natural gas consumption would increase from a current usage of 13.6 million ft^3 to 21.2 million ft^3. For a large plant, annual natural gas consumption would increase from a current usage of 96 million ft^3 to 136 million ft^3. The increase in electrical energy consumption could range from 38 percent for a large plant to 58 percent for a small plant. For a small plant, annual electrical energy consumption would increase from 760,000 to 1.2 million kilowatt-hours (hWh). For a large plant, annual consumption would increase from 5.2 to 7.2 million kWh. The overall impact on national energy consumption is estimated to be the equivalent of 40,000 barrels of crude oil per year, or 1 percent relative to the baseline case. The fifth year impact would be an increase equivalent to 200,000 barrels of crude oil per year or 5 percent relative to the baseline.

The energy impacts of Regulatory Alternative III would be the same as those of Regulatory Alternative II for individual plants, but fewer plants would be affected because more plants could comply with the standard by using low-VOC content coatings for which there is no energy impact. The overall energy impacts of the two alternatives are about the same because no more than 15 percent of the plants would have a change in their energy impact as a result of this alternative.

Regulatory Alternative IV would have very little effect on fuel consumption for plants that locate in States that now impose numerical limits. There could be up to a 5 percent decrease in fuel consumption as a result of the assumed improvement in the capture efficiency of VOC emissions. No increase in electrical energy consumption is estimated for the plants in numerical limit areas. For plants that locate in States that adopt the CTG-recommended limits, the effect of Regulatory Alternative IV on fuel consumption could range from a 34 percent increase for a large plant to a 50 percent increase for a small plant. In a small plant, annual natural gas consumption would increase from the current usage rate of 13.6 million ft^3 to 20.0 million ft^3. for a large plant, annual natural gas consumption would increase from a current usage of 96 million ft^3 to 128 million ft^3. The effect on electrical energy consumption for plants in areas that adopt the CTG-recommended limit would be an increase in the range of 38 percent for a large plant to 58 percent for a small plant. For a small plant, annual electrical energy consumption would increase from 760,000 to 1,200,000 kWh. For a large plant, annual consumption would increase from 5.2 to 7.2 million kWh. The overall impact on national energy consumption is estimated to be the equivalent of 40,000 barrels of crude oil per year, or 1 percent relative to the baseline case. The fifth year impact would be an increase equivalent to 200,000 barrels of crude oil per year, or 5 percent relative to the baseline.

The energy impacts of Regulatory Alternative V would be the same as those for Regulatroy Alternative IV for individual plants, but fewer plants would be affected because more would be able to meet the standards by using low-VOC content coatings. The overall energy impact would be about the same for both alternatives.

Economic Impacts

A discounted cash flow approach was used to analyze the model plant costs and to determine the price impacts of each of the regulatory alternatives. The analysis was based on data consisting of the capital, installation, operating, and maintenance costs of the control equipment that could be used to achieve compliance with each of the baseline levels of control and with each of the regulatory alternatives. The cost data were obtained from coil coaters and from the vendors of coating equipment and emission control equipment for the coil coating industry.

Regulatory Alternative I, no NSPS, would have no economic or price impacts on plants located in States imposing numerical limits or on plants subject to revised SIP limitations based on the CTG-recommended limits. Current total installed capital costs for a new plant located in a State imposing numerical emission limits are estimated as $7.6 million for a small plant and $14.7 million for a large plant. Total annualized costs range from $4.2 million for a small plant to $11.0 million for a large plant. For a plant located in an area subject to revised SIP regulations based on the CTG-recommended limits, total installed costs range from $7.5 million for a small plant to $13.9 million for a large plant, and total annualized costs range from $4.2 million to $11.8 million for small and large plants, respectively.

Regulatory Alternatives II and III would have no impact on product price for plants that locate in States that currently impose numerical limits on VOC emissions. For plants that locate in States that adopt the CTG-recommended limits, the estimated price increase under Regulatory Alternatives II and III ranges from 1.0 to 3.9 percent for small and large plants, respectively, if the plants use higher VOC content coatings and incineration. This price impact represents increased installed capital costs in the range of $70,000 (about 1 percent) for a small plant to $780,000 (about 5 percent) for a large plant and increased total annualized costs in the range of $32,000 (about 1 percent) for a small plant to $380,000 (about 4 percent) for a large plant.

Alternatively, if prices are held constant, the return on investment (ROI) of a typical plant would decrease from the baseline level of 12 percent by an amount ranging from 0.38 percentage point for small plants to 2.70 percentage points for large plants that locate in areas that adopt the CTG-recommended limits. There could be no impact for plants in numerical limit areas. The 12 percent baseline ROI is the after-tax, weighted average cost of capital from equity, debt, and preferred stock. Financial data from 29 individual firms for 1978 were used to calculate this value. (For a full discussion of the derivation of this figure, see chapter 8 of the BID.)

The difference in the economic impacts between Regulatory Alternatives II and III occurs because fewer plants incur a cost under Regulatory Alternative III than under Alternative II. If a plant were forced to switch from the use of low-VOC content coatings to higher VOC content coatings and incineration to meet the requirements of Regulatory Alternative II, the economic impact would be the same as those described above. The number of such plants is indeterminate but would be no more than 15 percent of all new, modified, and reconstructed plants. Under Regulatory Alternative III, it is assumed that no plants would switch from waterborne coatings.

The economic impact of Regulatory Alternatives IV and V would be the same on plants that use higher VOC content coatings and incineration and would be relatively small for plants that locate in States that now impose numerical limits on VOC emissions. The price increase for these plants in estimated to range from 0.2 percent for a large plant to 0.8 percent for a small plant. The increase in the total installed capital costs of these plants ranges from $110,000 (about 1 percent) for a small plant to $140,000 (about 1 percent) for a large plant, and the increase in total annualized costs would be in the range of $11,000 (less than 1 percent) for a small plant to $23,000 (less than 1 percent) for a large plant. For plants that locate in areas that adopt the CTG-recommended limits, the impact of an NSPS based on Regulatory Alternatives IV or V would be a price increase in the range of 1.9 percent for a small plant to 4.2 percent for a large plant if the plants use higher VOC content coatings and incineration. The increase in the total installed cost of a new plant locating in these areas would be in the range of $180,000 (about 2 percent) for a small plant to $920,000 (about 6 percent) for a large plant. The increase in total annualized costs would be in the range of $55,000 (about 1 percent) for a small plant to $390,000 (about 4 percent) for a large plant.

If prices are held constant, the ROI of a typical plant would decrease from the baseline level of 12 percent by an amount ranging from 0.7 percentage point for a small plant to 2.4 percentage points for large plants that locate in areas that adopt the CTG-recommended limits and by an amount ranging from 0.1 to 0.3 percentage point for large and small plants, respectively, that locate in numerical limit areas.

Nationally, the average price increase of coil coated metal could be expected to increase by about 3.1 percent if an NSPS were promulgated based on Regulatory Alternative IV and by 2.6 percent if an NSPS were based on Regulatory Alternative V. The price increase for Regulatory Alternative IV is based on the assumption that plants would not be able to meet the emission limits by using low-VOC content coatings but, instead, would switch to higher VOC content coatings and incineration. The price increase for Regulatory Alternative V is based on the assumption that 15 percent of the new and modified plants would use low-VOC content coatings.

As can be seen from the above discussion, the price impacts, relative to the baseline, of Regulatory Alternatives II through V are relatively small for plants that locate in States that already impose numerical limits on VOC emissions. The impacts are higher for plants that locate in States that adopt the CTG-recommended limits, but the estimated impacts are probably an overstatement of the actual impacts because a number of plants already operate incinerators and coating rooms for reasons other than emission regulations. Costs in these situations would not be attributable to the proposed standards. The differences between the impacts of Alternatives II, III, IV, and V are small. The impacts of each alternative are concluded to be reasonable.

Selection of Best System of Continuous Emission Reduction

Regulatory Alternatives IV and V are estimated to reduce emissions in the fifth year by 3,900 and 3,200 Mg, respectively, relative to the emissions under Regulatory Alternative I. This amount is 1,400 to 2,100 Mg greater than the reduction that would be achieved by Regulatory Alternative II or III. There are no adverse environmental impacts from any of the regulatory alternatives, which leads to a conclusion that Regulatory Alternatives IV and V are the most reasonable from an environmental standpoint.

The energy impacts of Regulatory Alternatives II through V on plants that locate in States that adopt the CTG-recommended limits might be considered large (up to a 58 percent increase relative to Alternative I); however, a low-cost, energy-efficient system of control was used as the

baseline from which the impacts are estimated. Numerous contacts with the coil coating industry revealed that few such systems are in use in existing plants. The energy impact on plants that locate in areas that impose numerical limits on VOC emissions is quite small and may even be positive. The energy impact of Alternative IV or V relative to Alternative II or III may be positive, which makes Alternatives IV and V appear to be the more reasonable choices in view of the greater reduction in VOC emissions that they achieve.

The greater emission reduction associated with Regulatory Alternatives IV and V relative to Alternatives II and III is achieved with only a small increase in the economic impact compared to Alternative II or III. The differential increase in the total installed capital costs and total annualized cost for Regulatory Alternative IV or V (1 to 6 percent increase) over these costs for Regulatory Alternative II or III (0 to 5 percent increase) are relatively small. Price increases attributed to Regulatory Alternatives IV and V are in the range of 0.2 to 4.1 percent, while the corresponding increases attributed to Regulatory Alternatives II and III range from 0.0 to 3.9 percent. This is a differential price increase of 0.2 percent over the range of plant sizes studied. These additional impacts appear reasonable relative to the additional reduction in emissions that is achieved, which again makes Regulatory Alternatives IV and V appear to be the best candidates for the best system of continuous emission reduction.

A comparison of Regulatory Alternatives IV and V shows that Alternative IV produces an additional emission reduction of 700 Mg (or 22 percent) in the fifth year relative to Alternative V, which makes Alternative IV the better choice for environmental considerations. The energy and economic impacts of both alternatives are the same for individual plants, but Alternative V is estimated to affect about 15 percent fewer plants than Alternative IV, which makes Alternative V the more attractive choice from energy and economic considerations. Data submitted by coating manufacturers indicate that many of the waterborne coatings used by the coil coating industry would not meet the emission limit in Alternative IV, which could force new, modified, and reconstructed plants to abandon the use of low-VOC content coatings. However, coating data indicate that most commonly used waterborne coatings could meet a higher emission limit than would be allowed for these coatings under Regulatory Alternative V, which implies that no shifts away from low-VOC content coatings are likely under this alternative. There are some advantages to the use of low-VOC content coatings over the use of incineration systems. The overall energy requirement for low-VOC content coatings is lower than that for higher VOC content coatings and incineration because of the lower volume of oven ventilation required for low-VOC content coatings. Additionally, EPA has for a number of years encouraged the development and use of low-VOC content coatings as a means of reducing VOC emissions and EPA does not wish to preclude the use and further development of these coatings by setting an emission limit that cannot be met by their use. These considerations make Regulatory Alternative V more reasonable than Regulatory Alternative IV.

In view of the above assessment of the environmental, energy, and economic impacts, the large emission reductions that would be achieved, and the reasonable energy and economic impacts relative to these reductions, Regulatory Alternative V appears to be the most reasonable choice as the best system of continuous emission reduction. Regulatory Alternative V has therefore been selected as the basis for the proposed new source standards of performance. This alternative has been determined to be affordable, and the environmental, energy, and economic impacts have been determined to be reasonable.

Selection of Format for the Proposed Standards

A number of different formats were considered for the proposed standards. The format selected must be compatible with all of the control methods or systems that would be used to comply with the proposed standards, such as the use of low-VOC content coatings or the use of higher VOC content coatings coupled with an incinerator. The formats considered were emission limits expressed in terms of the VOC concentration in exhaust gases, mass of emissions per unit of production, mass of emissions per unit of coating solids applied, and an overall percentage emission reduction.

Typically, concentration standards are preferred over mass standards because mass standards require more measurements and conversion calculations. Exhaust gas flow rates and raw material or product flow rates have to be measured, and concentration measurements have to be converted to mass measurements. Where incineration is used as a control technique, there is a potential for air dilution. Excess air is used in incinerators to ensure complete combustion, and the quantity of excess air used can vary. Due to the potential for air dilution, correction factors are necessary to ensure that measurements of emissions from all control devices are referenced to the same basis and that the quantity of VOCs emitted is the same no matter how much excess air is used. If incinerators are used, correction factors referencing all calculations to a specific oxygen concentration level in the exhaust gases are a solution to the problem of using varying quantities of excess air. These factors, however, do not compensate for indirect air dilution resulting from combustion of more fuel and air than is necessary. In any event, a concentration standard would require a measurement of exhaust oxygen concentration. For these reasons, this format was not selected for the proposed standards.

For an emission limit expressed in terms of mass of VOCs per unit of production, compliance is relatively simple to demonstrate when low-VOC content coatings are used but is more difficult with the use of emission control devices. For low-VOC content coatings, the VOC content of the coatings used would be determined and multiplied by the volume of coatings used over a given time period. This value would then be divided by the production during that same time period to give the VOC emissions per unit of production. When emission control devices are used, stack tests would be necessary in addition to the determination of the VOC content of the coating to determine VOC emissions. The emissions over a period of time could then be divided by the production over the same period of time to yield the VOC emissions per unit of production. This format would not be very flexible in accommodating the large variations that exist in the VOC and solids content of the coatings used by the industry and the range of coating thicknesses that are used to meet the requirements of the many end products for which coil coated metal is used. This format could also penalize those coaters who, for reasons of product performance, must use a coating with a high VOC content or must use an above-average coating thickness. Therefore, an emission limit expressed in terms of mass of VOCs per unit of production was rejected as the format for the proposed standards.

An emission limit expressed in terms of VOC emissions per volume of coating solids applied overcomes the problems associated with the first two formats.

Because roller coating is the method of application, transfer efficiency is nearly 100 percent, which eliminates the need to consider this parameter explicitly in the compliance procedures. Stack testing would not be required unless emission control devices were used, and this format is compatible with all of the control methods that might be used. The difficulty with this format lies with the selection of the level of the emission limit, because the range of VOC content varies widely in the many different coating formulations used by the industry. To allow the use of coatings with varying VOC contents, a level would have to be selected that would permit compliance when coatings are used with the higher levels of VOC content. Such a limit may not achieve optimum VOC emissions control for coaters that use coatings with average or lower VOC content.

A format requiring an overall percentage reduction overcomes the problem with varying VOC content of the coatings but is not as compatible with compliance by the use of low-VOC content coatings as is the format of VOC content per unit of coating solids applied. However, the combination of this format with an emission limit expressed in terms of mass of emissions per unit of coating solids applied would allow the plant owner or operator to decide which method of compliance is most compatible with the VOC content of the coatings applied in his plant. Therefore, this combined format was selected for the proposed standards. This format has all of the advantages associated with the third format (mass of emissions per unit of coating solids applied) and does not penalize those coaters who must use coatings with a high VOC content because they are allowed to demonstrate the required percentage reduction in overall emissions.

Selection of Emission Limits

Section 111(a)(1) requires the emission limits to reflect "application of the best technological system of continuous emission reduction which (taking into consideration the cost of achieving such emission reduction, and nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated." Section 111(a)(1). The "best technological system" defined by Section 111(a)(1) is one that is not "exorbitantly costly." *Essex Chemical Corp.* v. *Ruckelshaus*, 486 F.2d 427, 433 (D.C. Cir. 1973).

Application of the "best technological system" results in a three-step standard: for coatings with VOC contents of 1.4 or more kg/l of coating solids, the standard is 90 percent reduction in VOC emissions. For coatings with VOC contents of .28 to 1.4 kg/l of coating solids, the standard is .14 kg VOC/l of coating solids. For coatings with VOC contents below .28 kg/l of coating solids, the standard is .28 kg/l.

As discussed earlier, VOC reductions of 90 percent are achievable by systems of capture and control. However, the cost and energy requirements of achieving VOC emission reductions varies according to the VOC content of the coating being controlled. The lower the VOC content of the coating, the higher are the cost and energy requirements of achieving a given reduction in emissions. This is for two reasons. First, control of lower VOC coatings generally requires capture and control systems of the same size and cost as control of higher-VOC coatings, but it achieves less emission reduction because there is less VOC to be controlled. Second, the cost and energy requirements of controlling lower-VOC coatings in incinerators are further increased by the need to use additional supplemental fuel to operate the incinerator.

In the Administrator's judgment, the cost and energy requirements of a capture and control system that achieves a 90 percent reduction are reasonable on coatings with VOC contents of 1.4 or more kg/l of coating solids. Such a control system is therefore the "best technological system" and the standard for such coatings is 90 percent reduction.

For coatings with VOC contents between .28 and 1.4 kg/l of coating solids, the standard is .14 kg VOC/l of coating solids. In the Administrator's judgment, the cost and energy requirements of achieving significantly greater emission reduction on these coatings would be exorbitant. Therefore, the "best technological system" for these coatings is one that can achieve .14 kg VOC/l of coating solids.

For coatings with VOC contents below .28 kg/l of coating solids, the standard is .28 kg VOC/l of coating solids. That is, no capture and control system is required on these coatings. This emission limitation reflects the Administrator's judgment that the cost and energy requirements of using any add-on control and capture system to control such coatings would be exorbitant.

Modification Considerations

The history of steady growth by the coil coating industry has lead many owners and operators of coil coating lines to look for ways of increasing their production capacity. Because the lead time to construct a new coil coating line is often as long as 2 years, more expedient means of increasing production capacity were developed. Many coaters have found that the design speed of existing coil coating lines can be increased by replacing or modifying the drive motors, electrical controls, or both. This increased speed is often achievable without modifications to the ovens because of improvements that occur in coating technology. This method of increasing production has played an important part in the growth of the coil coating industry to date and is expected to continue to play an important part in future industry growth. When accompanied by a capital expenditure, such changes to increase the design speed of coil coating lines would subject an existing coil coating line to the proposed standards if VOC emissions increase. There are no technological reasons why one of the control techniques on which the proposed standards are based—incineration with heat recovery and low-VOC content coatings—cannot be applied to existing coil coating lines that undergo a modification or reconstruction. The use of incineration with heat recovery as a retrofit on existing lines is well documented in the literature. To exclude these lines from the requirements of the proposed standards would be to exclude a large portion of projected industry growth. This fact, when considered with the feasibility of retrofitting, leads to the conclusion that it is reasonable to apply the proposed standards to all capital expenditure modifications for increasing the design speed of a coil coating line that results in an increased VOC emission rate. The impacts of the proposed standards are reasonable as applied to modified and reconstructed facilities.

Method of Determining Compliance

The two most likely methods of compliance with the proposed standards are the installation of emission control devices or the use of low-VOC content coatings. Because of the variations that exist in emission control systems and in the physical configurations of coil coating lines, the exact procedure used in determining compliance may vary from plant to plant. Generally, each owner or operator of a new, modified, or reconstructed coil coating plant must begin conducting performance tests within the first 6 months of operation. Following is a summary of the major requirements for determining compliance with the proposed standards:

(1) Where low-VOC content coatings are used to achieve compliance with the proposed numerical emission limit (0.28 kg/l of coating solids applied), the plant owner or operator must conduct monthly performance tests that consist of a calculation of a weighted average of the VOC content (including dilution solvents) per liter of coating solids for each prime coat and for each finish coat operation for each calendar month of operation. Equations are provided for calculating the weighted average. The data necessary to calculate the average VOC content of the coatings may be obtained from formulation data supplied by the manufacturer of the coatings or, in cases where the validity of the formulation data is in doubt, through a coating analysis performed with Reference Method 24.

(2) Where higher VOC content coatings are used with an emission control device to meet the proposed numerical emission limit (0.14 kg/l of coating solids applied), the owner or operator must conduct monthly performance tests that consist of a calculation of a weighted average of the VOC content (including dilution solvents) of the coatings applied for each prime coat and each finish coat operation for each calendar month according to the equations provided. The owner or operator must also calculate the overall VOC removal efficiency required to meet the emission limit and, during the first monthly performance test, must measure the actual overall VOC destruction rate achieved. If incineration is used, the latter value is determined by measuring the concentration of VOCs in the effluent gases in and out of the control device and to the atmosphere and by then calculating the overall control efficiency with the equations provided in the proposed standards. If carbon adsorption is used, the actual overall VOC removal efficiency is determined by a material balance performed with the equations provided in the proposed standards. Compliance is demonstrated where the measured value of the overall VOC removal rate is greater than or equal to the required overall VOC removal rate. If incineration is used, the operating temperature of the control device must be measured and recorded during the measurement of incinerator efficiency. Subsequent to the first monthly performance test, compliance is demonstrated if the computed overall VOC destruction rate required is less than or equal to the overall VOC destruction rate measured during the most recent measurement of incinerator efficiency. The measurement of the VOC destruction rate of the incinerator must be repeated when directed by the Administrator or when the owner or operator elects to operate the control device at conditions that are different from those during the most recent measurement.

(3) Where compliance is achieved through the demonstration of a 90 percent overall emission reduction, the owner or operator must conduct the first monthly performance test with the equations provided in the proposed standards and Reference Method 25 to determine the overall percent reduction of the control device. Compliance is demonstrated where the overall percent reduction is equal to or greater than 90 percent. The operating temperature of the control device must be measured during the test. In subsequent months, if the operating temperature of the control device is maintained within specified intervals of the temperature measured during the most recent measurement of incinerator efficiency, compliance is demonstrated. The test of the efficiency of the control device must be repeated when directed by the Administrator or when the owner or operator elects to operate the control device at conditions that are different from those during the most recent measurement.

(4) During the first monthly performance test for a capture system and incinerator one must be able to measure all of the potential emissions, both fugitive emissions and those ducted to the incinerator. To do this, all fugitive emissions from the coating application area must be captured and vented through stacks suitable for testing. Prior to the performance test for incineration-controlled affected facilities, the owner or operator will be required to construct a temporary total enclosure around the coating application station for the purpose of capturing fugitive VOC emissions. A total enclosure is defined as any structure or building around the coating applicator and flashoff area or the entire coating line for the purpose of confining and totally capturing fugitive VOC emissions. If a permanent total enclosure exists on the line prior to the performance test, and the enforcing agency is satisfied that the enclosure is totally capturing fugitive emissions, the construction of a temporary enclosure is not required.

Two types of violations may occur at a source that achieves compliance through the use of incineration in conjunction with higher VOC content coatings. The first is an increase in the average VOC content of the coatings. The second type of violation would involve improper operation and maintenance of the control device. These two types of violations are discussed below.

When incineration is used to achieve compliance with the numerical limits of the proposed standards, the first monthly performace test consists of determining the weighted average VOC content of all coating formulations applied for a calendar month and of measuring the overall VOC destruction rate of the incinerator. The overall VOC destruction rate measured during that test will determine the maximum allowable average VOC content of coatings that can be used by the source. The VOC content must not exceed a value that, when reduced by the measured overall VOC destruction rate of the incinerator, is less than or equal to the numerical emission limit. If, during any subsequent monthly performance test, the average VOC content exceeds the allowable level (as determined by the most recent measurement), the source would be considered in violation. If an owner or operator wishes to increase the VOC content above the allowable level (as determined by the most recent measurement), he must demonstrate, by conducting another measurement that the overall VOC destruction rate of the incinerator is sufficient to meet the proposed standards with the higher VOC content coatings.

The second type of violation would involve a recurring pattern of temperature fluctuations lasting for 3 hours or more during the coating process. Although the proposed standards would require the owner or operator to report each such occurrence and its duration, the temperature drop in itself would not necessarily be considered a violation; however, repeated incidents may indicate improper operation and maintenance of control equipment, a violation of 40 CFR 60.11(d). If a source's continuous monitor shows repeated drops in temperature, the Administrator may require that a test of the overall VOC destruction rate of the incinerator be conducted at the lower temperature. If the test shows a violation of the standard, the plant may be cited for improper operation and maintenance of the control device and would be required to increase the operating temperature to that at which compliance was demonstrated.

A source that achieves compliance with the proposed standards through the use of Low-VOC content coatings without the use of emission control devices must determine a weighted average of the VOC content of the

coatings applied for each calendar month. Each of these calculations or measurements would be considered a performance test. Therefore, each measurement or calculation that results in an average VOC content greater than 0.28 kg/l, as averaged over the calendar month, would be a violation.

Performance Test Methods

Reference Method 24, "Determination of Volatile Matter Content, Water Content, Density, Volume Solids, and Weight Solids of Surface Coatings," provides the data necessary for a determination of the VOC content of coating material measured as mass of volatile organics per volume of coating solids. For prime coat and finish coat operations, Reference Method 24 could used to determine the VOC content of the coating material. The Administrator may at any time require that Reference Method 24 be used, but generally he will allow the owner or operator to obtain these data from the coating formulator or from company records, in which case Reference Method 24 would be retained as the reference method for verification when there is cause to doubt the validity of the formulation data. The method by which the VOC concentration is to be measured in the gas streams is Reference Method 25, "Determination of Total Gaseous Nonmethane Organic Emissions as Carbon." The method by which the volumetric flow rate of stack gases is to be measured is Reference Method 2, "Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube)," as described in 40 CFR Part 60, Appendix A. During all measurements performed with Reference Method 25, the operating temperature of the control device must be measured for use as a standard against which the operating temperature during subsequent operations may be compared.

Selection of Monitoring Requirements

Monitoring requirements are generally included in standards of performance to provide a means for ensuring proper operation and maintenance of emission control systems and to provide plant and enforcement personnel with sufficient data to determine compliance with the proposed standards.

Although continuous monitoring of total VOC emissions may be considered technically feasible, there are substantial technical problems and questions associated with this procedure, and it would also involve a significant expense to the industry for equipment and manpower. When incineration is used to achieve compliance with the proposed standards, operating parameters can be used to monitor VOC removal once the effectiveness of the system is demonstrated.

The proposed standards would require the plant owner or operator to measure the incinerator temperature parameters during each measurement of the overall VOC destruction rate of the incinerator. Monitoring would then consist of recording the temperature parameters on a continuous basis. Recording devices for these parameters are normally installed on coil coating lines for process control and would, therefore, require no additional expenditures. For thermal incinerators, the plant owner or operator would also be required to report on a quarterly basis all periods in excess of 3 hours during which the average temperature of the incinerator is more than 28° C (50° F) below the combustion temperature for which compliance was demonstrated. For catalytic incinerators, the plant owner or operator would be required to report, on a quarterly basis, all coating periods in excess of 3 hours during which the difference between the upstream and downstream temperatures fall below 80 percent of the difference at which compliance was demonstrated or during which the upstream temperature falls more than 28° C (50° F) below the temperature at which compliance was demonstrated. In addition, for those facilities that use thermal incineration, continuous daily records of the incinerator temperature must be maintained at the source. For those facilities using catalytic incineration, the plant owner or operator would be required to maintain continuous daily records of the gas temperature, both upstream and downstream of the catalyst bed, since a decline in the temperature difference between the inlet and exhaust would be indicative of a reduction in catalyst activity.

In addition, each plant owner or operator that uses higher VOC content coatings in combination with an incinerator or that uses low-VOC content coatings without an incinerator to comply with the numerical limit specified in the proposed standards would be required to calculate for each calendar month a weighted average of the VOC content of coatings applied for each affected facility. For each affected facility, the plant owner or operator would be required to report each calendar month of operation following the first compliance test where the numerical limit was exceeded. These reports would have to be submitted within 10 days after the end of each such month.

Impact of Reporting Requirements

A reports impact analysis for the metal coil surface coating industry was prepared in response to the U.S. Environmental Protection Agency (EPA) guidelines for implementing Executive Order 12044 (44 FR 30988, May 29, 1979). The purpose of the analysis is to estimate the economic impact of the reporting and recordkeeping requirements that would be imposed by the proposed standards and by those appearing in the General Provisions of 40 CFR Part 60. Included in the analysis are the rationale for the selection of the proposed requirements, and evaluation of the major alternatives considered prior to the selection required by the General Provisions and by the proposed standards. A copy of the reports impact analysis is included in Subcategory II–I of the metal coil surface coating docket (EPA Docket No. OAQPS A–80–5).

Based on the reports impact analysis, a total of 23 industry person-years would be required to comply with the recordkeeping and reporting requirements through the first 5 years of applicability.

Public Hearing

A public hearing will be held to discuss the proposed standards in accordance with Section 307(d)(5) of the Clean Air Act. Persons wishing to make oral presentations should contact EPA at the address given in the ADDRESSES section of this preamble. Oral presentations will be limited to 15 minutes each. Any member of the public may file a written statement before, during, or within 30 days after the hearing. Written statements should be addressed to the Central Docket Section address given in the ADDRESSES section of this preamble.

A verbatim transcript of the hearing and written statements will be available for public inspection and copying during normal working hours at EPA's Central Docket Section in Washington, D.C. (see the ADDRESSES section of this preamble).

Docket

The docket is an organized and complete file of all the information submitted to or otherwise considered in the development of this proposed rulemaking. The principal purposes of the docket are (1) to allow interested parties to readily identify and locate documents so that they can intelligently and effectively participate in the rulemaking process and (2) to serve as the record in case of judicial review.

Miscellaneous

As prescribed by Section 111, establishment of standards of performance for Metal Coil Surface Coating was preceded by the Administrator's determination (40 CFR 60.16, 44 FR 49222, dated August 21, 1979) that these sources contribute significantly to air pollution that may reasonably be anticipated to endanger public health or welfare. In accordance with Section 117 of the Act, publication of this proposal was preceded by consultation with appropriate advisory committees, independent experts, and Federal departments and agencies. The Administrator will welcome comments on all aspects of the proposed regulation, including economic and technological issues, and on the test methods.

Comments are specifically requested on the definition of the affected facility that is contained in the proposed standards. Any comments submitted to the Administrator on the definition of the affected facility should contain specific information and data pertinent to an evaluation of the magnitude and severity of the impact of the current proposal and suggested alternative courses of action that would avoid this impact.

It should be noted that standards of performance for new sources established under Section 111 of the Clean Air Act reflect

> * * * application of the best technological system of continuous emission reduction which (taking into consideration the cost of achieving such emission reduction, any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated [Section 111(a)(1)].

Although there may be emission control technology available that can reduce emissions below those levels required to comply with standards of performance, this technology might not be selected as the basis of standards of performance due to costs associated with its use. Accordingly, standards of performance should not be viewed as the ultimate in achievable emission control. In fact, the Act requires (or has the potential for requiring) the imposition of a more stringent emission standard in several situations.

For example, applicable costs do not necessarily play as prominent a role in determining the "lowest achievable emission rate" for new or modified sources locating in nonattainment areas, i.e., those areas where statutorily-mandated health and welfare standards are being violated. In this respect, Section 173 of the Act requires that new or modified sources constructed in an area where ambient pollutant concentrations exceed the National Ambient Air Quality Standards (NAAQS) must reduce emissions to the level that reflects the "lowest achievable emission rate" (LAER), as defined in Section 171(3) for such category of source. The statute defines LAER as that rate of emissions based on the following, whichever is more stringent:

> (A) the most stringent emission limitation which is contained in the implementation plan of any State for such class or category of source, unless the owner or operator of the proposed source demonstrates that such limitations are not achievable, or
>
> (B) the most stringent emission limitation which is achieved in practice by such class or category of source.

In no event can the emission rate exceed any applicable New Source Performance Standard [Section 171(3)].

A similar situation may arise under the prevention of significant deterioration of air quality provisions of the Act (Part C). These provisions require that certain sources [referred to in Section 169(1)] employ "best available control technology" (BACT) as defined in Section 169(3) for all pollutants regulated under the Act. BACT must be determined on a case-by-case basis, taking energy, environmental, and economic impacts and other costs into account. In no event may the application of BACT result in emissions of any pollutants that will exceed the emissions allowed by any applicable standard established pursuant to Section 111 (or 112) of the Act.

In all events, State Implementation Plans (SIPs) approved or promulgated under Section 110 of the Act must provide for the attainment and maintenance of NAAQS designed to protect public health and welfare. For this purpose, SIPs must in some cases require greater emission reduction than those required by standards of performance for new sources.

Finally, States are free under Section 116 of the Act to establish even more stringent emission limits than those established under Section 111 or those necessary to attain or maintain the NAAQS under Section 110. Accordingly, new sources may in some cases be subject to limitations more stringent than standards of performance under Section 111, and prospective owners and operators of new sources should be aware of this possibility in planning for such facilities.

This regulation will be reviewed 4 years from the date of promulgation as required by the Clean Air Act. This review will include an assessment of such factors as the need for integration with other programs, the existence of alternative methods, enforceability, improvements in emission control technology, and reporting requirements. The reporting requirements in this regulation will be reviewed as required under EPA's sunset policy for reporting requirements in regulations.

Section 317 of the Clean Air Act requires the Administrator to prepare an economic impact assessment for any new source standard of performance promulgated under Section 111(b) of the Act. An economic impact assessment was prepared for the proposed regulations and for other regulatory alternatives. All aspects of the assessment were considered in the formulation of the proposed standards to insure that the proposed standards would represent the best system of emission reduction considering costs. The economic impact assessment is included in the Background Information Documents.

Dated: December 18, 1980.

Douglas M. Costle,

Administrator.

It is proposed that 40 CFR Part 60 be amended by adding a new Subpart TT as follows:

PART 60—STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

* * * * *

Subpart TT—Standards of Performance for Metal Coil Surface Coating

Sec.

60.460 Applicability and designation of affected facility.
60.461 Definitions.
60.462 Standards for volatile organic compounds.
60.463 Performance test and compliance provisions.
60.464 Monitoring of emissions and operations.
60.465 Reporting and recordkeeping requirements.
60.466 Test methods and procedures.

Authority: Sections 111 and 301(a) of the Clean Air Act, as amended [42 U.S.C. 7411, 7601(a)], and additional authority as noted below.

Subpart TT—Standards of Performance for Metal Coil Surface Coating

§ 60.460 Applicability and designation of affected facility.

(a) The provisions of this subpart apply to the following affected facilities in a metal coil surface coating line: each prime coat operation, each finish coat operation, and each prime and finish

coat operation combined when the finish coat is applied wet on wet over the prime coat and both coatings are cured simultaneously.

(b) This subpart applies to any facility identified in paragraph (a) of this section that commences construction, modification, or reconstruction after _____ (date of publication in Federal Register).

§ 60.461 Definitions.

(a) All terms used in this subpart not defined below are given the same meaning as in the Act or in Subpart A of this part.

"Coating" means any organic material that is applied to the surface of metal coil for decorative or protective purposes.

"Coating application station" means that portion of the metal coil surface coating operation where the coating is applied to the surface of the metal coil. Included as part of the coating application station is the flashoff area between the coating application station and the curing oven.

"Curing oven" means the device that uses heat or radiation to dry or cure the coating applied to the metal coil.

"Finish coat operation" means the coating application station, curing oven, and quench station used to apply and dry or cure the final coating(s) on the surface of the metal coil. Where only a single coating is applied to the metal coil, that coating is considered a finish coat.

"Metal coil surface coating operation" means the application system used to apply an organic coating to the surface of any continuous metal strip that is packaged in a roll or coil.

"Prime coat operation" means the coating application station, curing oven, and quench station used to apply and dry or cure the initial coating on the surface of the metal coil.

"Quench station" means that portion of the metal coil surface coating operation where the coated metal coil is cooled, usually by a water spray, after baking or curing.

"VOC content" means that quantity, in kilograms per liter of coating solids, of volatile organic compounds (VOCs) in a coating as applied to metal coil.

(b) All symbols used in this subpart not defined below are given the same meaning as in the Act and in Subpart A of this part.

C_a = the VOC concentration in each effluent gas stream leaving the control device and entering the atmosphere, in parts per million by volume.

C_b = the VOC concentration in each effluent gas stream entering the control device, in parts per million by volume.

C_f = the VOC concentration in each effluent gas emitted directly to the atmosphere, in parts per million by volume.

D_{ci} = density of each coating as applied, in kilograms per liter.

E = the overall VOC destruction rate of the capture system and control device.

ER = the required overall VOC destruction rate.

G = the monthly average VOC content per unit of coating solids applied, in kilograms per liter.

k = the number of coating formulations applied.

L_{ci} = the volume of each coating applied, in liters.

L_o = volume of solids in coatings applied, in liters.

N = weighted average of mass of VOCs per volume of solids, after the control device.

$$\frac{\text{kg VOCs}}{\text{liter of solids}}$$

l = the number of effluent gas streams entering the control device from one affected facility.

n = the number of effluent gas streams leaving the control device and entering the atmosphere.

m = the total number of effluent gas streams entering the control device.

M_o = total mass of VOCs consumed in a calendar month, in kilograms.

M_r = total mass of VOCs recovered from a affected facility during a calendar month, in kilograms.

p = the number of effluent gas streams emitted directly to the atmosphere from one affected facility.

Q_a = the volumetric flow rate of each effluent gas stream leaving the control device and entering the atmosphere, in dry standard cubic meters per second.

Q_b = the volumetric flow rate of each effluent gas stream entering the control device, in dry standard cubic meters per second.

Q_f = the volumetric flow rate of each effluent gas stream emitted directly to the atmosphere, in dry standard cubic meters per second.

V_{si} = the proportion of solids in each coating as applied, by volume.

W_{oi} = the proportion of VOCs in each coating as applied, by weight.

§ 60.462 Standards for volatile organic compounds.

(a) On and after the date on which the initial performance test required by § 60.8 has been completed, each owner or operator subject to this subpart shall not cause to be discharged into the atmosphere more than:

(1) 0.28 kilogram VOC per liter (kg VOC/*l*) of coating solids applied for each calendar month for each prime coat or finish coat operation without the use of emission control device(s); or

(2) 0.14 kg VOC/*l* of coating solids applied for each calendar month for each prime coat or finish coat operation by using emission control device(s) operated at the most recently demonstrated overall efficiency; or

(3) 10 percent of the VOCs applied for each calendar month for each prime coat or finish coat operation (90 percent emission reduction).

§ 60.463 Performance test and compliance provisions.

(a) Paragraphs 60.8(d) and (f) do not apply to the performance test procedures required by this subpart.

(b) Each owner or operator of an affected facility shall conduct a performance test for each calendar month for each affected facility according to the procedures in this section.

(c) Where compliance with the numerical limit specified in § 60.462(a)(1) or (2) is achieved through the use of low-VOC content coatings without an emission control device or through the use of higher VOC content coatings in conjunction with an emission control device, the owner or operator shall compute and record a weighted average of the VOC content per volume of coating solids applied for each calendar month. The owner or operator shall obtain the data necessary to compute the weighted average through information provided by the formulator of the coating material or, if there is any doubt as to the validity of the formulation data, through the analysis of each coating, as applied, with Reference Method 24. Coating and solvent usage data may be obtained from company records. The owner or operator shall compute the average VOC content of coatings applied by the following equations:

(1) The total mass of VOCs consumed shall be computed with the following equation:

$$M_o = \sum_{i=1}^{k} W_{oi} D_{ci} L_{ci} .$$

(2) The total volume of solids consumed shall be computed with the following equation:

$$L_s = \sum_{i=1}^{k} V_{si} L_{ci} .$$

(3) The average VOC content shall be computed with the following equation:

$$G = \frac{M_o}{L_s} .$$

(d) Where compliance with the numerical limit specified in § 60.462(a)(1) is achieved through the use of low-VOC content coatings without emission control devices, compliance is achieved where the value of the VOC content per unit of coating solids applied (G) is less than or equal to 0.28 kg// for each affected facility.

(e) Where compliance with the numerical limit specified in

$$E = \frac{\sum_{i=1}^{\ell} (C_{bi} \times Q_{bi})}{\sum_{i=1}^{\ell} (C_{bi} \times Q_{bi}) + \sum_{i=1}^{p} (C_{fi} \times Q_{fi})}$$

§ 60.462(a)(2) is achieved through the use of higher VOC content coatings in conjunction with an emission control device that destroys VOCs, the owner or operator shall determine and record, in addition to the average VOC content per volume of coating solids applied, the required overall VOC destruction rate and, during the first monthly test, the actual overall VOC destruction rate of the control device according to the following procedures.

(1) The required overall VOC destruction rate is calculated with the following equation:

$$ER = \frac{G-0.14}{G}$$

(2) The actual overall VOC destruction rate is calculated with measured values of the VOC concentration and volumetric flow rate of each gas stream entering and leaving the control device and of each gas stream emitted directly to the atmosphere by the following equation:

$$\frac{\sum_{i=1}^{m} (C_{bi} \times Q_{bi}) - \sum_{i=1}^{n} (C_{ai} \times Q_{ai})}{\sum_{i=1}^{m} (C_{bi} \times Q_{bi})}$$

(i) The owner or operator of the affected facility shall construct the overall VOC emission reduction system so that all volumetric flow rates and total VOC emissions can be accurately determined by the applicable test methods and procedures specified in § 60.466(a)(2).

(ii) The owner or operator of an affected facility shall construct a temporary total enclosure around the coating applicator and flashoff area during the performance test for the purpose of capturing fugitive VOC emissions. If a permanent total enclosure exists in the affected facility prior to the performance test and the Administrator is satisfied that the enclosure is totally capturing fugitive VOC emissions, then no additional total enclosure will be required for the performance test.

(3) Where compliance with the numerical limit specified in § 60.462(a)(2) is achieved through the use of higher VOC content coatings in conjunction with an emission control device that destroys VOCs, compliance is achieved when the value of the overall VOC destruction rate (E) is greater than or equal to the required overall VOC destruction rate (ER).

(f) Where compliance with § 60.462(a)(3) is achieved through the demonstration of a 90 percent overall reduction in VOC emissions, the owner or operator shall determine and record the actual overall VOC destruction rate using the equations provided in paragraph (e) of this section. Compliance with § 60.462(c) is achieved when the value of the overall reduction in emissions (E) is equal to or greater than 0.90.

(g) An owner or operator shall use the following procedure for each calendar month for each affected facility that uses a capture system and a control device that recovers VOCs (e.g., carbon adsorber) to comply with the applicable emission limit specified under §60.462(a)(2):

(1) Calculate the weighted average of mass of VOCs per volume of solids emitted after the control device with the following equation:

$$N = \frac{M_o - M_r}{L_s}$$

(2) If the weighted average of mass of VOCs per volume of solids emitted after the control device (N) is less than or equal to the applicable emission limit specified under § 60.462(a)(2), the affected facility is in compliance. Each monthly calculation is a performance test for the purposes of this subpart.

§ 60.464 Monitoring of emissions and operations.

(a) Where compliance with the numerical limit specified in § 60.462(a)(1) is achieved through the use of low-VOC content coatings without the use of emission control devices, the owner or operator shall compute and record the average VOC content per volume of coating solids applied during each calendar month for each affected facility, according to the equations provided in § 60.463(c).

(b) Where compliance with the numerical limit specified in § 60.462(a)(2) is achieved through the use of higher VOC content coatings in combination with the use of an emission control device that destroys VOCs, the owner or operator shall compute and record for each affected facility the average VOC content per volume of coating solids applied during each calendar month, according to the equations provided in § 60.463(c).

(c) If thermal incineration is used, each owner or operator subject to the provisions of this subpart shall install, calibrate, operate, and maintain a device that continuously records the combustion temperature of any effluent gases incinerated to achieve compliance with § 60.462(a)(2) or (3). This device shall have an accuracy of ±2.5° C or ±0.75 percent of the temperature being measured expressed in degrees Celsius, whichever is greater. Each owner or operator shall also record all periods (during actual coating operations) in excess of 3 hours during which the average temperature in any thermal

incinerator used to control emissions from an affected facility remains more than 28° C (50° F) below the temperature at which compliance with § 60.462(a)(2) or (3) was demonstrated during the most recent measurement of incinerator efficiency required by § 60.8. The report required by § 60.7 shall identify each such occurrence and its duration. If catalytic incineration is used, the owner or operator shall install, calibrate, operate, and maintain a device to continuously monitor and record the gas temperature both upstream and downstream of the incinerator catalyst bed. This device shall have an accuracy of ±2.5° C or ±0.75 percent of the temperature being measured expressed in degrees Celsius, whichever is greater. The owner or operator shall record all periods during the coating operation in excess of 3 hours where the average difference between the temperature upstream and downstream of the incinerator catalyst bed remains below 80 percent of the temperature difference at which compliance was demonstrated during the most recent measurement of incinerator efficiency or when the inlet temperature falls more than 28° C (50° F) below the temperature at which compliance with § 60.462(a) (2) or (3) was demonstrated during the most recent measurement of incinerator efficiency required by § 60.8. The report required by § 60.7 shall identify each such occurrence and its duration.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414)

§ 60.465 Reporting and recordkeeping requirements.

(a) Where compliance with the numerical limit specified in § 60.462(a)(1) or (2) is achieved through the use of low-VOC content coatings without emission control devices or through the use of higher VOC content coatings in conjunction with emission control devices that destroy VOCs, each owner or operator subject to the provisions of this subpart shall include in the initial compliance report required by § 60.7 the weighted average of the VOC content of coating solids applied during a period of one calendar month for each affected facility.

(b) Where compliance with § 60.462(a) (2) or (3) is achieved through the use of an emission control device that destroys VOCs, each owner or operator subject to the provisions of this subpart shall include the following data in the initial compliance report required by § 60.7:

(1) The actual overall VOC destruction rate, and required overall VOC destruction rate used to attain compliance with § 60.462(a) (2) or (3); and

(2) The combustion temperature of the thermal incinerator or the gas temperature, both upstream and downstream of the incinerator catalyst bed, used to attain compliance with § 60.462(a) (2) or (3).

(c) Where compliance with § 60.462(a)(1) is achieved through the use of low-VOC content coatings without the use of an emission control device, each owner or operator shall report for each affected facility each month where the average VOC content of coatings applied exceeds the limits specified in § 60.462(a)(1). These reports must be submitted within 10 days after the end of each such month.

(d) Where compliance with § 60.462(a)(2) is achieved through the use of higher VOC content coatings and an emission control device that destroys VOCs, each owner or operator shall report for each affected facility each month for which the average VOC content of the coatings applied, when reduced by the destruction efficiency of the control device (as determined by the most recent measurement), exceeds the numerical limit specified in § 60.462(a)(2). These reports must be submitted within 10 days after the end of each such month.

(e) Where compliance with § 60.462(a) (2) or (3) is achieved by the use of a thermal incinerator, each owner or operator must report quarterly all periods in excess of 3 hours during which the average combustion temperature of the incinerator, as measured by the continuous monitor, remained more than 28° C (50° F) below the temperature at which compliance was demonstrated during the most recent measurement of incinerator efficiency. Where compliance is achieved with a catalytic incinerator, the owner or operator must report quarterly all periods in excess of 3 hours during which the average difference between the temperature upstream and downstream of the catalyst bed remains below 80 percent of the temperature difference at which compliance was demonstrated during the most recent measurement of incinerator efficiency and must report all periods in excess of 3 hours during which the average temperature upstream of the catalyst bed remains more than 28° C (50° F) below the temperature at which compliance was demonstrated during the most recent measurement of incinerator efficiency.

(f) Where compliance is achieved through the use of a solvent recovery system, the owner or operator shall record daily the amount of solvent recovered by the system for each affected facility. The owner or operator shall report each month where the amount of solvent recovered by the system falls below that necessary for compliance. These reports must be submitted within 10 days after the end of each such month.

(g) Each owner or operator subject to the provisions of this subpart shall maintain at the source, for a period of at least 2 years, records of all data and calculations used to determine VOC emissions from each affected facility. Where compliance is achieved through the use of thermal incineration, each owner or operator shall maintain, at the source, daily records of the incinerator combustion temperature. If catalytic incineration is used, the owner or operator shall maintain at the source daily records of the gas temperature, both upstream and downstream of the incinerator catalyst bed.

§ 60.466 Test methods and procedures.

(a) The Reference Methods in Appendix A to this part except as provided under § 60.8(b) shall be used to determine compliance with § 60.462 as follows:

(1) Reference Method 24, or data provided by the formulator of the coating for determining the VOC content of each coating as applied to the surface of the metal coil. In the event of a dispute, Reference Method 24 shall be the reference method;

(2) Reference Method 25 for the measurement of the VOC concentration in the effluent gas stream entering and leaving the incinerator for each stack equipped with an emission control device, and for the measurement of the VOC concentration in each effluent gas stream emitted directly to the atmosphere;

(3) Method 1 for sample and velocity traverses;

(4) Method 2 for velocity and volumetric flow rate;

(5) Method 3 for gas analysis; and

(6) Method 4 for stack gas moisture.

(b) For Method 24 the coating sample must be a 1-liter sample taken at a point where the sample will be representative

of the coating as applied to the surface of the metal coil.

(c) For Method 25, the sampling time for each of three runs is to be at least 60 minutes, and the minimum sample volume is to be at least 0.003 dry standard cubic meter (dscm); however, shorter sampling times or smaller volumes, when necessitated by process variables or other factors, may be approved by the Administrator.

(d) The Administrator will approve testing of representative stacks on a case-by-case basis if the owner or operator can demonstrate to the satisfaction of the Administrator that testing of representative stacks yields results comparable to those that would be obtained by testing all stacks.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414))

[FR Doc. 81-87 Filed 1-2-81; 8:45 am]

BILLING CODE 6560-26-M

40 CFR Part 60

[AD-FRL-1752-6]

Standards of Performance for New Statutory Sources; Metal Coil Surface Coating; Extension of Comment Period

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule; extension of comment period.

SUMMARY: This action provides for a 30-day extension of the comment period for the proposed standards of performance for metal coil surface coating. These standards were proposed in the Federal Register on January 5, 1981 (46 FR 1102). This action responds to a request from the National Coil Coaters Association for an extension of the comment period. This extension will allow additional time for the industry to futher evaluate the proposed standards and submit additional information and data.

DATES: Comments must be postmarked no later than April 6, 1981. Also, written comments responding to, supplementing, or rebutting written or oral comments received at the public hearing on February 4, 1981, must be postmarked no later than April 6, 1981.

ADDRESS: Comments should be submitted (in duplicate if possible) to: Central Docket Section (A-130), Attention: Docket Number A-80-5, U.S. Environmental Protection Agency, 401 M Street, SW., Washington, D.C. 20460.

FOR FURTHER INFORMATION CONTACT: Mr. Gene W. Smith, Standards Development Branch, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5421.

Dated: February 5, 1981.

Paul Stolpman,

Acting Assistant Administrator for Air, Noise, and Radiation.

[FR Doc. 81-4962 Filed 2-11-81; 8:45 am]

BILLING CODE 6560-26-M

ENVIRONMENTAL PROTECTION AGENCY

■

STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

ASPHALT PROCESSING AND ASPHALT ROOFING MANUFACTURE

SUBPART UU

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 60

[AD-FRL-1505-7]

Standards of Performance for New Stationary Sources; Asphalt Processing and Asphalt Roofing Manufacture

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule and notice of public hearing.

SUMMARY: The proposed standards would limit atmospheric emissions of particulate matter from new, modified, and reconstructed asphalt blowing stills, asphalt saturators, asphalt storage tanks, and mineral handling and storage operations in the asphalt processing and roofing manufacturing industry. In addition, the proposed standards will limit the opacity of emissions from asphalt blowing stills, asphalt saturators, asphalt storage tanks, and mineral handlings and storage operations and fugitive emissions from asphalt saturator hooding. Two EPA reference methods are also being proposed along with the standards.

The standards implement Section 111 of the clean Air Act and are based on the Administrator's determination that asphalt processing and asphalt roofing manufacturing facilities contribute significantly to air pollution which may reasonably be anticipated to endanger public health or welfare. The intended effect is to require new, modified, and reconstructed affected facilities in asphalt roofing manufacturing plants, oil refineries, and asphalt processing plants to use the best demonstrated system of continuous emission reduction, considering costs, non-air quality health and environmental impacts, and energy impacts.

If requested, a public hearing will be held to provide interested persons an opportunity for oral presentation of data, views, or arguments concerning the proposed standards.

DATES: *Comments.* Comments must be received on or before January 19, 1981.

Public Hearing. A public hearing will be held, if requested. Persons wishing to request a public hearing must contact EPA by December 2, 1980. If a hearing is requested, an announcement of the date and place will appear in a separate **Federal Register** notice.

ADDRESSES: *Comments.* Comments should be submitted (in duplicate if possible) to: Central Docket Section (A-130), Attention: Docket No. OAQPS A-79-39. U.S. Environmental Protection Agency, 401 M Street, SW., Washington, D.C. 20460.

Public Hearing. Persons wishing to request a public hearing should notify Ms. Deanna B. Tilley, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone (919) 451-5477.

Background Information Document. The background information document (BID) for the proposed standards may be obtained from the U.S. EPA Library (MD-35), Research Triangle Park, North Carolina 27711, telephone (919) 541-2777. Please refer to "Asphalt Roofing Manufacturing Industry, Background Information for Proposed Standards," EPA-450/3-80-021a.

Docket. A docket, number OAQPS A-79-39, containing information used by EPA in development of the proposed standards, is available for public inspection between 8:00 a.m. and 4:00 p.m. Monday through Friday, at EPA's Central Docket Section (A-130), West Tower Lobby, Gallery 1, Waterside Mall, 401 M Street, S.W., Washington, D.C. 20460.

FOR FURTHER INFORMATION CONTACT: Ms. Susan R. Wyatt, Emission Standards and Engineering Division (MD-13), Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone (919) 541-5477.

SUPPLEMENTARY INFORMATION:

Proposed Standards

The proposed standards would limit particulate emissions from the following new, modified, or reconstructed affected facilities in asphalt roofing manufacturing plants, oil refineries, and asphalt processing plants: Blowing stills; saturators, wet loopers, and coaters; asphalt storage tanks; and mineral handling and storage areas. The saturator, wet looper, and coater are considered to be one facility and are designated as the saturator.

Particulate emission limitations are proposed for blowing stills and saturators. Blowing still particulate emissions would be limited to 0.60 kg/Mg (1.28 lb/ton) of asphalt charged during conventional blowing and 0.67 kg/Mg (1.34 lb/ton) of asphalt charged during catalytic blowing. When No. 6 fuel oil is used to fire the afterburner, the particulate emissions from blowing stills would be limited to 0.64 kg/Mg (1.28 lb/ton) of asphalt charged for conventional blowing and 0.71 kg/Mg (1.42 lb/ton) of asphalt charged for catalytic blowing. Saturator particulate emissions would be limited to 0.04 kg/Mg (0.08 lb/ton) of shingle and mineral-surfaced roll roofing produced or to 0.4 kg/Mg (0.8 lb/ton) of saturated felt and smooth-surfaced roll roofing produced, depending on the product.

An opacity standard is proposed for each affected facility as follows: 0 percent for blowing stills, 20 percent for saturators, 0 percent for asphalt storage tanks, and 1 percent for mineral handling and storage areas. A fugitive emission standard of no visible emissions 80 percent of the time is proposed for saturator capture systems.

Continuous monitoring of the operating temperature of the control devices used to meet the proposed standards would be required to ensure proper operation and maintenance.

The performance test methods for determining compliance with the proposed standards would be Reference Method 26 for particulate emissions, Reference Method 9 for opacity, and Reference Method 22 for fugitive emissions. Methods 22 and 26 are being proposed along with the proposed standards.

Summary of Environmental, Energy, and Economic Impacts

It is projected that the equivalent of three new medium-size asphalt processing and roofing plants will be constructed within 5 years from the proposal date of the standards. The proposed standards would reduce particulate emissions from asphalt processing and asphalt roofing plants by about 490 megagrams per year (540 tons per year) in the fifth year after the standards are proposed. This represents a reduction in particulate emissions of 65 percent from State Implementation Plan (SIP) levels.

The proposed standards would increase wastewater from a typical asphalt roofing plant by approximately 1.0 percent. There would be no change in the quality of the wastewater as a result of the proposed standards. The impact of the proposed standards on solid waste disposal would be negligible. There would be no impact on noise.

The proposed standards would increase the total energy consumption of a typical asphalt roofing plant by about 3.2 percent. This would increase the nationwide energy usage by the equivalent of approximately 600 cubic meters (3,800 barrels) of oil per year in the fifth year after the standards go into effect.

Capital costs for industry compliance with the proposed standards over the first 5 years would be $0.30 million. Fifth-year annualized costs would be $0.09 million. As a result of the proposed

standards, the product wholesale price could increase about 0.15 percent, or $0.02/square (80 shingles), which could increase the price for a roof on a typical three-bedroom house by about $3. If the price of shingles cannot be increased and the industry must absorb all of the costs of compliance with the proposed standards, the resulting drop in net profit after taxes would be about 0.4 percent. The costs of emission controls required by the proposed standards is not expected to have any impact on expansion or construction in the asphalt roofing manufacturing industry.

Rationale

Selection of Source for Control

The asphalt processing and asphalt roofing industry is a significant contributor to nationwide emissions of particulate matter. EPA's priority list, 44 FR 49222 of August 21, 1979, identifies source categories chosen for development of new source performance standards (NSPS). During development of the list, consideration was given to the quantity of emissions from each source category, the extent to which each pollutant endangers health and welfare, and the mobility and competitive nature of each source category. The asphalt roofing manufacturing industry is number 45 out of the 59 source categories chosen for NSPS.

The asphalt roofing industry encompasses not only asphalt roofing plants but certain production units at oil refineries and asphalt processing plants which were not included on the Priority List promulgated on August 21, 1979. At asphalt roofing plants, paper and fiberglass felts are saturated with asphalt and sold as saturated felt or saturated and coated with asphalt and surfaced with selected mineral aggregates to produce roll roofing or shingles. The asphalt used for saturants and coatings is prepared by blowing air through hot asphalt flux. Asphalt is blown at 17 oil refineries, at 2 asphalt processing plants, and at about 70 percent of the 118 asphalt roofing plants. An amendment which would add asphalt processing units at oil refineries and asphalt processing plants to the EPA priority list for development of standards of performance is being proposed today in a separate Federal Register notice.

The asphalt roofing industry supplies over 80 percent of the domestic demand for roofing materials. Although a 34 percent increase in asphalt roofing prices since 1974 has caused some acceleration in the search for substitutes, asphalt roofing continues to dominate the market.

The construction of new houses and the renovation of existing structures are the primary determinants of the demand for asphalt roofing products. Declines in construction of new homes have generally been offset by increasing strength in the replacement roofing market; thus, there has been a stable demand for asphalt roofing products. For the past 10 years, the industry has grown 2.0 percent annually; projections for the next 5 years show an expected annual growth of 1.5 to 2.0 percent. Asphalt processing and asphalt roofing plants are located in urban areas where future growth is also expected to take place.

For these reasons, the asphalt processing and asphalt roofing industry has been selected for the developent of new source performance standards.

Selection of Pollutants

The asphalt processing and roofing industry is a source of hydrocarbon particulate, polycyclic organic matter (POM), aldehyde, and sulfur dioxide (SO_2) emissions.

The emissions from the asphalt processing and roofing industry are aerosols containing particulate hydrocarbons. The particulate hydrocarbons comprise 75 percent of all pollutants emitted from an average asphalt roofing plant controlled to typical SIP levels. It is expected that by 1985, annual nationwide particulate emissions from this industry will increase by 770 Mg (850 tons) if emissions are controlled to the level of a typical SIP regulation. These emissions can be significantly reduced by available control technology that has been demonstrated.

Test data indicate that aldehyde and SO_2 emissions from asphalt processing and asphalt roofing manufacture are relatively low compared to particulate emissions. By 1985 the increase in emissions would be only 4.5 Mg/yr (5.0 tons/yr) for aldehyde and 13.5 Mg/yr (15.0 tons/yr) for SO_2. Therefore, SO_2 and aldehyde were not selected for regulation at this time.

By 1985 the annual nationwide increase in POM emissions from new, modified, or reconstructed asphalt processing and asphalt roofing manufacturing plants would be 4.6 Mg (5.1 tons). Control devices generally used to control particulate emissions from asphalt processing roofing manufacture are capable of reducing POM emissions by about 90 percent from uncontrolled levels. Since particulate control devices also control POM, a separate standard for this pollutant is not being proposed at this time.

For the reasons stated in the preceding paragraphs, particulate is the only pollutant selected for regulation by standards of performance at this time. This decision does not preclude the future regulation of aldehyde or POM emissions from asphalt roofing and asphalt processing plants if the Administrator finds that either of these two pollutants endangers health or welfare.

Selection of Facilities To Be Considered for Regulation

The major sources of particulate emissions are asphalt blowing stills; saturators; asphalt storage tanks; and mineral handling and storage facilities, which consist of the unloading area, conveyor transfer points, and storage bins. All of these sources are found in asphalt roofing plants. The asphalt blowing stills and asphalt storage tanks may also be located at oil refineries and asphalt processing plants. The blowing stills and asphalt storage tanks at oil refineries and asphalt processing plants were also considered for regulation by standards of performance because the emissions, processes, and applicable controls are the same as those in asphalt roofing plants.

Typical baseline (SIP) emissions from each facility in a medium size plant are:

Blowing still: 43 kg/h (95 lb/h);
Saturator: 18 kg/h (40 lb/h);
Asphalt storage tanks: 1.8 kg/h (4.0 lb/h); and
Mineral handling and storage area: 1.0 kg/h (2.2 lb/h).

Coater-mixers and mineral surfacing, two relatively insignificant sources of particulate emissions, are located at asphalt roofing plants. Coater-mixers are usually enclosed, and no emissions escape to the atmosphere. Emissions from mineral surfacing are contained within the building. Therefore, these two emission sources were excluded from further consideraton for regulation by standards of performance.

Particulate emission control technolgy exists in the asphalt processing and asphalt roofing industry for all significant sources of particulate emissions. The minerals, the transfer and storage equipment, and the control technology used in the asphalt roofing industry for mineral handling and storage operations are the same as those used in the nonmetalic minerals industries. Therefore, it is appropriate to transfer the control technolgy from these industries to the asphalt roofing manufacturing industry. Blowing stills, saturators, asphalt storage tanks, and mineral handling and storage areas

were selected as facilities to consider for regulation because they are significant sources of particulate emissions for which control technology is available.

Selection of Basis of Proposed Standards

Tests at four asphalt roofing plants have demonstrated that particulate emissions from saturators and asphalt storage tanks may be effectively controlled to essentially the same emission level by any one of three pollution control devices: Afterburner (A/B), high velocity air filter (HVAF), or electrostatic precipitator (ESP). These three devices are commonly used to meet State Implementation Plans; however, the SIP Limits do not necessarily require that the devices achieve the best level of control. To achieve the best level of control, each of the control devices must be operated at the proper temperature. Afterburner effectiveness generally increases with increasing combustion temperature. Exhaust gases entering the HVAF and ESP must be cooled to condense the hydrocarbons and allow their capture.

A survey of asphalt roofing manufacturers and State, regional, and local agencies was conducted to find well-controlled asphalt roofing plants. As a result of this survey, 27 asphalt roofing plants were visited to select the best plants for emissions testing. During the plant visits, opacity readings were taken at control device outlets, the control devices were visually inspected, engineering drawings were examined, and emission reports, when available, were studied. The information collected during the plant inspections was evaluated, and the best-controlled plants were selected for emissions testing.

Tests indicated that an afterburner controlling emissions from a saturator and operating at a temperature above 649°C (1200°F) could achieve about a 93 percent emission reduction. Tests also indicated that an ESP or HVAF could achieve about a 93 percent particulate emission reduction if the saturator exhaust gases are cooled below 60°C (140°F).

An afterburner was the only device tested for control of emissions from blowing stills. The effectiveness of an afterburner in controlling emissions varies with the temperature in the combustion zone. Test data show that an afterburner operating over a temperature range of 760°C to 870°C (1400°F to 1660°F) reduced emissions from the blowing still by 95 percent. The exact relationship between degree of control and operating temperature varies with the concentration of combustible gases in the inlet gas and the size of the control equipment.

The test data show that the emissions from asphalt storage tanks can be effectively controlled by venting the emissions through either a mist eliminator or a particulate control device on the saturator. It is general industry practice for asphalt storage tanks to be vented to the saturator control device when the saturator is operating and to a mist eliminator when the saturator is not operating. However, emissions from the asphalt storage tanks can also be continuously controlled by a mist eliminator or other control device.

Fabric filters are used to control the emissions from the minerals handling and storage operations at some plants in the asphalt roofing industry; however, they have not been tested. These filters have been shown to be effective (through observations of opacity) in reducing particulate emissions from minerals handling and storage operations in the non-metallic minerals industries. Since the minerals handled and the handling and storage operations for the minerals are the same for the two industries, fabric filters are selected as representative of the best technological system for continuous emission reduction from mineral handling and storage operations at asphalt roofing plants.

The proposed standards are based on the pollution control devices that were tested. Other pollution control devices are available that may achieve the level of contol required by the proposed standards. Any control technique that achieves the emission limit outlined in the proposed standards could be used to comply with the standards.

Selection of Regulatory Alternatives

The impacts that varying amounts of emission control would have on the industry, the consumer, and the environment were considered during development of the emission standards. For saturators, each of the three control devices tested demonstrated essentially equal levels of control. For the other facilities, only one type of control device could be tested. Since only one level of control was demonstrated for each respective facility, regulatory alternatives that require control of different combinations of the facilities were defined so that varying impacts could be considered. No new source performance standard (NSPS) would be promulgated under Alternative 1. The facilities would be controlled by existing State regulations. Alternative 2 would require NSPS control for saturators and asphalt storage tanks; Alternative 3 would require NSPS control for saturators, asphalt storage tanks, and asphalt blowing stills; Alternative 4 would require NSPS control for saturators, asphalt storage tanks, and mineral handling and stortage areas; and Alternative 5 would require NSPS control for all affected facilities.

The projected five-year industry growth after proposal of the standards is equal to three medium-size asphalt roofing plants with blowing stills. The environmental and energy impacts of one medium-size plant are one-third the values given below and are based on an HVAF and ESP controlling a saturator, an afterburner controlling a blowing still, a fabric filter controlling mineral handling and storage facilities, and a mist eliminator controlling asphalt storage tanks.

Environmental Impacts

Regulatory Alternative 1, the baseline condition, represents the typical SIP level of control. The actual emissions from individual plants may vary from the emissions allowed by the typical SIP due to differences in State regulations and control methodologies. However, it was judged reasonable to select the typical SIP level of control as the baseline condition for the purposes of comparing environmental impacts. The uncontrolled emissions in the fifth year would be about 2,800 Mg/yr (3,100 tons/yr). The fifth-year environmental impact, if no NSPS is established, would be an increase in nationwide particulate emissions of 770 Mg/yr (850 tons/yr). The fifth-year reduction in emissions beyond SIP control would be 230 Mg/yr (250 tons/yr) for Regulatory Alternative 2; 480 Mg/yr (530 tons/yr) for Alternative 3; 240 Mg/yr (260 tons/yr) for Alternative 4; and 490 Mg/yr (540 tons/yr) for Alternative 5. This would be a reduction of 30 percent for Alternative 2, 62 percent for Alternative 3, 31 percent for Alternative 4, and 64 percent for Alternative 5.

The water pollution impact resulting from adoption of any one of Regulatory Alternatives 2 through 5 would be minimal. Water sprays used to cool inlet fumes of a saturator control device would increase the amount of wastewater to be treated in the fifth year by 30 to 40 m^3/yr (8,000 to 10,500 gal/yr).

Adoption of any of the Regulatory Alternatives 2 through 5 would result in only a small increase in solid waste. The only solid waste generated by the control devices used in the asphalt roofing industry is the saturated filter media from the HVAF.

Dispersion modeling was used to assess the air quality impact of

particulate emissions from asphalt processing and asphalt roofing manufacturing plants under worst-case meteorological conditions. The dispersion analysis used 1964 climatological data for Pittsburgh, Pennsylvania, and Oklahoma City, Oklahoma. Both data sets are reasonably consistent with meteorological conditions representing maximum impact for short stacks. The National Ambient Air Quality Standards (NAAQS) 24-hour maximum primary standard is 260 $\mu g/m^3$, and the 24-hour maximum secondary standard is 150 $\mu g/m^3$. The dispersion analysis for a medium-size asphalt processing and asphalt roofing plant indicated that the primary standard would not be exceeded by a plant controlled under any of the regulatory alternatives but that the secondary standard could be exceeded under Regulatory Alternatives 1, 2, and 4. Adoption of either Regulatory Alternative 3 or Regulatory Alternative 5 would result in a concentration of particulate emissions from an asphalt processing or asphalt roofing plant considerably below the NAAQS 24-hour maximum secondary standard.

Energy Impacts

The construction of three new medium-size asphalt roofing plants controlled by SIP's (Regulatory Alternative 1) would result in an energy usage of 19,100 m^3/yr (120,000 bbl/yr) of oil for all plant operations in the fifth year. The fifth-year increase in energy over Regulatory Alternative 1 would be 20 m^3/yr (140 bbl/yr) of oil for Regulatory Alternative 2; 590 m^3/yr (3,700 bbl/yr) of oil for Alternative 3; 30 m^3/yr (200 bbl/yr) of oil for Alternative 4; 600 m^3/yr (3,800 bbl/yr) of oil for Alternative 5. This is an increase from Regulatory Alternative 1 of 0.1 percent for Alternative 2, 3.1 percent for Alternative 3, 0.2 percent for Alternative 4, and 3.2 percent for Aternative 5.

Economic Impacts

The fifth-year capital and annualized costs for the controls typically being installed by asphalt roofing plants to comply with SIP's would be $1,800,000 and $600,000 respectively. The increase in the fifth-year capital and annualized costs and the increase in the product price if the asphalt roofing manufacturing industry passes through the compliance costs associated with the proposed standards are summarized in the following paragraphs for Regulatory Alternatives 2, 3, 4, and 5.

Regulatory Alternative 2 would result in an increased capital cost of $215,000 and an increased annualized cost of $20,000. This increase in annualized costs could result in a 0.03 percent product price increase for asphalt shingles.

Regulatory Alternative 3 would increase capital costs by $215,000, annualized costs by $59,000, and the product price of asphalt shingles by 0.08 percent.

Regulatory Alternative 4 would increase capital costs by $305,000, annualized costs by $53,000, and the product price of asphalt shingles by 0.07 percent.

Regulatory Alternative 5 would increase capital costs by $305,000, annualized costs by $92,000, and the product price of asphalt shingles by 0.12 percent.

It is reasonable to expect that the industry could pass through these costs for any of the regulatory alternatives. However, if the industry must absorb all the costs for compliance with the proposed standards, the reduction in profit would be 0.4 percent.

A detailed analysis of the economic impact of the alternatives on the asphalt processing and asphalt roofing industry was developed for asphalt roofing plants, where the majority of the asphalt processing and asphalt roofing manufacture occurs. Oil refineries and asphalt processing plants contain only blowing stills and asphalt storage tanks. The regulatory alternatives would require the same controls for blowing stills and asphalt storage tanks at oil refineries, asphalt processing plants, and asphalt roofing plants. Therefore, the costs of meeting the alternatives would be no greater for oil refineries and asphalt processing plants than for asphalt roofing plants. For these reasons, product price increases for Alternatives 2 through 5 should be no greater for products produced at oil refineries than for those produced at asphalt roofing plants.

Historically, oil refineries have demonstrated the ability to pass through cost adjustments on the price of their products. If they have to absorb the costs of compliance with the proposed standards, the reduction in profit would be less than .01 percent. Therefore, there should be no adverse economic impact on oil refineries.

Regulatory Alternatives 2 through 5 are not expected to have an adverse impact on asphalt processing plants. No growth is anticipated in this industry. In fact, the number of asphalt processing plants has been declining in recent years. If new plants are constructed, they are expected to be able to pass through control costs.

Selection of the Alternative for the Standards

Regulatory Alternative 5 would result in the greatest reduction in emissions. Operation of the controls required to comply with Alternative 5 would increase the energy used in all plant operations by only 3.2 percent, and the adverse environmental impacts would be negligible. As discussed previously, the increased control costs would be the same for oil refineries, asphalt processing plants, and asphalt roofing plants. It is expected that all of the costs of compliance with the proposed standards would be passed through. If so, the wholesale product cost would increase by 0.12 percent. The cost to the consumer for a new roof on an average three-bedroom house would be increased by $3. However, if all of the compliance costs were absorbed, the reduction in profit would be 0.4 percent. Because Regulatory Alternative 5 would result in the greatest emission reduction and because, in the Administrator's judgment, the environmental, energy, and economic impacts associated with this emission reduction are reasonable, the Administrator selected Alternative 5 as the basis for the proposed standards.

Consideration of Growth Projections Made by the Industry

Industry representatives commented at the meeting of the National Air Pollution Control Techniques Advisory Committee (December 12, 1979) that EPA had underestimated the growth rate in the industry. They later projected that growth in the industry during the 5 years after proposal of the standards would be: 5 new medium-size plants; 5 new medium-size plants to replace 5 small-size obsolete plants; 5 plants with reconstructed saturators to replace saturators destroyed by fire; and 20 plants each modified to increase production from the saturator by 20 percent. (*1, 2*) The environmental, energy, and economic impacts of the growth projected by the industry have been considered to determine how the industry's growth projections could affect the selection of a regulatory alternative.

The environmental impacts of the growth projected by industry are as follows. The uncontrolled emissions in the fifth year would increase by 7,000 Mg/yr (7,700 tons/yr). If no NSPS is established, the nationwide particulate emissions would increase in the fifth year by 3,200 Mg/yr (3,500 tons/yr). The fifth-year reduction in emissions beyond the SIP level of control would be 960 Mg/yr (1,600 tons/yr) for Regulatory Alternative 2; 2,000 Mg/yr (2,200 tons/

yr) for Alternative 3; 1,000 Mg/yr (1,100 tons/yr) for Alternative 4; and 2,040 Mg/yr (2,250 tons/yr) for Alternative 5. The percent emission reductions for each alternative would be the same as those projected for the EPA growth estimates.

The growth projections made by the industry would increase the amount of wastewater to be treated in the fifth year by 200 to 235 m^3/yr (56,000 to 62,000 gal/yr). Water pollution impact would be minimal.

The energy impacts resulting from the growth projections made by industry for the SIP level of control (Regulatory Alternative 1) would result in an energy usage of 48,000 m^3/yr (300,000 bbl/yr) of oil for all plant operations in the fifth year. The fifth year increase in energy over Regulatory Alternative 1 would be 78 m^3/yr (490 bbl/yr) of oil for Regulatory Alternative 2; 1,500 m^3/yr (9,400 bbl/yr) of oil for Alternative 3; 100 m^3/yr (650 bbl/yr) of oil for Alternative 4; and 1,530 m^3/yr (9,600 bbl/yr) of oil for Alternative 5. The percent increase in energy usage for each alternative would be the same as the percent increase using the EPA growth estimate.

Using the growth projections made by the industry, the fifth-year capital and annualized costs for the controls typically being installed by asphalt roofing plants to comply with SIP's would be $4,500,000 and $1,500,000, respectively. The fifth-year capital and annualized costs would further increase by $1,070,000 and $270,000, respectively, for Regulatory Alternative 2, by $270,000, respectively, for Regulatory Alternative 2, by $1,070,000 and $370,000, respectively, for Regulatory Alternative 4, and by $1,300,000 and $450,000, respectively, for Regulatory Alternative 5.

The product price increase and/or the reduction in profit resulting from compliance with the proposed standards would be the same as previously reported for the EPA growth projection.

The growth projections made by the industry would not change the solid waste and noise impacts previously calculated by EPA.

Under either the industry or the EPA growth projections, Alternative 5 would result in the greatest reduction in emissions. The production cost increases and/or the percent reductions in profit associated with achieving the emission standards would be the same. Under either projection, the impacts of Alternative 5 on energy and the environment would be reasonable. For these reasons, the selection of Regulatory Alternative 5 as the basis for the proposed standard is not changed.

Selection of the Format of the Proposed Standards

Standards for asphalt roofing plants could be expressed either as concentration standards, which limit emissions per unit volume of exhaust gases discharged to the atmosphere, or as mass standards, which limit emissions per unit of production. In selecting a format for the proposed standards, the cost of compliance testing and the effect on reducing the mass emissions were considered.

In most cases, concentration standards are preferable to mass standards because the concentration format requires fewer calculations and measurements and is, therefore, less costly. Concentration standards, however, usually require correction factors to prevent dilution of exhaust gases as a means of meeting the standards. Excess air may be introduced into the exhaust flow either by poorly designed hooding or by lekage through doors and duct joints. Also, two of the control devices upon which the proposed standards are based may use additional air for cooling the gases before they enter the contol device. The quantity of air used for cooling would vary according to ambient temperature, temperature of the asphalt in the saturator, and the location of the control device. Therefore, development of the correction factor necessary for the concentration standards would be difficult. For this reason, concentration is not a desirable format.

Mass standards expressed as allowable emissions per unit of production require measurement of the production rate as well as of the concentration of emissions in the control equipment exhaust systems. Since asphalt processing and asphalt roofing production figures are readily available and plant personnel would not have to monitor production continuously, this format would not increase the cost of compliance testing above the cost of other formats. Dilution air would have no effect on the emission results. For these reasons, mass per unit of production is selected as the format for expressing the standards of performance for asphalt processing and asphalt roofing plants. The proposed standards are expressed as kilograms of pollutant per megagram (kg/Mg) of product for the saturator and as kilograms of pollutant per megagram (kg/Mg) of asphalt charged for the blowing still.

An opacity format for visible stack emissions for all facilities is proposed to aid enforcement and operating personnel in determining that emission control devices are properly maintained and operated. A visible emissions format is selected as the basis of the standard for the saturator capture system to ensure that a well-designed and well-operated capture system is used.

Selection of Numerical Emission Limits

Four saturators were tested for particulate emissions. Two of the saturators were controlled by a high velocity air filter (HVAF), one by electrostatic precipitators (ESP), and one by afterburners (A/B).

The saturator at plant A was controlled by two ESP modules operating in parallel. The average of three test runs conducted at or below a filtration temperature of 52° C (126° F) on this unit showed an emission rate of 0.019 kg/Mg (0.038 lb/ton). The fourth test run, shown in the BID, was conducted at a filtration temperature above the 52° C (126° F) temperature specified in Method 26 and, therefore, was not used in determining the average emission rate.

Two afterburners operating in parallel controlled the emissions from the saturator and asphalt storage tanks at plant B. A performance test consisting of three runs was completed on each of the afterburners. One afterburner was operating at 538° C (1000° F) and the other at 649° C (1200° F). The emissions from the afterburner operating at 538° C (1000° F) averaged 0.035 kg/Mg (0.07 lb/ton). The emissions from the afterburner operating at 649° C (1200° F) averaged 0.015 kg/Mg (0.03 lb/ton). The combined emissions from the two afterburners at plant B averaged 0.045 kg/Mg (0.09 lb/ton) during the performance test. If both afterburners had been operated at the higher temperature, 649° C (1200° F), the control efficiencies would have been approximately equal, and the average of the emissions from both afterburners would have been approximately 0.025 kg/Mg (0.05 lb/ton).

At plant C the emissions from the saturator and asphalt storage tanks are controlled by an HVAF. A performance test consisting of three test runs was conducted at this plant; the emissions averaged 0.026 kg/Mg (0.052 lb/ton).

An HVAF controlled the emissions from the saturator at plant D. The emission rate determined by the performance test consisting of three test runs averaged 0.035 kg/Mg (0.07 lb/ton).

The HVAF, ESP, and afterburner (operated at the higher temperature) all control mass emission rates to between 0.015 and 0.035 kg/Mg (0.03 and 0.07 lb/ton). Each of these control devices could meet a standard set at 0.04 kg/Mg (0.08 lb/ton). Therefore, the emission limit for the saturator and asphalt storage tanks

vented to the saturator control devices has been set at 0.04 kg/Mg (0.08 lb/ton), a level which can be achieved by the HVAF, ESP, or afterburner. This emission limit is based on data collected during production of 106.6–kg (235-lb) shingles. The proposed standard for a saturator producing shingles or mineral surfaced roll roofing requires that the performance tests be conducted while the saturator line is producing a 106.6-kg (235-lb) shingle in order to be consistent with the procedure used during the emissions tests.

A second emission limit for saturators in mass per unit of production is necessary because some asphalt roofing plants produce only saturated felt and roll roofing which are lighter than the shingles that were being produced during the emissions testing program. The uncontrolled mass of particulate emissions per unit time is the same from a saturator producing shingles as from a saturator producing saturated felt if the felt feed rate and asphalt temperature are the same. For saturators operating at the same felt feed rates, the weight of asphalt shingle produced is about 10 times greater than the weight of saturated felt produced. The particulate emissions rate for a saturator producing 106.6-kg (235-lb) shingles was divided by the production rate of a roofing line producing a 6.8-kg (15-lb) saturated felt to derive the proposed emission limit of 0.4 kg/Mg (0.8 lb/ton) for saturators producing a 6.8-kg (15-lb) saturated felt and smooth-surfaced roll roofing.

There was only one blowing still considered to be well controlled and suitable for emissions testing. Two performance tests, each consisting of three runs, were conducted at the afterburner controlling emissions from the blowing still at Plant E. The emission rate for the three saturant blows averaged 0.24 kg/Mg (0.48 lb/ton) of asphalt charged to the still. The emission rate for the three coating blows averaged 0.44 kg/Mg (0.88 lb/ton) with a high individual reading of 0.55 kg/Mg (1.1 lb/ton) of asphalt charged to the still. To allow for possible variations since only one blowing still was tested, the Administrator determined that the emission limit for blowing stills would be set above the highest individual reading observed during the two performance tests. Therefore, the emission limit for the blowing still has been set at 0.60 kg/Mg (1.2 lb/ton) of asphalt charged during conventional blowing, a level which can be achieved by an afterburner during either a coating or a saturant blow. The emission limit provides a 35 percent margin above the average of the individual test runs.

Industry representatives commented that three conditions may influence emissions and the achievability of the proposed emission standards for blowing stills and questioned whether the test results at Plant E are representative of the entire industry.(*1*) These conditions are:

1. The use of ferric chloride as a catalyst in the blowing stills,
2. The use of asphalt flux from different crudes, and
3. The use of No. 2 or No. 6 fuel oil in the afterburner. EPA has considered each of these conditions as discussed in the following paragraphs.

Industry representatives stated that by 1985 the use of a catalyst in the air blowing of asphalt may be widespread. They questioned whether the proposed emission limit, which is based on conventional blowing, would be achievable if catalytic blowing is used. A catalyst is added during air blowing to increase reaction rates and to achieve the desired properties of the coating asphalt. There are no data to quantify the emissions from catalytic blowing of asphalt or from an afterburner controlling the emissions from catalytic blowing. No well-controlled catalytic blowing stills that are suitable for testing are known to exist. However, available information on the operating characteristics of blowing stills and afterburners can be used to assess the achievability of the proposed emission limit when catalytic blowing is used.

In catalytic blowing, a ferric chloride catalyst is added to the still in amounts ranging from 0.2 to 0.5 percent by weight of asphalt charged to the still.(*4*) For ferric chloride to be emitted from the still, it would have to be contained in the liquid asphalt droplets that may be entrained in the gases leaving the still. Liquid drops in the fume that result from condensation of vaporized hydrocarbon material would not contain any ferric chloride. All blowing stills include knock-out boxes or cyclones to remove some of the liquid drops from the fume before incineration. The liquid captured by the knock-out box generally has a viscosity similar to a fuel oil. This indicates that the majority of particulate emissions result from the condensation of light compounds in the asphalt flux and not from entrained liquid droplets. If large amounts of entrained asphalt flux were present, the material captured would have a higher viscosity. Therefore, if tests were done, EPA expects that very little, if any, ferric chloride would be measured in the emissions from the afterburner. Since test data are not available and since afterburners, the control device on which the standard is based, would not control ferric chloride, the Administrator has decided to allow an increment in the standard for catalytic blowing.

In the unlikely event that all of the uncontrolled emissions during the emissions test at Plant E resulted from entrainment of liquid asphalt droplets and if these asphalt droplets contained 0.5 percent (the maximum amount used by industry) by weight of ferric chloride, the ferric chloride emissions would be 0.07 kg/Mg (0.14 lb/ton) of asphalt.

It is possible that ferric chloride will be converted to ferric oxide in the afterburner. If this happens, the mass of emissions would not change because the molecular weights of these compounds are equal. If the proposed emission limit for blowing stills were increased by 0.07 kg/Mg (0.14 lb/ton), the allowable emissions from a blowing still of a medium-size plant would increase from 25.4 to 26.8 Mg/yr (28 to 29.5 tons/yr). The amount by which controlled emissions would be reduced below the baseline level would be 97.5 Mg/yr (107.5 tons/yr) instead of 99 Mg/yr (109 tons/yr). These changes in the benefits of the proposed standard would be relatively small. After considering these factors, the Administrator concluded that an increment for catalytic blowing based on worst-case conditions and the emission test data from Plant E would be reasonable. The uncontrolled emissions at another plant could be higher than those at Plant E. However, after considering the small probability of finding ferric chloride in the emissions at a plant using catalytic blowing, the Administrator concluded that basing the increment on the emissions at Plant E is sufficient to ensure the achievability of the proposed emission limit. Therefore, the proposed emission limit for catalytic blowing is 0.67 kg/Mg (1.34 lb/ton) of asphalt charged to the still.

Industry representatives also expressed concern that catalytic blowing would change the characteristics of the particulate emissions and, therefore, affect the achievability of the proposed emission limit. (*1, 2*) EPA has considered the impacts of these possible changes in the emission characteristics on the achievability of the proposed emission standard as discussed in the following paragraphs.

Information gathered from the industry indicates that during catalytic blowing, the total mass of volatile organic emissions per unit of asphalt production and the flow rate of the blowing air will be the same as during blowing without a catalyst. (*4*) The blowing time may be reduced by as much as two-thirds. (*4*) Therefore, in the worst case, the mass per unit time and

the concentration of combustible particulate in the fume may be approximately three times higher than those measured when no catalyst is used. Even though the particulate emissions per unit time could triple, the total mass of particulate emissions per unit of production would remain the same. Therefore, the afterburner efficiency required to meet the proposed emission limit, which is in mass of emissions per unit of production, would be the same as that required if no catalyst were used. A well-designed afterburner could easily achieve the proposed emission limit under the worst-case conditions for catalytic blowing.

The fuel and the capital costs for the afterburner controlling catalytic blowing would differ from the costs reported for the model plants. The fuel costs reported for the model plant include enough fuel to raise the temperature of the fume to 760°C (1400°F) without taking any credit for the heating value of the particulate in the fume. For the plant tested, the fume provided approximately one-third of the total energy consumed. This method of estimating fuel costs was used to assure that the model plant fuel costs would represent worst-case conditions where the concentration of particulate in the fume is very small. Since the concentration of particulate in the fume from catalytic blowing could be as much as three times higher than the concentration in a fume from conventional blowing, the heating value of the catalytic blowing fume alone should be sufficient to maintain the afterburner at 760°C (1400°F). Therefore, if the combustible particulate in the fume triples, the fuel cost for the afterburner on a catalytic blowing still would be considerably less than the fuel cost for the afterburner at the model plant.

The capacity of an afterburner controlling catalytic blowing will have to be larger than the capacity of an afterburner controlling non-catalytic blowing. In the worst case, catalytic blowing reduces the blowing time by two-thirds and triples the rate of emissions. In this case, and assuming an uncontrolled emission rate equal to that at Plant E, the required afterburner capacity might be triple the capacity of the afterburner required for the losses from the still at Plant E or double the capacity of the model plant afterburner. (The model plant afterburner was 1.5 times the size needed for conditions at Plant E.) Doubling the afterburner capacity would be necessary to handle the mass of material just to meet the baseline condition (Regulatory Alternative 1) which is based on typical SIP's. The SIP's limit the mass rate of emissions to a specified level, e.g., 46 lbs/h for a medium-size plant. Doubling the capacity of the model plant afterburner at a medium-size plant would increase the capital cost of the afterburner from $121,000 to $172,000.(3) The capital charges resulting from the increased investment would increase baseline production costs from $13.480 to $13.484 per square of roofing shingle. The production cost for achieving the proposed emission limit (Regulatory Alternative 5) would increase from $13.500 to $13.504 per square of roofing shingle. These costs are reasonable and would not alter the selection of Regulatory Alternative 5 as the basis for the proposed standards. The incremental costs in achieving the proposed emission limit over baseline emission levels would not be increased.

Since the proposed emission limit has been adjusted to allow for emissions of an inorganic catalyst and since the adjusted limit can be achieved at a reasonable cost, the Administrator has determined that no additional adjustment in the proposed emission limit is needed for catalytic blowing.

Industry representatives stated that blowing asphalt fluxes from different crude oils may result in different emission rates. They questioned the achievability of the proposed emission limit when asphalt fluxes different from those used in the emissions testing program are blown. EPA has considered the impact of blowing asphalt fluxes from various crude oils on the achievability of the proposed emission limit as discussed in the following paragraphs.

Data from industry show that losses of material (measured at the outlet of the still) from blowing asphalt fluxes from different crude oils range from 1.0 to 3.9 percent of the asphalt charged to the still.(4) The flux used during the emissions test at Plant E was labeled a 2.0 percent volatility crude. The uncontrolled emissions during the test were measured at the outlet of the cyclone and equaled 1.3 percent of the asphalt charged to the still. In the worst case, without a cyclone, when uncontrolled emissions are 3.9 percent of the asphalt charged, an afterburner capable of destroying 98.5 percent of the particulate emissions would be required to achieve the proposed emission limit. The worst case (losses of 3.9-percent of asphalt flux) is not likely to occur. For a medium-size plant, a 3.9 percent loss of asphalt from the still would cost about $480,000 per year at current asphalt prices. Therefore, there is a strong incentive to use low-cost cyclones or knock-out boxes to recover the material that is lost from the still. Even if these devices were only 25 percent efficient, the afterburner efficiency required to achieve the emission limit would be reduced to 98 percent. Studies on afterburners show that a well-designed afterburner can achieve efficiencies in excess of 98.5 percent.(5) In fact, efficiencies approaching 100 percent can be achieved.(5) If the emission rates are tripled, the concentration of combustible particulates in the fume will also triple, making it easier to achieve higher afterburner efficiencies than those achieved during the test at Plant E.

The cost of achieving the proposed emission limit might increase above the costs reported for the model plants if the uncontrolled emissions are greater than those tested at Plant E. In the worst case (assuming no cyclone) the uncontrolled emissions would be triple those tested at Plant E. The fuel costs reported for the model plant would not increase because the model plant costs include enough fuel to maintain the afterburner at 760°C (1,400°F) without assuming any credit for the heating value of the fume. Any increase in the temperature required for a higher efficiency could come from the heating value of the fume, which would be sufficient to raise the combustion temperature from 760° to 930°C (1,400° to 1,700°F) without increasing the fuel consumption. Studies show that such an increase in temperature alone may be sufficient to achieve a 98.5 percent efficiency in a well-designated afterburner.(5)

The capital costs would increase above the costs reported for the model plant because a larger afterburner would be required to achieve a higher capacity and because a longer residence time may be needed to achieve the required efficiency. For the new capacity, the afterburner size may be triple the size needed for the test condition at Plant E or double the size of the model plant afterburner. (The model plant afterburner is 1.5 times the size needed for Plant E.) The afterburner cost for a medium-size model plant would increase from $121,000 to $172,000 if the size of the afterburner is doubled.

The higher afterburner capacity would be necessary to meet the baseline condition (typical SIP's) because the SIP's limit the mass rate of emissions. The increase in capital charges for the larger afterburner would increase the production costs associated with achieving the baseline emission levels (Regulatory Alternative 1) from $13.480 to $13.484 per square of roofing shingle. The production costs associated with

achieving the proposed emissions standard would increase the $13.500 to $13.504 per square of roofing shingle. A further increase in capital cost may result if it is necessary to increase the afterburner efficiency. For example, if emissions per unit of asphalt charged are tripled, the afterburner efficiency would need to increase to meet either the SIP level of control or the proposed standard. Since the SIP emission limits are lower than the proposed standard, the increased efficiency required to meet the SIP level of control might be achievable without increasing the size of the afterburner (e.g., by temperature adjustment). However, the increased efficiency needed to meet the proposed standard might require increasing the residence time in the afterburner. Therefore, to assure a worst-case cost analysis, the capital cost for a larger afterburner to achieve the increased residence time is charged to the incremental cost of achieving the proposed emission limit over the baseline. The model plant afterburner is designed for a residence time of 0.5 second. Control efficiencies generally increase with residence time up to 1.0 second.(7) In the worst case, the fume residence time in the model plant afterburner might need to be doubled to provide a 98.5 percent control efficiency. This would raise the capital cost from $172,000 to $244,000.(3) The increase in capital charges, resulting from the higher investment cost for compliance with the proposed emission limit, would increase production costs in a medium-size plant from $13.504 to $13.510 per square of roofing shingle. These costs for compliance could result in a product price increase of 0.19 percent or, if all costs are absorbed, a reduction in profit of 0.6 percent. These economic impacts would not reduce growth in the industry and are judged by the Administrator to be reasonable.

Catalytic blowing of a high-loss flux, the "extreme" worst-case situation could require an afterburner with 6 times the capacity of the medium-size model plant or 3 times the capacity of an afterburner for a high-loss flux. It is not likely that new plants will be designed that would allow the high losses because of the value of the material that could be recovered. Even if this "extreme" worst case existed, the afterburner fuel cost would decrease and the afterburner capital costs would increase. The increase in capital costs for an afterburner controlling emissions from a medium-size model plant would be $176,000. Because the need for this increase is uncertain and because it was analyzed only for an "extreme" worst-case condition, the increase in cost has been charged to the cost of achieving the standard. This increase in capital charges for the larger afterburner would increase the production costs associated with achieving the proposed standard (Regulatory Alternative 5) from $13.50 to $13.513 per square of roofing shingle. These costs for compliance could result in a product price increase of 0.24 percent, or, if all costs are absorbed, a reduction in profit of 0.8 percent. These economic impacts would not reduce growth in the industry and are judged by the Administrator to be reasonable.

Because well-designed control equipment could achieve the proposed emission limit without adverse economic impacts, the Administrator has determined that the proposed emission limit would apply to blowing stills processing asphalt fluxes from any crude oil.

Industry representatives have stated that the use of No. 6 and No. 2 fuel oil in an afterburner will affect controlled emissions because of the ash content of fuel oil and have questioned the achievability of the proposed standard when fuel oil is used. The afterburner controlling the emissions from the blowing still during the tests at Plant E was fired with natural gas.

The American Petroleum Institute (API) specifications for No. 6 fuel oil show that the ash content ranges from 0.01 to 0.05 percent.(8) The fuel consumption rate of the model plant afterburner (a conservative estimate because the heating value of fume was not considered in the calculation) was used to calculate the increased particulate resulting from the ash content of No. 6 fuel oil. The increased particulate would range from 0.0007 to 0.036 kg/Mg (0.0014 to 0.072 lb/ton) of asphalt charged to the still.(3) The worst-case conditions occur when No. 6 fuel oil with a 0.5 percent ash content is fired in the afterburner at the model plant fuel consumption rate. The Administrator has decided to add an increment to the proposed blowing still emission limits to allow for the worst-case conditions. Therefore, the proposed blowing still emission limits when No. 6 fuel oil is used are 0.64 kg/Mg (1.28 lb/ton) for conventional blowing and 0.71 kg/Mg (1.42 lb/ton) for catalytic blowing.

The API specifications show that No. 2 fuel oil has an ash content of <0.01 percent.(8) Based on the fuel consumption rate of the model plant afterburner, the contribution of ash from No. 2 fuel oil will be <0.0006 kg/Mg (<0.0012 lb/ton) of asphalt charged to the still.(3) This increase in particulate is negligible; therefore, no increment is added to the proposed blowing still emission limits when No. 2 fuel oil is fired in the afterburner.

Selection of Visible Emission Limits

An opacity standard is proposed for all the affected facilities to help ensure proper operation and maintenance of control systems on a day-to-day basis. EPA Reference Method 9 was used to take opacity readings for saturators and blowing stills at plants A, B, C, D, and E during particulate emission tests. Opacity readings for storage tanks were taken only at plant F. The 6-minute average opacity readings of the emissions from the saturators ranged from 0 to 16 percent. All the opacity readings for the emissions from the blowing still were 0 percent. All of the 6-minute average opacity readings for the emissions from the asphalt storage tanks were 0 percent.

In a study of the non-metallic minerals industry, EPA Reference Method 9 was used to take opacity readings at the outlet of fabric filters controlling emissions from handling and storage of materials (sand, talc, mineral stabilizer, and granules) similar to those used in the asphalt roofing industry. The opacity emission data from the "Draft Background Information Document for Non-Metallic Mineral Processing Plants" were used to establish the proposed opacity emission limit for mineral handling and storage facilities in the asphalt roofing industry. Ninety-two percent of the 6-minute averages showed zero percent opacity. The remaining 6-minute averages were greater than zero but less than or equal to 1 percent opacity.

The proposed opacity standards are set at or above the upper limit of the opacity data collected during the emissions testing program. The proposed standards are 0 percent opacity for blowing stills, 20 percent opacity for saturators, 0 percent opacity for asphalt storage tanks, and 1 percent opacity for minerals handling and storage.

A fugitive emission standard is proposed to ensure good capture of fugitive emissions from the saturator. During the emission testing program, several canopy hoods and one total enclosure hood were observed. Only the total enclosure hood achieved good capture of fugitive emissions. Total enclosure hoods can be used for new, modified, or reconstructed facilities. Therefore, total enclosure hoods were selected to represent the best technological system for continuous capture of fugitive emissions from saturators.

Only the total enclosure hood at plant B was available for testing at the time the emissions testing program was conducted. Observations of visible emissions at this plant form the basis of the proposed emission standard. During the emission testing program at plant B, the consecutive periods of observations taken while the saturator was operating under representative conditions (when the line speed was >80 percent of usual daily line speed) totaled 5.5 hours. Fugitive emissions were visible for not more than 16.7 percent of the time during any period of consecutive observations totaling 60 minutes, 12 percent of the time during any period of consecutive observations totaling 120 minutes, and 8 percent of the time during the full 5.5 hours of observations.

A period of consecutive observations, taken during representative operating conditions, totaling 60 minutes was chosen as a sufficient period of time to assess the performance of the capture system. During the test the highest average reading for such a 60-minute period was 16.7 percent. The proposed emission limit allows visible emissions from saturators for 20 percent of any period of consecutive observations, during representative operating condition, totaling 60 minutes.

Modification/Reconstruction Considerations

The proposed standards of performance would apply to saturators, blowing stills, asphalt storage tanks, and mineral handling and storage facilities. Any physical or operational change that increases the emissions to the atmosphere in kilograms per hour from any one of these facilities could be considered a modification according to Section 60.14 of Title 40 of the Code of Federal Regulations (CFR) and if so would subject that facility to the standards of performance. There are several physical and operational changes that may increase emissions to the atmosphere but are exempt from the modification provision. One such exemption is for a production rate increase that is accomplished without a capital expenditure. Asphalt roofing production lines are designed to operate at maximum line speeds (e.g., 600 feet per minute). Initial startup and operation of the production line is at a lower speed that the design capacity. Typically, the line speed is gradually increased, sometimes over a period of years, to approach the designed line speed. Because the line was originally designed for a maximum attainable line speed, there is no capital expediture, as defined in Section 60.14 Title 40 CFR, associated with any increases in line speed up to the designed capacity. These production rate increases are not considered to be modifications.

Other physical and operational changes which are exempted from the modification provision are maintenance, repair, and replacement determined to be routine; an increase in the hours of operation; and the addition or use of an air pollution control device that is environmentally beneficial. The use of alternative fuel or raw material, such as a different asphalt flux, is not a modification if the facility was designed to accommodate that alternative use. Physical and operational changes which do not increase the emission rate to the atmosphere would not be considered as modifications and therefore would not be covered by the standards.

"Reconstruction" means the replacement of components of an existing facility to such an extent that the fixed capital cost of the new components exceeds 50 percent of the fixed capital cost that would be required to construct a comparable entirely new facility and that it is technologically and economically feasible to meet the applicable standard set forth in Part 60. Reconstruction as defined in § 60.15(b) of title 40 CFR Part 60 would apply to each affected facility individually. For example, if a saturator is changed to the extent that it is considered reconstructed and is, therefore, required to conform to the proposed standards, this woud not cause the other facilities of an asphalt roofing plant to be subject to the provisions of the proposed standards.

It is technologically feasible and economically reasonable to install the same particulate control devices on modified or reconstructed facilities as would be installed on newly constructed facilities. Therefore, no special exemptions for modified and reconstructed facilities are included in the proposed standards of performance.

Selection of Performance Test Methods

Reference Method 5, "Determination of Particulate Emissions from Stationary Sources," was examined to determine its applicability to the asphalt processing and asphalt roofing industry. It was decided that this method was not suitable for determining particulate emissions from asphalt processing and asphalt roofing plants. Therefore, a program was initiated to develop a test method for particulate emissions from sources in these plants. The test method developed was Reference Method 26, "Determination of Particulate Emissions from the Asphalt Processing and Asphalt Roofing Industry." Emission measurements were conducted at seven asphalt roofing plants using this method.

In summary, problems associated with the use of Method 5 for asphalt processing and asphalt roofing plants were: (1) The filtration temperature was too high; (2) there was no precollector filter to reduce oil droplet loading; (3) the cleanup reagent did not effectively dissolve baked-on oil and asphalt; (4) sample loss occurred during analytical procedures; and (5) there was inadequate recovery of samples from condensed water collected in the cyclone collection flask. The following paragraphs explain how Method 26 alleviates the problems associated with Method 5.

At the collection temperature specified in Method 5, 121°C (250°F), a portion of the liquid particulate from asphalt processing and asphalt roofing plants vaporizes and passes through the particulate sampling device as a gas. The change of filtration temperature to 52°C (126°F) in Method 26 reduces this problem and provides a consistent basis for evaluating different control systems and the emissions from different plants. The data used in setting the emission limits proposed for saturators were collected at or below the 52°C (126°F) filtration temperature.

In Method 26 a precollector filter is used to reduce the oil droplet loading on the primary filter, which prevents oil from seeping through the glass fiber filter mat during periods of high droplet concentrations.

The cleanup reagent specified in Method 26 is 1,1,1-trichloroethane (TCE). The acetone used in Method 5 does not remove all baked-on oil and tar from the sampling apparatus. TCE is effective in dissolving the baked-on oil and asphalt.

The analytical procedure developed for Method 26 minimizes sample loss through evaporation. Experimental results showed that the weight loss from the evaporation process was minimal.

Collection and analytical procedures for condensed water were developed for Method 26. When Method 5 was used, condensation occurred in the filtration section of the sample train when the moisture content of the stack gases was above 10 percent. These conditions occurred during blowing still tests but not during saturator tests.

Method 26 is an effective test procedure for sampling emissions from asphalt processing and asphalt roofing plants and is being proposed with the proposed standards as the performance test method for particulate emissions from asphalt processing and asphalt roofing plants.

Reference Method 26, "Determination of Particulate Emissions from the

Asphalt Processing and Asphalt Roofing Industry," specifies: (1) Measurement system design criteria; (2) measurement system performance specifications and performance test procedures; and (3) procedures for emission sampling. Two hours per run is proposed as the sampling time for emission testing because this is sufficient time to collect a representative sample from asphalt processing and asphalt roofing plants. Each performance test would consist of three runs. Method 26 is sufficiently similar to Method 5 that test personnel experienced with Method 5 should have no difficulty obtaining reliable data.

Reference Method 22, "Visual Determination of Fugitive Emissions From Material Processing Sources," is being proposed as a performance test method to determine compliance with standards of performance limiting fugitive emissions from asphalt saturator capture systems. Reference Method 22 was developed because fugitive emissions from saturator capture systems may occur within asphalt roofing plant buildings where lighting and background conditions needed for opacity readings are not attainable.

Reference Method 9, "Visual Determination of the Opacity of Emissions from Stationary Sources," is selected as a test method to determine compliance with standards of performance limiting particulate emissions from asphalt processing and asphalt roofing plants. Reference Method 9 is used to read opacity of emissions from exhaust stacks of control devices which are outside the plant. Opacity readings can be used to indicate whether a control device is being properly operated and maintained.

Selection of Monitoring Requirements

Monitoring requirements can provide a convenient means for enforcement personnel to ensure that emission control systems are properly operated and maintained. For blowing stills and saturators, the most straightforward means of ensuring proper operation and maintenance of the control device would be to monitor particulate emissions. However, no continuous particulate monitors are available for this industry. Resolution of the sampling problems and development of performance standards for continuous particulate monitors would entail a major development program. For these reasons, continuous monitoring of particulate emissions from the asphalt processing and asphalt roofing industry is not required by the proposed standards.

Opacity can be used as an indication of poor operation of the control device. If the opacity from the control device exceeds the proposed limit, it is an indication that a control device is not operating properly and may not be meeting the particulate emission limit. However, the absence of opacity does not always indicate that the emission limit is being met.

The only instrument for continuous measurement of opacity is the transmissometer which is not ideally suited to the measurement of opacity in the effluent gas streams at asphalt processing and asphalt roofing plants. The particulate emissions from these plants are liquid hydrocarbon mixtures that are converted to gases by the temperatures that are present in th effluent gas streams. The gaseous emissions would not be detected by the transmissometer, but will recondense and be visible in the atmosphere. For these reasons, continuous monitoring of opacity is not required.

The proposed standards would require continuous recording of the operating temperature which is critical to the effectiveness of the control devices upon which the proposed standards are based. This requirement would apply to the temperature in the combustion zone of an afterburner and to the inlet temperature for a high velocity air filter (HVAF) or an electrostatic precipitator (ESP). If the average temperature over any 6-hour period of operation was below that measured during the performance test for afterburners or above that measured for HVAF's or ESP's, by definition excess emissions would have occurred. The plant owner or operator would have to report the occurrence of excess emissions in a quarterly report. A 6-hour averaging time for temperature was selected because this corresponds to the period of time required for a performance test. Other parameters to be monitored may be specified by the Administrator if the temperature of a control device used to meet the standards is not critical to the performance of the device.

Comments were received from the industry contending that if a performance test on a saturator control device (HVAF or ESP) were run during cold weather, the operating temperature measured may be lower than if the performance test were run in warm weather. The temperature value that is measured during a performance test in which the numerical emission limit is met would be the temperature value used to determine excess emissions that must be reported. If the performance test were run in cold weather, the extra cooling by the ambient air might cause the established temperature to be lower than is actually necessary to meet the proposed emission limit. Further, this temperature value might be impossible to maintain in warm weather. Therefore, a temperature value established in a cold weather performance test may actually be lower than the temperature at which the inlet gases should be maintained to meet the emission limit. The temperature attainable during warm weather may indicate excess emissions when in fact the emission levels are not in excess of the numerical emission limit. For this reason, the proposed standards allow plant owners and operators the option of repeating the performance test to establish a new value for the temperature which indicates the occurrence of excess emissions.

Records of temperature measurements would have to be retained for at least 2 years following the date of the measurements by owners and operators subject to this subpart. This requirement is included under § 60.7(d) of the General Provisions of 40 CFR part 60.

Impacts of Reporting Requirements

The proposed standards would require asphalt processing and asphalt roofing plants to submit reports to the Administrator so that he can ensure compliance with the regulation. The proposed standards would require four types of reports. First, there are notification reports required under the General Provisions that would enable the Agency to keep abreast of facilities subject to the standards of performance. Second, there are reports of performance test results. Third, there are performance evaluations of the temperature monitoring and recording system. Fourth, there are quarterly reports of excess emissions which would permit the Agency to determine whether the emission control system installed to comply with the standards is being properly operated and maintained.

Section 60.7(b) of Part 60 Subpart A of the Code of Federal Regulations (CFR) requires an owner or operator of a plant to maintain records of all startups, shutdowns, or malfunctions of an affected facility. Section 60.7(c) requires submittal of quarterly reports of excess emissions and identification of any periods of excess emissions from any affected facility when startups, shutdowns, and malfunctions occurred. A primary purpose of maintaining records of startups, shutdowns, and malfunctions at a plant is for later use in the quarterly reports identifying the occurrence and duration of excess emissions.

Clarification of what constitutes startup, shutdown, and malfunction as opposed to normal operation in asphalt roofing and asphalt processing plants is necessary to avoid unnecessary and burdensome recordkeeping.

Air blowing of asphalt is usually a batch operation. Saturant and coating asphalts are produced by blowing air through hot asphalt flux in a blowing still. A minimum of four batches will be blown each operating day at a typical asphalt roofing plant. The beginning and ending of a batch is considered to be normal operation and excess emissions are not expected to occur during these times. Therefore, it is not necessary to record the beginning and ending of each batch as startup and shutdown.

The production of saturated felt, roll roofing and shingles is a continuous process. Saturated felt is produced by applying hot saturant asphalt to a felt made of paper. Coating asphalt is then applied to the saturated felt to produce roll roofing. Roll roofing is further processed by adding talc to one side of the felt and mineral aggregate to the other side to produce asphalt shingles. The typical asphalt roofing production line operates 16 hours per day, 5 to 6 days per week, and 50 weeks per year. Breaks in the felt may cause temporary halts in production several times during each operating day. However, the emission control equipment would operate continuously with no increase of emissions to the atmosphere. Since temporary halts in the production line to repair breaks in the felt are considered to be normal operation and would not by themselves result in excess emissions, they do not need to be recorded as startup, shotdown, or malfunction.

The resources needed by the industry to maintain records, to collect data, and to prepare the reports through the first 5 years would be about 3,200 man-hours. These figures are based on the assumption that the proposed standards would cover three new, modified, or reconstructed asphalt roofing manufacturing plants, with blowing stills, through the first 5 years.

Using the growth projections made by industry representatives, the resources needed by the industry to maintain records, to collect data, and to prepare the reports through the first 5 years would be about 30,000 man-hours.

Public Hearing

A public hearing will be held to discuss the proposed standards in accordance with Section 307(d)(5) of the Clean Air Act. Persons wishing to make oral presentations should contact EPA at the address given in the Addresses section of this preamble. Oral presentations will be limited to 15 minutes each. Any member of the public may file a written statement before, during, or within 30 days after the hearing. Written statements should be addressed to the Central Docket Section address given in the Addresses section of this preamble.

A verbatim transcript of the hearing and written statements will be available for public inspection and copying during normal working hours at EPA's Central Docket Section in Washington, D.C. (see Addresses section of this preamble).

Docket

The docket is an organized and complete file of all the information submitted to or otherwise considered in the development of this proposed rulemaking. The principal purposes of the docket are (1) to allow interested parties to readily identify and locate documents so that they can intelligently and effectively participate in the rulemaking process, and (2) to serve as the record in case of judicial review.

Miscellaneous

As prescribed by Section 111, establishment of standards of performance for affected facilities in asphalt roofing plants; asphalt blowing stills and asphalt storage tanks in oil refineries and asphalt processing plants was preceded by the Administrator's determination (40 CFR 60.16, 44 FR 49222, dated August 21, 1979) that these sources contribute significantly to air pollution which may reasonably be anticipated to endanger public health or welfare. In accordance with Section 117 of the Act, publication of this proposal was preceded by consultation with appropriate advisory committees, independent experts, and Federal departments and agencies. The Administrator will welcome comments on all aspects of the proposed regulation, including economic and technological issues, and on the proposed test methods.

Comments are specifically invited on the effects of different crude oils and the catalytic blowing of asphalt on particulate emissions. Any comments submitted to the Administrator on the effects of different crude oils and catalytic blowing of asphalt on particulate emissions should contain emission test data pertinent to an evaluation of the magnitude and severity of its impact and suggested alternative courses of action that would avoid this impact.

It should be noted that standards of performance for new sources established under Section 111 of the Clean Air Act reflect:

> * * * application of the best technological system of continuous emission reduction which (taking into consideration the cost of achieving such emission reduction, and nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated (Section 111(a)(1)).

Although there may be emission control technology available that can reduce emissions below those levels required to comply with standards of performance, this technology might not be selected as the basis of standards of performance due to costs associated with its use. Accordingly, standards of performance should not be viewed as the ultimate in achievable emission control. In fact, the Act requires (or has the potential for requiring) the imposition of a more stringent emission standard in several situations.

For example, applicable costs do not necessarily play as prominent a role in determining the "lowest achievable emission rate" for new or modified sources located in nonattainment areas, i.e., those areas where statutorily-mandated health and welfare standards are being violated. In this respect, Section 173 of the Act requires that new or modified sources constructed in an area which exceeds the National Ambient Air Quality Standard (NAAQS) must reduce emissions to the level which reflects the "lowest achievable emission rate" (LAER), as defined in Section 171(3). The statute defines LAER as that rate of emissions based on the following, whichever is more stringent:

1. The most stringent emission limitation which is contained in the implementation plan of any State for such class or category of source, unless the owner or operator of the proposed source demonstrates that such limitations are not achievable, or
2. The most stringent emission limitation which is achieved in practice by such class or category of source.

In no event can the emission rate exceed any applicable new source performance standard (Section 171(3)).

A similar situation may arise under the prevention of significant deterioration of air quality provisions of the Act (Part C). These provisions require that certain sources (referred to in Section 169(1)) employ "best available control technology" (BACT) as defined in Section 169(3) for all pollutants regulated under the Act. Best available control technology must be determined on a case-by-case basis, taking energy, environmental, and economic impacts and other costs into account. In no event may the application of BACT result in emissions of any

pollutants which will exceed the emissions allowed by any applicable standard established pursuant to Section 111 (or 112) of the Act.

In all events, State Implementation Plans (SIP's) approved or promulgated under Section 110 of the Act must provide for the attainment and maintenance of NAAQS designed to protect public health and welfare. For this purpose, SIP's must in some cases require greater emission reduction than those required by standards of performance for new sources.,

States are free under Section 116 of the Act to establish even more stringent emission limits than those established under Section 111 or those necessary to attain or maintain the NAAQS under Section 110. Accordingly new sources may in some cases be subject to limitations more stringent than standards of performance under Section 111. Prospective owners and operators of new sources should be aware of this possibility in planning for such facilities.

This regulation will be reviewed four years from the date of promulgation as required by the Clean Air Act. This review will include an assessment of such factors as the need for integration with other programs, the existence of alternative methods, enforceability, improvements in emission control technology, and reporting requirements. The reporting requirements in this regulation will be reviewed as required under EPA's sunset policy for reporting requirements in regulations.

Section 317 of the Clean Air Act requires the Administrator to prepare an economic impact assessment for any new source standard of performance under Section 111(b) of the Act. An economic impact assessment was prepared for the proposed regulations and for other regulatory alternatives. All aspects of the assessment were considered in the formulation of the proposed standards to insure that the proposed standards would represent the best system of emission reduction considering costs. The economic impact assessment is included in the background information document.

Dated: November 10, 1980.

Douglas M. Costle,

Administrator.

References

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7. J. A. Danielson (Ed.). Air Pollution Engineering Manual. Prepared by the U.S. Environmental Protection Agency. Publication No. AP-40. p. 176. May 1973.

8. R. H. Perry and C. H. Chilton. Chemical Engineers' Handbook. 5th Ed. New York, McGraw-Hill, 1969. p. 9-10.

It is proposed that 40 CFR Part 60 be amended as follows:

1. By adding Subpart UU as follows:

Subpart UU—Standards of Performance for Asphalt Processing and Asphalt Roofing Manufacture

Sec.

60.470 Applicability and designation of affected facilities.
60.471 Definitions.
60.472 Standards for particulate matter.
60.473 Monitoring of operations.
60.474 Test methods and procedures.

Authority: Sec. 111, 301(a), Clean Air Act, as amended, (42 U.S.C. 7411, 7601(a)), and additional authority as noted below.

Subpart UU—Standards of Performance for Asphalt Processing and Asphalt Roofing Manufacture

§ 60.470 Applicability and designation of affected facilities.

(a) The provisions of this subpart are applicable to the following affected facilities: Saturators; mineral handling and storage facilities; asphalt storage tanks; and blowing stills used for asphalt processing and asphalt roofing manufacture.

(b) The provisions of this subpart apply to any affected facility identified in paragraph (a) of this section, the construction or modification of which is begun after ———— (date of publication in the Fedral Register).

§ 60.471 Definitions.

As used in this subpart, all terms not defined herein shall have the meaning given them in the Act and in Subpart A of this part.

"Afterburner (A/B)" means an exhaust gas incinerator used to control emissions of particulate matter.

"Asphalt processing" means the storage and blowing of asphalt at asphalt roofing plants, oil refineries, and asphalt processing plants for use in the manufacture of asphalt roofing products.

"Asphalt roofing manufacture" means production of asphalt roofing (shingles, roll roofing, siding, or saturated felt).

"Asphalt storage tank" means any tank used to store hot asphalt for asphalt roofing manufacture or asphalt processing. Storage tanks may be located at asphalt roofing plants, oil refineries, and asphalt processing plants.

"Blowing still" means the equipment in which air is blown through hot asphalt flux to produce different grades of asphalt for the manufacture of asphalt roofing.

"Catalyst" means a substance which, when added to asphalt flux in a blowing still, alters the penetrating-softening point relationship and increases the rate of oxidation of the flux.

"Coating blow" means the process in which air is blown through hot asphalt flux to produce coating asphalt. The coating blow starts when the air is turned on and stops when the air is turned off.

"Electrostatic precipitator (ESP)" means an air pollution control device in which solid or liquid particulates in a gas stream are charged as they pass through an electric field and precipitated on a collection surface.

"High velocity air filter (HVAF)" means an air pollution control filtration device for the removal of sticky, oily, or liquid aerosol particulate matter from exhaust gas streams.

"Mineral handling and storage facility" means the areas in asphalt roofing plants in which minerals are unloaded from a carrier, the conveyor transfer points between the carrier and the storage silos, and the storage silos.

"Saturant blow" means the process in which air is blown through hot asphalt flux to produce saturant asphalt. The saturant blow starts when the air is turned on and stops when the air is turned off.

"Saturator" means the equipment in which asphalt is applied to felt to make asphalt roofing products. The term saturator includes the saturator, wet looper and coater.

§ 60.472 Standards for particulate matter.

(a) On or after the date on which the performance test required to be conducted by § 60.8 is completed, no owner or operator subject to the provisions of this subpart shall cause to be discharged into the atmosphere from any saturator:

(1) Particulate matter in excess of:

(A) 0.04 kilograms of particulate per megagram of asphalt shingle or mineral-surfaced roll roofing produced, or

(B) 0.4 kilograms per megagram of saturated felt or smooth-surfaced roll roofing produced;

(2) Exhaust gases with opacity greater than 20 percent; and

(3) Any visible emissions from a saturator capture system for more than 20 percent of any period of consecutive valid observations totaling 60 minutes.

(b) On or after the date on which the performance test required to be conducted by § 60.8 is completed, no owner or operator subject to the provisions of this subpart shall cause to be discharged into the atmosphere from any blowing still:

(1) Particulate matter in excess of 0.67 kilograms of particulate per megagram of asphalt charged to the still when a catalyst is added to the still; and

(2) Particulate matter in excess of 0.71 kilograms of particulate per megagram of asphalt charged to the still when a catalyst is added to the still and when No. 6 fuel oil is fired in the afterburner; and

(3) Particulate matter in excess of 0.60 kilograms of particulate per megagram of asphalt charged to the still during blowing without a catalyst; and

(4) Particulate matter in excess of 0.64 kilograms of particulate per megagram of asphalt charged to the still during blowing without a catalyst and when No. 6 fuel oil is fired in the afterburner; and

(5) Exhaust gases with an opacity greater than 0 percent.

(c) On or after the date on which the performance test required to be conducted by § 60.8 is completed, no owner or operator subject to the provisions of this subpart shall cause to be discharged into the atmosphere from any asphalt storage tank exhaust gases with opacity greater than 0 percent. If, however, the emissions from any asphalt storage tank(s) are ducted to a control device for a saturator, the combined emissions shall meet the emission limit contained in paragraph (a) of this section during the time the saturator control device is operating. At any other time the asphalt storage tank(s) must meet the 0 percent opacity limit.

(d) On or after the date on which the performance test required to be conducted by § 60.8 is completed, no owner or operator subject to the provisions of this subpart shall cause to be discharged into the atmosphere from any mineral handling and storage facility emissions with opacity greater than 1 percent.

§ 60.473 Monitoring of operations.

(a) The owner or operator subject to the provisions of this subpart, and using either an electrostatic precipitator or a high velocity air filter to meet the emission limit in § 60.472(a)(1) and/or (b)(1) shall continuously monitor and record the temperature of the gas at the inlet of the control device. The temperature monitoring instrument shall have an accuracy of ±5°C over its range.

(b) The owner or operator subject to the provisions of this subpart and using an afterburner to meet the emission limit in § 60.472(a)(1) and/or (b)(1) shall continuously monitor and record the temperature in the combustion zone of the afterburner. The monitoring instrument shall have an accuracy of ±10°C over its range.

(c) An owner or operator subject to the provisions of this subpart and using a control device not mentioned in paragraphs (a) and (b) of this section shall provide to the Administrator information describing the operation of the control device and the process parameter(s) which would indicate proper operation and maintenance of the device. The Administrator may require continuous monitoring and will determine the process parameters to be monitored.

(d) For the purpose of reports required under § 60.7(c), periods of excess emissions that shall be reported are defined as any 6-hour period during which the average temperature measured in accordance with paragraph (a) of this section is above the temperature measured in accordance with § 60.474 (h) or (i) at a time when the emission limits in § 61.472 (a) or (b) were met, or the average temperature measured in accordance with paragraph (b) of this section falls below the temperature measured in accordance with § 60.474 (h) or (i) at a time when the emission limits in § 61.472 (a) or (b) were met. Each excess emission report shall include the value identified for the temperature specified under § 60.474 (h) or (i) and the monitored temperature value.

(Sec. 114, Clean Air Act as amended (42 U.S.C. 7414))

§ 60.474 Test methods and procedures.

(a) Reference methods in Apendix A of this part, except as provided in § 60.8(b), shall be used to determine compliance with the standards prescribed in § 60.472 as follows:

(1) Method 26 for the concentration of particulate matter;

(2) Method 1 for sample and velocity traverses;

(3) Method 2 for velocity and volumetric flow rate;

(4) Method 3 for gas analysis; and

(5) The Administrator will determine compliance with the standards prescribed in § 60.472(a)(3) by using Method 22. During the test run, readings are to be recorded every 15 seconds for a period of consecutive observations during representative conditions (in accordance with § 60.8(c) of the General Provisions) totaling 60 minutes. A performance test shall consist of one run.

(b) For Method 26 the sampling time for each run on a saturator shall be at least 120 minutes, and the sampling volume shall be at least 3 dscm. Method 26 shall be used to measure the emissions from the saturator while the asphalt roofing plant is making 106.6-kg (235-lb) asphalt shingle if the final product is shingle or mineral-surfaced roll roofing or while the asphalt roofing plant is making 6.8-kg (15-lb) saturated felt if the final product is saturated felt or smooth-surfaced roll roofing. Method 26 shall be used to measure emissions from the blowing still for at least 90 minutes or for the duration of the coating blow whichever is greater. If the blowing still is not used to blow coating asphalt, Method 26 shall be used to measure emissions from the blowing still for at least 90 minutes or for the duration of the saturant blow, whichever is greater.

(c) The particulate emission rate, E, shall be computed as follows:

$$E = Q_{sd} \times C_s$$

(1) E is the particulate emission rate (kg/h);

(2) Q_{sd} is the average volumetric flow rate (dscm/h) as determined by Method 2; and

(3) C_s is the average concentration (kg/dscm) of particulate matter as determined by Method 26.

(d) The asphalt roofing production rate, P (Mg/h), shall be determined by dividing the weight in megagrams (Mg) of roofing produced on the shingle or saturated felt process lines during the performance test by the number of hours required to conduct the performance test. The roofing production shall be obtained by direct measurement.

(e) The production rate of asphalt from the blowing still, P_s (Mg/h), shall be determined by dividing the weight of asphalt charged to the still by the time required for the performance test during a coating asphalt blow. The weight of asphalt charged to the still shall be determined at the starting temperature of the coating blow. The weight of asphalt shall be converted from the volume measurement as follows:

M = Vd/c
M = weight of asphalt in megagram
V = volume of asphalt in cubic meters
d = density of asphalt in kilograms per cubic meter
c = conversion factor 1.000 kilograms per megagram

The density of asphalt at any measured temperature is calculated by using the following equation:

$d = 1056.1 - 0.6176 \times °C$

The method of measurement shall have an accuracy of ±10 percent.

(f) The saturator emission rate shall be computed as follows:

$R = E/P$

(g) The blowing still emission rate shall be computed as follows:

$R_s = E/P_s$

where:

(1) R is the saturator emission rate (kg/Mg):
(2) R_s is the blowing still emission rate (kg/Mg):
(3) E is the particulate emission rate (kg/hr) from paragraph (c) of this section:
(4) P is the asphalt roofing production rate (Mg/h): and
(5) P_s is the asphalt charging rate (Mg/h).

(h) Temperature shall be measured and continuously recorded with the monitor required under § 60.473 (a) or (b) during the measurement of particulate by Method 26.

(i) If at a later date the owner or operator believes the emission limits in § 60.472 (a) and (b) are being met even though the temperature measured in accordance with § 60.473 paragraphs (a) or (b) is exceeding that measured during the performance test, he may submit a written request to the Administrator to repeat the performance test and procedure outlined in paragraph (h) of this section.

(Sec. 114, Clean Air Act as amended (42 U.S.C. 7414))

2. By adding Method 26 and Method 22 to Appendix A as follows:

Appendix A—Reference Methods

* * * * *

Method 26—Determination of Particulate Emissions From the Asphalt Processing and Asphalt Roofing Industry

1. *Applicability and Principle.*

1.1 *Applicability.* This method applies to the determination of particulate emissions from asphalt roofing industry process saturators, blowing stills, and other sources as specified in the regulations.

1.2 *Principle.* Particulate matter is withdrawn isokinetically from the source and collected on a glass fiber filter maintained at a temperature no greater than 52° C (126° F). The particulate mass, which includes any material that condenses at or above the filtration temperature, is determined gravimetrically after removal of uncombined water.

2. *Apparatus.*

2.1 *Sampling Train.* The sampling train configuration is the same as shown in Figure 5-1 of Method 5, except a precollector cyclone is added between the probe and the heated filter and is located in the heated section of the train. The sampling train consists of the following components:

2.1.1 *Probe Nozzle, Pitot Tube, Differential Pressure Gauge, Filter Holder, Condenser, Metering System, Barometer, and Gas Density Determination Equipment.* Same as Method 5, Sections 2.1.1, 2.1.3 to 2.1.5, and 2.1.7 to 2.1.10, respectively.

2.1.2 *Probe Liner.* Same as in Reference Method 5, Section 2.1.2, with the note that at high stack gas temperatures [greater than 250 C (480° F)], water-cooled probes may be required to control the probe exit temperature to no greater than about 52° C (126° F).

2.1.3 *Precollector Cyclone.* Borosilicate glass following the construction details shown in APTD-0581.

Note.— The tester shall use the cyclone when the stack gas moisture is greater than 10 percent or when the stack gas oil concentration is high enough to cause oil to seep through the glass mat filter. The tester need not use the precollector cyclone or glass wool under other, less severe test conditions.

2.1.4 *Filter Heating System.* Any heating (or cooling) system capable of maintaining a sample gas temperature at the exit end of the filter holder during sampling of no greater than 52° C (126° F). Install a temperature gauge capable of measuring temperature to within 3° C (5.4° F) at the exit end of the filter holder so that the sample gas temperature can be regulated and monitored during sampling. The tester may use systems other than the one shown in APTD-0581.

2.2 *Sample Recovery.* The equipment required for sample recovery is as follows:

2.2.1 *Probe-Liner and Probe-Nozzle Brushes, Graduated Cylinder and/or Balance, Plastic Storage Containers, and Funnel and Rubber Policeman.* Same as Method 5, Sections 2.2.1, 2.2.5, 2.2.6, and 2.2.7, respectively.

2.2.2 *Wash Bottles.* Glass.

2.2.3 *Sample Storage Containers.* Chemically resistant, borosilicate glass bottles, with rubber-backed Teflon screw cap liners or caps that are constructed so as to be leak-free and resistant to chemical attack by 1,1,1-trichloroethane (TCE), 500-ml or 1000-ml. (Narrow mouth glass bottles have been found to be less prone to leakage.)

2.2.4 *Petri Dishes.* Glass, unless otherwise specified by the Administrator.

2.2.5 *Funnel.* Glass.

2.3 *Analysis.* For analysis, the following equipment is needed:

2.3.1 *Glass Weighing Dishes, Desiccator, Analytical Balance, Balance, Hygrometer, and Temperature Gauge.* Same as Method 5, Sections 2.3.1 to 2.3.4, 2.3.6, and 2.3.7, respectively.

2.3.2 *Beakers.* Glass, 250-ml and 500-ml.

2.3.3 *Separatory Funnel.* 100-ml or greater.

3. *Reagents.*

3.1 *Sampling.* The reagents used in sampling are as follows:

3.1.1 *Filters, Silica Gel, and Crushed Ice.* Same as Method 5, Sections 3.1.1, 3.1.2, and 3.1.4, respectively.

3.1.2 *Precollector Glass Wool.* No. 7220, Pyrex brand or equivalent.

3.1.3 *Stopcock Grease.* TCE-insoluble, heat-stable grease (if available). This is not necessary if screw-on connectors with Teflon sleeves, or similar, are used.

3.2. *Sample Recovery.* Reagent grade 1,1,1-trichloroethane (TCE), ≦0.001 percent residue, and stored in glass bottles is required. Run TCE blanks prior to field use and use only TCE with low blank values (≦0.001 percent). The tester shall in no case subtract a blank value of greater than 0.001 percent of the weight of TCE used from the sample weight.

3.3 *Analysis.* Two reagents are required for the analysis:

3.3.1 *TCE.* Same as 3.2.

3.3.2 *Desiccant.* Same as Method 5, Section 3.3.2.

4. *Procedure.*

4.1 *Sampling Train Operation.* The complexity of this method is such that, in order to obtain reliable results, testers should be trained and experienced with Method 5 test procedures.

4.1.1 *Pretest Preparation.* Maintain and calibrate all the components according to the procedure described in APTD-0576, unless otherwise specified herein.

Prepare probe liners and sampling nozzles as needed for use. Thoroughly clean each component with soap and water, followed by a minimum of three TCE rinses. Use the probe and nozzle brushes during at least one of the TCE rinses (refer to Section 4.2 for rinsing techniques). Cap or seal the open ends of the probe liners and nozzles to prevent contamination during shipping.

Prepare silica gel portions and glass filters as specified in Method 5, Section 4.1.1.

Prepare cyclone precollector systems for use as follows: Desiccate or oven-dry plugs of glass wool as needed and weigh these to a constant weight (use techniques similar to those described above for glass fiber filters). Place each tared glass wool plug in a labeled petri dish. Next, thoroughly clean equal numbers of glass cyclones and 125-ml Erlenmeyer flasks, using soap and water, followed by several TCE rinses. Pair each cyclone with a flask and identify (mark or label) each piece of glassware. Determine the tare weight of each glass cyclone to the nearest 0.1 mg. Seal the open ends of each flask and cyclone to prevent contamination during transport.

4.1.2 *Preliminary Determinations.* Select the sampling site, probe nozzle, and probe length as specified in Method 5, Section 4.1.2.

Select a total sampling time greater than or equal to the minimum total sampling time specified in the test procedures section of the applicable regulation. Follow the guidelines outlined in Method 5, Section 4.1.2, for sampling time per point and total sample volume collected.

4.1.3 *Preparation of Collection Train.* Prepare the collection train as specified in Method 5, Section 4.1.3 with the addition of the following.

If a precollector cyclone is to be used with a tared glass wool plug (see note in Section 2.1.2), prepare this by placing the glass wool plug into the inlet section of the cyclone near the top. Loosely pack the glass wool so as to

avoid high pressure drops in the sampling train. See Figure 26–1. Connect the cyclone to the correpsonding 125-ml Erlenmeyer flask.

Set up the sampling train as shown in Figure 5–1 of Method 5 with the addition of the precollector cyclone, if used, between the probe and filter holder. Use no stopcock grease on ground glass joints unless the grease is insoluble in TCE.

4.1.4 *Leak Check Procedures.* Follow the procedures given in Method 5, Sections 4.1.4.1 (Pretest Leak Check), 4.1.4.2 (Leak Check During Sample Run), and 4.1.4.3 (Post-Test Leak Check).

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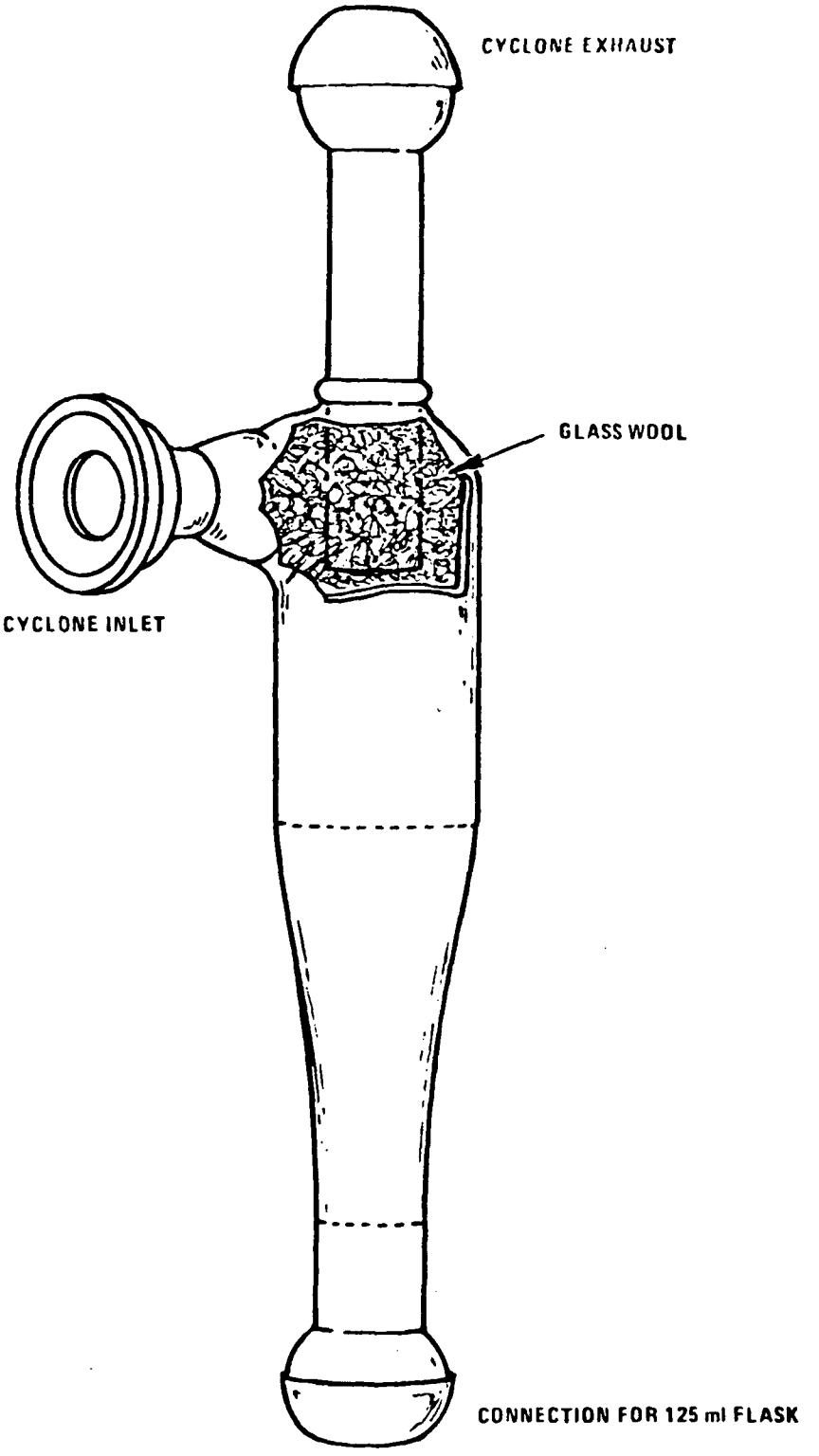

Figure 26-1. Precollector cyclone with glass wool plug.

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4.1.5 *Particulate Train Operation.* Operate the sampling train as described in Method 5, Section 4.1.5, except maintain the gas temperature exiting the filter at no greater than 52°C (126°F).

4.1.6 *Calculation of Percent Isokinetic.* Same as in Method 5, Section 4.1.6.

4.2 *Sample Recovery.* Begin proper cleanup procedure as soon as the probe is removed from the stack at the end of the sampling period. Allow the probe to cool. When the probe can be safely handled, wipe off all external particulate matter near the tip of the probe nozzle and place a cap over it to prevent losing or gaining particulate matter. Do not cap off the probe tip tightly while the sampling train is cooling as this would create a vacuum in the filter holder, thus drawing water from the impingers into the filter holder.

Before moving the sampling train to the cleanup site, remove the probe from the sampling train, wipe off the stopcock grease, and cap the open outlet of the probe. Be careful not to lose any condensate that might be present. Wipe off the stopcock grease from the filter inlet where the probe was fastened and cap it. Remove the umbilical cord from the last impinger and cap the impinger. If a flexible line is used between the first impinger or condenser and the filter holder, disconnect the line at the filter holder and let any condensed water or liquid drain into the impingers or condenser. After wiping off the stopcock grease, cap off the filter holder outlet and impinger inlet. The tester may use either ground-glass stoppers, plastic caps, or serum caps to close these openings.

Transfer the probe and filter-impinger assembly to a cleanup area which is clean and protected from the wind so that the chances of contaminating or losing the sample will be minimized.

Inspect the train prior to and during disassembly and note any abnormal conditions. Treat the samples as follows:

4.2.1. *Container No. 1 (Filter).* Carefully remove the filter from the filter holder and place it in its identified petri dish container.

Use a pair of tweezers and/or clean disposable surgical gloves to handle the filter. If it is necessary to fold the filter, do so such that the film of oil is inside the fold. Carefully transfer to the petri dish any particulate matter and/or filter fibers which adhere to the filter holder gasket, by using a dry nylon bristle brush and/or a sharp-edged blade. Seal the container.

4.2.2 *Container No. 2 (Cyclone).* Remove the Erlenmeyer flask from the cyclone. Using glass or other nonreactive caps, seal the ends of the cyclone and store for shipment to the laboratory. Do not remove the glass wool plug from the cyclone.

4.2.3 *Container No. 3 (Probe to Filter Holder).* Taking care to see that material on the outside of the probe or other exterior surfaces does not get into the sample, quantitatively recover particulate matter or any condensate from the probe nozzle, probe fitting, probe liner, cyclone collector flask, and front half of the filter holder by washing these components with TCE and placing the wash in a glass container. Carefully measure the total amount of TCE used in the rinses. Perform the TCE rinses as follows:

Carefully remove the probe nozzle and rinse the inside surface with TCE from a wash bottle. Brush with a nylon bristle brush and rinse until the TCE rinse shows no visible particles or discoloration, after which, make a final rinse of the inside surface.

Brush and rinse the inside parts of the Swagelok fitting with TCE in a similar way until no visible particles remain.

Rinse the probe liner with TCE. While squirting TCE into the upper end of the probe, tilt and rotate the probe so that all inside surfaces will be wetted. Let the TCE drain from the lower end into the sample container. The tester may use a glass funnel to aid in transferring the liquid washes to the container. Follow the TCE rinse with a probe brush. Hold the probe in an inclined position, squirt TCE into the upper end as the probe brush is being pushed with a twisting action through the probe, hold the sample container underneath the lower end of the probe, and catch any TCE and particulate matter which is brushed from the probe. Run the brush through the probe three times or more until no visible particulate matter is carried out or until no discoloration is observed in the TCE. With stainles steel or other metal probes, run the brush through in the above prescribed manner at least six times, since metal probes have small crevices in which particulate matter can be entrapped. Rinse the brush with TCE and quantitatively collect these washings in the sample container. After the brushing, make a final TCE rinse of the probe as described above.

It is recommended that two people clean the probe to minimize sample losses. Between sampling runs, keep brushes clean and protected from contamination.

Brush and rinse the inside of the cyclone collection flask and the front half of the filter holder. Brush and rinse each surface three times or more, if necessary, to remove visible particulate. Make a final rinse of the brush and filter holder. After all TCE washings and particulate matter have been collected in the sample container, tighten the lid on the sample container so that TCE will not leak out when it is shipped to the laboratory. Mark the height of the fluid level to determine later whether or not leakage occurred during transport. Label the container to clearly identify its contents. Whenever possible, containers should be shipped in such a way that they remain upright at all times.

4.2.4. *Container No. 4 (Silica Gel).* Note the color of the indicating silica gel to determine if it has been completely spent and make a notation of its condition. Transfer the silica gel from the fourth impinger to its original container and seal. The tester may use as aids a funnel to pour the silica gel without spilling and a rubber policeman to remove the silica gel from the impinger. It is not necessary to remove the small amount of dust particles that may adhere to the impinger wall and are difficult to remove. Since the gain in weight is to be used for moisture calculations, do not use any water or other liquids to transfer the silica gel. If a balance is available in the field, follow the procedure for Container No. 4 in Section 4.3.4.

4.2.5 *Impinger Water.* Treat the impingers as follows: Make a notation of any color or film in the liquid catch. Measure the liquid volume in the first three impingers to within ±1 ml by using a graduated cylinder or weigh the liquid to within ±0.5 g by using a balance. Record the volume or weight of liquid present, then discard the liquid. (This volume or weight information is required to calculate the moisture content of the effluent gas.)

4.2.6 *Blank.* Save a portion of the TCE used for cleanup as a blank. Take 200 ml of this TCE directly from the wash bottle being used and place it in a glass sample container labeled "TCE blank."

4.3 *Analysis.* Record the data required on a sheet such as the one shown in Figure 26-2. Handle each sample container as follows:

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Plant: _____

Date: _____

Run No.: _____

Filter No.: _____

Amount liquid lost during transport: _____

TCE blank volume, ml: _____

TCE wash volume, ml: _____

TCE blank concentration, mg/mg (equation 4): _____

TCE wash blank, mg (equation 5): _____

CONTAINER NUMBER	WEIGHT OF PARTICULATE COLLECTED, mg		
	FINAL WEIGHT	TARE WEIGHT	WEIGHT GAIN
1			
2			
3			
Total			
Less TCE blank			
Weight of particulate matter			

	VOLUME OF LIQUID WATER COLLECTED		
	IMPINGER VOLUME, ml	SILICA GEL WEIGHT, g	
FINAL			
INITIAL			
LIQUID COLLECTED			
TOTAL VOLUME COLLECTED		g *	ml

*CONVERT WEIGHT OF WATER TO VOLUME BY DIVIDING TOTAL WEIGHT INCREASE BY DENSITY OF WATER (1g/ml).

$$\frac{\text{INCREASE, g}}{\text{1g/ml}} = \text{VOLUME WATER, ml}$$

Figure 26-2. Analytical data.

BILLING CODE 6560-26-C

4.3.1 *Container No. 1 (Filter).* Transfer the filter from the sample container to a tared glass weighing dish and desiccate for 24 hours in a desiccator containing anhydrous calcium sulfate. Rinse Container No. 1 with a measured amount of TCE and analyze this rinse with the contents of Container No. 3. Weigh the filter to a constant weight. For the purpose of Section 4.3, the term "constant weight" means a difference of no more than 10 percent or 2 mg (whichever is greater) between two consecutive weighings made 24 hours apart. Report the "final weight" to the nearest 0.1 mg as the average of these two values.

4.3.2 *Container No. 2 (Cyclone).* Clean the outside of the cyclone, remove the caps, and desiccate for 24 hours or until any condensed water has evaporated. Weigh the cyclone plus contents (glass wool plug and oil). Determine the weight of the oil by subtracting out the combined tare weight of the cyclone plus glass wool. Transfer the glass wool and cyclone catch into a tared weighing dish; use TCE to aid in the transfer process. Desiccate the cleaned cyclone for 24 hours and reweigh the cyclone. If the final weight of the clean cyclone is within 10 mg of its initial tare weight, report the calculated oil weight. However, if the weight difference is greater, extract the oil from the glass wool (use measured amount of TCE) and analyze this oil solution with Container No. 3. Be careful not to include any of the glass wool fibers.

4.3.3 *Container No. 3 (Probe to Filter Holder).* Before adding either the rinse from Container No. 1 or the TCE-oil mixture from the glass wool extraction to Container No. 3, note the level of liquid in the container and confirm on analysis sheet whether or not leakage occurred during transport. If noticeable leakage occurred, either void the sample or take steps, subject to the approval of the Administrator, to correct the final results.

Measure the liquid in this container either volumetrically to ± ml or gravimetrically to ±0.5 g. Check to see if there is any appreciable quantity or condensed water present in the TCE rinse (look for a boundary layer or phase separation). If the volume of condensed water appears larger than 5 ml, separate the oil-TCE fraction from the water fraction using a separatory funnel. Measure the volume of the water phase to the nearest ml; adjust the stack gas moisture content, if necessary (see Sections 6.4 and 6.5). Next, extract the water phase with several 25-ml portions of TCE until, by visual observation, the TCE does not remove any additional organic material. Evaporate the remaining water fraction to dryness at 93°C (200°F), desiccate for 24 hours, and weigh to the nearest 0.1 mg.

Treat the total TCE fraction (including TCE from filter container rinse, water phase extractions, and glass wool extraction, if applicable) as follows: Transfer the TCE and oil to a tared beaker and evaporate at ambient temperature and pressure. The evaporation of TCE from the solution may take several days. Do not desiccate the sample until the solution reaches an apparent constant volume or until the odor of TCE is not detected. When it appears that the TCE has evaporated, desiccate the sample and weigh it at 24 hour intervals to obtain a "constant weight" (as defined for Container No. 1 above). The "total weight" for Container No. 3 is the sum of the evaporated particulate weight of the TCE-oil and water phase fractions. Report the results to the nearest 0.1 mg.

4.3.4 *Container No. 4 (Silica Gel).* This step may be conducted in the field. Weigh the spent silica gel (or silica gel plus impinger) to the nearest 0.5 using a balance.

4.3.5 *"TCE Blank" Container.* Measure TCE in this container either volumetrically or gravimetrically. Transfer the TCE to a tared 250-ml beaker and evaporate to dryness at ambient temperature and pressure. Desiccate for 24 hours and weigh to a constant weight. Report the results to the nearest 0.1 mg.

5. *Calibration.*

Calibrate the sampling train components according to the indicated sections of Method 5: Probe Nozzle (5.1), Pitot Tube Assembly (5.2), Metering System (5.3), Probe Heater (5.4), Temperature Gauges (5.5), Leak Check of Metering System (5.6), and Barometer (5.7).

6. *Calculations.*

6.1 *Nomenclature.* Same as in Reference Method 5, Section 6.1, with the following additions:

C_t = TCE blank residue concentration, mg/g.
M_t = Mass of residue of TCE after evaporation, mg.
V_{pc} = Volume of water collected in precollector, ml.
V_t = Volume of TCE blank, ml.
V_{tw} = Volume of TCE used in wash, ml.
W_t = Weight of residue in TCE wash, mg.
P_t = Density of TCE, mg/ml (see label on bottle).

6.2 *Dry Gas Meter Temperature and Orifice Pressure Drop.* Using the data obtained in this test, calculate the average dry gas meter temperature and average orifice pressure drop (see Figure 5-2 of Method 5).

6.3 *Dry Gas Volume.* Using the data from this test, calculate $V_{m(std)}$ by using Equation 5-1 of Method 5. If necessary, adjust the volume for leakages.

6.4 *Volume of Water Vapor.*

$$V_{w(std)} = K_1 (V_{lc} + V_{pc}) \quad \text{Eq. 26-1}$$

Where:

$K_1 = 0.00133$ m³/ml for metric units.
$= 0.04707$ ft³/ml for English units.

6.5 *Moisture Content.*

$$B_{ws} = V_{w(std)} / V_{m(std)} + V_{w(std)} \quad \text{Eq. 26-2}$$

Note.—In saturated or water droplet-laden gas streams, two calculations of the moisture content of the stack gas shall be made, one from the impinger and precollector analysis (Equations 26-1 and 26-2) and a second from the assumption of saturated conditions. The lower of the two values of moisture content shall be considered correct. The procedure for determining the moisture content based upon assumption of saturated conditions is given in the note of Section 1.2 of Reference Method 4. For the purpose of this method, the average stack gas temperature from Figure 2 may be used to make this determination, provided that the accuracy of the in-stack temperature sensor is within ±1°C (2°F).

6.6 *TCE Blank Concentration.*

$$C_t = M_t / V_t P_t \quad \text{Eq. 26-3}$$

6.7 *TCE Wash Blank.*

$$W_t = (C_t)(V_{tw})(P_t) \quad \text{Eq. 26-4.}$$

6.8 *Total Paticulate Weight.* Determine the total particulate catch from the sum of the weights obtained from Containers 1, 2, and 3 less the TCE blank.

6.9 *Particulate Concentration.*

$$C_s = K_2 M_n / V_{m(std)} \quad \text{Eq. 26-5}$$

Where:

$K_2 = 0.001$ g/mg.

6.10 *Isokinetic Variation and Acceptable Results.* Method 5, Sections 6.11 and 6.12, respectively.

7. *Bibliography.*

The bibliography for Reference Method 26 is the same as for Method 5, Section 7.

Method 22—Visual Determination of Fugitive Emissions From Material Processing Sources

1. *Introduction.*

This method involves the visual determination of fugitive emissions; i.e., emissions not emitted directly from a process stack or duct. Fugitive emissions inlcude emissions that: (1) Escape capture by process equipment exhaust hoods; (2) are emitted during material transfer; (3) are emitted from buildings housing material processing or handling equipment; (4) are emitted directly from process equipment.

This method determines the amount of time that any visible emissions occur during the observation period; i.e., the accumulated emission time. This method does not require that the opacity of emissions be determined. Since this procedure requires only the determination of whether a visible emission occurs and does not require the determination of opacity levels, observer certification according to the procedures of Reference Test Method 9 are not required. However, it is necessary that the observer is educated on the general procedures for determining the level of visible emissions. As a minimum the observer should be trained regarding the effects on the visibility of emissions caused by background contrast, ambient lighting, observer position relative to lighting, wind, and the presence of uncombined water (condensing water vapor).

2. *Applicability and Principle.*

2.1 Applicability. This method applies to the determination of the frequency of fugitive emissions from stationary sources (located indoors or outdoors) when specified as the test method for determining compliance with new source performance standards.

2.2 Principle. Fugitive emissions produced during material processing, handling, and transfer operations are visibly determined by an observer without the aid of instruments.

3. *Definitions.*

3.1 Emission Frequency. Percentage of time that emissions are visible during the observation period.

3.2 Emission Time. Accumulated amount of time that emissions are visible during the observation period.

3.3 Fugitive Emission. Pollutant generated by an affected facility which is not collected by a capture system and is released to the atmosphere.

3.4 Observation Period. Accumulated time period during which observations are conducted, not to be less than 6 minutes.

4. *Equipment.*

4.1 Stopwatches. Accumulative type, with a sweep second hand and unit divisions of at least 0.5 second; two required.

4.2 Light Meter. Light meter capable of measuring illuminance in the 50- to 200-lux range; required for indoor observations only.

5. *Procedure.*

5.1 Position. Survey the affected facility or building or structure housing the process unit to be observed and determine the locations of potential emissions. If the affected facility is located inside a building, determine an observation location that is consistent with the requirements of the applicable regulation (i.e., outside observation of emissions escaping the building/structure or inside observation of emissions directly emitted from the affected facility process unit).

Then select a position that enables a clear view of the potential emission point(s) of the affected facility or of the building or structure housing the affected facility, as appropriate for the applicable subpart. A position of at least 15 feet but not more than 0.25 mile from the emission source is recommended. For outdoor locations, the observer should be positioned so that the sun is not directly in the observer's eyes.

5.2 Field Records.

5.2.1 Outdoor Location. Record the following information on the field data sheet (Figure 22-1): company name, industry, process unit, observer's name, observer's affiliation, and date. Record also the estimated wind speed, wind direction, and sky condition. Sketch the process unit being observed and note observer location relative to the source and the sun. Indicate the potential and actual fugitive emission points on the sketch.

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FUGITIVE EMISSION INSPECTION
OUTDOOR LOCATION

Company _____	Observer _____
Location _____	Affiliation _____
Company representative _____	Date _____
Sky conditions _____	Wind direction _____
Precipitation _____	Wind speed _____
Industry _____	Process unit _____

Sketch process unit; indicate observer position relative to source and sun; indicate potential emission points and/or actual emission points.

OBSERVATIONS	Clock time	Observation period duration, min:sec	Accumulated emission time, min:sec
Begin observation			
End observation			

Figure 22 1

BILLING CODE 6560-26-C

FUGITIVE EMISSION INSPECTION
INDOOR LOCATION

Company _____	Observer _____
Location _____	Affiliaton _____
Company representative _____	Date _____
Industry _____	Process unit _____

Light type (flourescent, incandescent, natural) _____

Light location (overhead, behind observer, etc.) _____

Illuminance (lux or footcandles) _____

Sketch process unit; indicate observer position relative to source; incicate potential emission points and/or actual emission points.

OBSERVATIONS	Clock time	Observation period duration, min:sec	Accumulated emission time, min:sec
Begin observation	_____		
		_____	_____
	_____		
		_____	_____
	_____		
		_____	_____
	_____		
		_____	_____
	_____		
		_____	_____
	_____		
		_____	_____
End observation	_____		

Figure 22-2

BILLING CODE 6560-26-C

5.2.2 Indoor Location. Record the following information on the field data sheet (Figure 22-2): company name, industry, process unit, observer's name, observer's affiliation, and date. Record, as appropriate, the type, location, and intensity of lighting on the data sheet. Sketch the process unit being observed and note observer location relative to the source. Indicate the potential and actual fugitive emission points on the sketch.

5.3 Indoor Lighting Requirements. For indoor locations, use a light meter to measure the level of illumination at a location as close to the emission source(s) as is feasible. An illumination of greater than 100 lux (10 foot candles) is considered necessary for proper application of this method.

5.4 Observations. Record the clock time when observations begin. Use one stopwatch to monitor the duration of the observation period: start this stopwatch when the observation period begins. If the observation period is divided into two or more segments by process shutdowns or observer rest breaks, stop the stopwatch when a break begins and restart it without resetting when the break ends. Stop the stopwatch at the end of the observation period. The accumulated time indicated by this stopwatch is the duration of the observation period. When the observation period is completed, record the clock time.

BILLING CODE 6560-26-M

40 CFR Part 60

[AD-FRL 1803-2]

Standards of Performance for New Stationary Sources; Asphalt Processing and Asphalt Roofing Manufacture

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule; amendment and clarification.

SUMMARY: On November 18, 1980, "Standards of Performance for New Stationary Sources: Asphalt Processing and Asphalt Roofing Manufacture" were proposed in the **Federal Register** (45 FR

76404). During the public comment period, clarification was requested regarding the applicability of the standards to asphalt processing facilities that prepare blown asphalts used for nonroofing purposes. The amendments are being published to clarify the applicability of the proposed standards and to provide an opportunity for comments from processors of nonroofing asphalts who may be subject to the amended proposed standards.

This notice also pertains to the Amendment to the Priority List (45 FR 76427). It clarifies that asphalt processing refers to blowing stills and storage tanks for roofing and/or nonroofing asphalts that are located at asphalt processing plants, petroleum refineries, and asphalt roofing plants.

DATES: *Comments:* Comments on this amendment must be received by July 10, 1981.

PUBLIC HEARING: A public hearing will be held, if requested. Persons wishing to request a public hearing must contact EPA by June 9, 1981. If a hearing is requested, an announcement of the date and place will appear in a separate Federal Register notice.

ADDRESSES: *Comments:* Comments relating to this amendment only should be submitted (with one duplicate copy) to: Central Docket Section (A-130), Attention: Docket No. OAQPS A-79-39, U.S. Environmental Protection Agency, 401 M Street SW., Washington, D.C. 20460.

Public Hearing. Persons wishing to request a public hearing on the amendment should notify Ms. Naomi Durkee, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone (919) 541-5631.

Background Information Document. The background information document (BID) for the proposed standards may be obtained from the U.S. EPA Library (MD-35), Research Triangle Park, North Carolina 27711, telephone (919) 541-2777. Please refer to "Asphalt Roofing Manufacturing Industry, Background Information for Proposed Standards," EPA-450/3-80-021a.

Docket. A docket, number OAQPS A-79-39, containing information used by EPA in development of the proposed standards, is available for public inspection between 8:00 a.m. and 4:00 p.m. Monday through Friday at EPA's Central Docket Section (A-130), West Tower Lobby, Gallery 1, Waterside Mall, 401 M Street, SW., Washington, D.C. 20460.

FOR FURTHER INFORMATION CONTACT: Ms. Susan R. Wyatt, Emission Standards and Engineering Division (MD-13), Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone (919) 541-5578.

SUPPLEMENTARY INFORMATION:

Amendments to Proposed Standards

"Standards of Performance for New Stationary Sources: Asphalt Processing and Asphalt Roofing Manufacture" were proposed in the November 18, 1980, Federal Register (45 FR 76404). These proposed standards limit particulate emissions from asphalt roofing facilities and from two asphalt processing facilities: blowing stills and storage tanks. The definition of asphalt processing in the proposed regulations referred to the storage and blowing of asphalt "for use in the manufacture of asphalt roofing products." Blowing stills were defined as equipment "in which air is blown through hot asphalt flux to produce different grades of asphalt for the manufacture of asphalt roofing." The asphalt storage tank was defined as a tank storing hot asphalt "for roofing manufacture or asphalt processing." When considered together, these definitions restrict the applicability of the proposed standards to equipment used to produce or store roofing asphalts.

Half of the blown asphalts currently being produced is used in the roofing industry.(*1-3*) The other half includes predominantly those asphalts used for paving but also includes asphalts used for pipe wrapping, pond liners, and mopping grade asphalts. EPA and industry growth projections indicated the necessity for three to seven stills and 21 to about 50 storage tanks respectively, by 1985 to supply the demand for roofing asphalts. However, the market for blown nonroofing asphalts is not expected to grow in the next five years.(*3*) Therefore, construction of new stills and storage tanks subject to the proposed standards of performance is expected to take place only to meet the demand for roofing asphalts.

Comments received after proposal have indicated that even though growth will occur only due to the increased demand for roofing asphalts, the applicability of the proposed standards should include blowing stills and storage tanks that process or store any type of asphalt. The same still and storage tank may be used for nonroofing as well as roofing asphalts. If the applicability of the standards depended on the eventual use of the product, a still or storage tank could be subject to the regulation on one day (while blowing or storing roofing asphalt) but not subject to the regulation on another day (while blowing or storing nonroofing asphalt). Even if the same still or storage tank were not used for more than one type of asphalt, there could be one unit devoted to roofing asphalts and subject to the regulation while another identical unit devoted to nonroofing asphalts would not be subject to the regulation. Furthermore, to meet the increased demand for roofing asphalt, a manufacturer could increase capacity by constructing new stills or storage tanks, but then limit the use of the new facilities to nonroofing asphalts while devoting a larger number of existing facilities to roofing asphalts.

The fluxes from which nonroofing blown asphalts are prepared may vary in physical characteristics, such as volatility, but such variation also exists with roofing asphalt fluxes. Industry supplied information on the range of volatility found among asphalt fluxes that are air blown. It was determined that the standard was achievable for all fluxes within this range as noted in the November 18, 1980 Federal Register notice (45 FR 76410). The size and operating parameters (such as temperature and residence time) of a control device required to achieve the emission limits for the highest volatility fluxes were determined, and costs were calculated accordingly. These costs have been determined to be reasonable for asphalt processing plants, petroleum refineries, and asphalt roofing plants, the same plants that could have blowing stills used for nonroofing blown asphalts. An asphalt storage tank containing asphalt to be used in roofing manufacture is no different from a storage tank containing asphalt that will be used for some other purpose. The number of new stills and storage tanks constructed in the asphalt processing and asphalt roofing industries remains the same as was projected in the proposed regulations since such construction will be due to growth in the asphalt roofing market. Therefore, the environmental, energy, and economic impacts of the proposed standards are not changed as a result of these amendments.

In summary, the same blowing stills and storage tanks are, or may be, used to process or store either nonroofing or roofing asphalts, and the emission limits remain achievable independent of the type of asphalt blown. The costs and the economic, energy, and environmental impacts projected in the November 18, 1980 Federal Register (45 FR 76404) apply to all asphalt blowing stills and storage tanks regardless of how the asphalts will be used. These costs and

impacts were determined to be reasonable. EPA has determined that the proposed emission limits for blowing stills and storage tanks used for roofing asphalts should apply to blowing stills and storage tanks for any type of asphalt except asphalt mixtures referred to as cutback and emulsified asphalts which are not included in this regulation. These proposed amendments would change the definitions of "asphalt processing," "asphalt storage tanks," and "blowing still" to include asphalts used for any purpose. The amendments would also add definitions for "asphalt processing plant" and "asphalt roofing plant" to be consistent with the proposed regulation. The regulation refers to the plants where process operations occur rather than to the processes themselves.

Because there may be some asphalt processing plants or petroleum refineries blowing and/or storing asphalts used for purposes other than roofing, which were not included in the proposed standards but which may be inlcuded in the amended proposed standards, the date used to determine if facilities at these locations are subject to the standards is the proposal date of this amendment rather than the proposal date of the standard. A paragraph has been added to the proposed standards to indicate this.

Minor amendments were made to the performance test procedures to clarify the duration of the tests when stills are being used to process nonroofing asphalts.

Clarification of the Amendment to the Priority List. The Priority List was amended (45 FR 76427) to add "asphalt processing" to the source category previously listed as "asphalt roofing." The amendment was necessary because the processing of asphalt for roofing manufacture takes place at petroleum refineries and asphalt processing plants as well as at roofing plants, and the process is essentially the same at any of the locations. Since "asphalt processing" has been added to the Priority List, no additional changes to the list or to the amendment are necessary; however, the new, broader definition of asphalt processing applies to the Priority List source category.

Applicability of Proposed Standards to Storage Tanks. During the public comment period that followed publication of the proposed standards in the Federal Register (45 FR 76404), several comments were received regarding the applicability of the proposed standards to asphalt storage tanks which may exist at petroleum refineries that do not process asphalt (i.e., that do not have blowing stills). These tanks are covered by the proposed standards. The revised definitions make this clearer. They also expand the applicability to include storage tanks that store asphalt to be used for any purpose, not only roofing products. Cutback asphalts (asphalts diluted with solvents to reduce viscosity so that asphalts can be used at lower temperatures) and emulsified asphalts (asphalts dispersed in water with an emulsifying agent) are not included in the proposed standards. If asphalt is stored at relatively low temperatures and tanks exhibit zero percent opacity without controls, they would meet the proposed standards. Otherwise, controls are available for meeting the proposed standards.

Environmental Energy, and Economic Impacts. The environmental, energy, and economic impacts discussed in the November 18, 1980 Federal Register notice (45 FR 76404) for the proposed standards are not projected to change as a result of these amendments. These impacts were based on the construction of three to seven new stills and 21 to about 50 new storage tanks to meet the growth in the asphalt roofing market. Since there is no growth projected for the use of other blown asphalt products, the number of affected facilities remains the same. Changes to existing stills and storage tanks that would qualify as a modification or reconstruction would be very rare. Any increases in capacity would be met by the addition of a new unit or by replacing a small still or storage tank with a new, larger one. Stills and storage tanks used for nonroofing asphalt may be the same ones used for roofing asphalt or they may be additional units. Either way, they will be located at the same locations (asphalt processing plants, petroleum refineries, and asphalt roofing plants) and will require the same control devices. Since the economic impacts were based on conditions which are applicable to blowing or storing nonroofing asphalts as well as roofing asphalts, these impacts remain unchanged.

"Major Rule" Determination. Under Executive Order 12291, EPA is required to judge whether a regulation is a "major rule" and therefore subject to certain requirements of the Order. The Agency has determined that this regulation, both as proposed and as amended, would result in none of the adverse economic effects set forth in Section 1 of the Order as grounds for finding a regulation to be a "major rule." Fifth-year annualized costs of the proposed standard would be $450,000. The product wholesale price could increase about 0.5 percent, which could increase the price for a roof on a typical 3-bedroom house by about $3.00. If the costs were absorbed, the resulting drop in net profit after taxes could be about 0.4 percent. The Agency has also concluded that this rule is not "major" under either of the other criteria established in the Executive Order. The proposed amendment does not change the economic impacts of the standard. This regulation was submitted to the Office of Management and Budget for review as required by Executive Order 12291.

Regulatory Flexibility Analysis Certification. Pursuant to the provisions of 5 U.S.C. 605(b), I hereby certify that the attached amendments to the proposed rule will not, if promulgated, have a significant economic impact on a substantial number of small entities. The amendments will not affect any small entities since additional stills and storage tanks used for nonroofing asphalts would not exist at these locations.

Dated: May 19, 1981.

Walter C. Barber,

Acting Administrator.

References

(1) Background Information for Proposed Standards—Asphalt Roofing Manufacturing Industry, EPA 450/3-80-021a, June 1980, p. 8-26.

(2) Memo to Docket A-79-39, Calculations for Amount of Asphalt Blown for Roofing, Paving and All Other Uses. Docket No. A-79-39-IV-B-001.

(3) Letter from V. P. Puzinauskas, the Asphalt Institute to R. C. Cooper, MRI. January 1981. Blown asphalt products. Docket No. A-79-39-IV-E-004.

It is proposed to amend 40 CFR Part 60 by amending §§ 60.470, 60.471, and 60.474 to read as follows.

1. Section 60.470 (a) and (b) is revised to read as follows:

§ 60.470 Applicability and designation of affected facilities.

(a) The affected facilities to which this subpart applies are saturators and mineral handling and storage facilities at asphalt roofing plants; and asphalt storage tanks and blowing stills at asphalt processing plants, petroleum refineries, and asphalt roofing plants.

(b) Any saturator or mineral handling and storage facility under paragraph (a) of this section that commences construction or modification on or after November 18, 1980, is subject to the requirements of this subpart. Any asphalt storage tank or blowing still located at an asphalt processing plant, petroleum refinery, or asphalt roofing plant that processes and/or stores

asphalt used for roofing only or for roofing and other purposes, and that commences construction or modification on or after November 18, 1980, is subject to the requirements of this subpart. Any asphalt storage tank or blowing still located at an asphalt processing plant, petroleum refinery, or asphalt roofing plant that processes and/or stores only nonroofing asphalts and that commences construction or modification on or after May 26, 1981 is subject to the requirements of this subpart.

* * * * *

2. Section 60.471 is revised by changing the definitions of "asphalt processing," "aspahlt storage tank," and "blowing still" and by adding the definitions of "asphalt processing plant" and "asphalt roofing plant":

§ 60.741 Definitions.

* * * * *

"Asphalt processing" means the storage and blowing of asphalt.

"Asphalt processing plant" means a plant which blows asphalt for use in the manufacture of asphalt products.

* * * * *

"Asphalt roofing plant" means a plant which produces asphalt roofing products (shingles, roll roofing, siding, or saturated felt).

"Asphalt storage tank" means any tank used to store asphalt at an asphalt roofing plant, a petroleum refinery, and an asphalt processing plant. Storage tanks containing cutback asphalts (asphalts diluted with solvents to reduce viscosity for low temperature applications) and emulsified asphalts (asphalts dispersed in water with an emulsifying agent) are not subject to this regulation.

"Blowing still" means the equipment in which air is blown through asphalt flux to produce different grades of asphalt.

* * * * *

3. Section 60.474 is amended by revising paragraphs (b) and (e) to read as follows:

§ 60.474 Test methods and procedures.

* * * * *

(b) For Method 26 the sampling time for each run on a saturator shall be at least 120 minutes, and the sampling volume shall be at least 3 dscm. Method 26 shall be used to measure the emissions from each saturator while the asphalt roofing plant is making 106.6-kg (125-lb) asphalt shingle if the final product is shingle or mineral-surfaced roll roofing or while the asphalt roofing plant is making 6.8-kg (15-lb) saturated felt if the final product is saturated felt or smooth-surfaced roll roofing. Method 26 shall be used to measure emissions from the blowing still for at least 90 minutes or for the duration of the coating blow, whichever is greater. If the blowing still is not used to blow coating asphalt, Method 26 shall be used to measure emissions from the blowing still for at least 90 minutes or for the duration of the blow, whichever is greater.

* * * * *

(e) The production rate of asphalt from the blowing still, P_s (Mg/h), shall be determined by dividing the weight of asphalt charged to the still by the time required for the performance test during a blow. The weight of asphalt charged to the still shall be determined at the starting temperature of the blow. The weight of asphalt shall be converted from the volume measurement as follows:

$M = Vd/c$

M = weight of asphalt in megagrams
V = volume of asphalt in cubic meters
d = density of asphalt in kilograms per cubic meter
c = conversion factor 1,000 kilograms per megagram

The density of asphalt at any measured temperature is calculated by using the following equation:

$d = 1056.1 - 0.6176 \times °C$

The method of measurement shall have an accuracy of ±10 percent.

* * * * *

[FR Doc. 81-15513 Filed 5-22-81; 8:45 am]
BILLING CODE 6560-26-M

ENVIRONMENTAL PROTECTION AGENCY

■

STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

VOC FUGITIVE EMISSION SOURCES; SYNTHETIC ORGANIC CHEMICALS MANUFACTURING INDUSTRY

SUBPART VV

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 60

[AD-FRL 1635-6]

Standards of Performance for New Stationary Sources; VOC Fugitive Emission Sources; Synthetic Organic Chemicals Manufacturing Industry

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule and notice of public hearing.

SUMMARY: The proposed standards would limit emissions of volatile organic compounds (VOC) from fugitive emission sources in the synthetic organic chemicals manufacturing industry (SOCMI). SOCMI is a portion of the organic chemical industry which produces the group of chemicals listed in Appendix E. These proposed standards would (1) require a leak detection and repair program to reduce VOC emissions from valves and (2) specify the use of certain equipment to reduce VOC emissions from pumps, compressors, sampling connections, and open-ended lines. the proposed standards would also prohibit leaks from safety/relief valves during normal operations. The standards would apply only to equipment that contains 10 percent or more VOC. Reference Method 21 and Appendix E are being proposed with the standards.

The proposed standards implement the Clean Air Act and are based on the Administrator's determination that fugitive emission sources of VOC in SOCMI contribute significantly to air pollution which may reasonably be anticipated to endanger public health or welfare. As required by Section 111 of the Clean Air Act, the proposed standards are intended to require new, modified, and reconstructed sources in SOCMI to use the best demonstrated system of continuous emission reduction, considering costs, nonair quality health and environmental impacts, and energy requirements.

A public hearing will be held to provide interested persons an opportunity for oral presentation of data, views, or arguments concerning the proposed standards.

DATES: *Comments.* comments must be received by April 6, 1981.

Public Hearing. A public hearing will be held on March 3, 1981, beginning at 9 a.m.

Request to Speak at Hearing. Persons wishing to present oral testimony should contact EPA by March 24, 1981.

ADDRESSES: *Comments.* Comments should be submitted (in duplicate if possible) to: Central Docket Section (A-130), Attention: Docket No. A-79-32, U.S. Environmental Protection Agency, 401 M Street S.W., Washington, D.C. 20460.

Public Hearing. The public hearing will be held at the EPA Administration Bldg. Auditorium Research Triangle Park North Carolina.

Persons wishing to present oral testimony should notify Ms. Naomi Durkee, Emissions Standards & Engineering Branch (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5271.

Background Information Document. The Background Information Document (BID) for the proposed standards may be obtained from the U.S. EPA Library (MD-35), Research Triangle Park, North Carolina 27711, telephone number (919) 541-2777. Please refer to *VOC Fugitive Emissions in the Synthetic Organic Chemicals Manufacturing Industry—Background Information For Proposed Standards*, EPA-450/3-80-033a.

Docket. Docket No. A-79-32, containing supporting information used in developing the proposed standards, is available for public inspection and copying between 8:00 a.m. and 4:00 p.m., Monday through Friday, at EPA's Central Docket Section, West Tower Lobby, Gallery 1, Waterside Mall, 401 M Street, S.W., Washington, D.C. 20460. A reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: Ms. Susan Wyatt, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5477.

SUPPLEMENTARY INFORMATION:

Proposed Standards

The proposed standards of performance would apply to fugitive emission sources within process units operated to produce one or more of the organic chemicals listed in proposed Appendix E. Certain equipment processing VOC liquids and gases would be covered by the standards. Implementation of the proposed standards would reduce fugitive emissions of VOC from pumps, compressors, valves, sampling connections, safety/relief valves, and open-ended valves in VOC service. The proposed standards would require: (1) a leak detection and repair program for in-line valves in gas and light liquid VOC service; (2) certain equipment for certain fugitive emission sources in VOC service; and (3) no detectable VOC emissions from safety/relief valves in VOC service during normal operation. VOC service means that a fugitive emission source contains or contacts a process fluid composed of equal to or greater than 10 percent VOC by weight. In addition, the proposed standards would provide a procedure for determining the equivalency of alternative control measures.

The proposed standards include a leak detection and repair program that would require monthly monitoring for valves in gas and light liquid service. Valves found not to leak for two successive months could be monitored quarterly. Monitoring would be conducted in accordance with Reference Method 21 which is being proposed with these proposed standards. The proposed standards would require repair of leaking valves within 15 days after detection of the leak unless repair would require a process unit shutdown. A Leak is defined as a detectable VOC concentration equal to or greater than 10,000 parts per million by volume (ppmv). An initial attempt at repairing these valves would be required within 5 days after detection of a leak.

Two alternative standards have been provided for valves in gas and light liquid service. A plant owner or operator might elect to comply with one of the alternative standards which would be based on data gathered during one year's monthly monitoring in his affected facility. The first alternative standard would provide an allowable percentage of valves leaking. The second alternative standard would provide for the use of a different leak detection and repair program which would achieve the same level of control as the program designed by EPA.

The proposed standards would require pumps in light liquid service to be equipped with dual mechanical seal systems that include a barrier fluid system. The barrier fluid would be required to be something other than a light liquid or gaseous VOC. Light liquids are defined as VOC liquids with vapor pressures greater than 0.3 kPa at 20°C. Each barrier fluid system would be equipped with a sensor so that failure of the inner and outer seals could be detected. In addition, each barrier fluid system would be operated at a pressure greater than the seal area pressure or would be equipped with a barrier fluid degassing reservoir. The degassing reservoir would be connected, by a closed vent system, to a control device having a VOC control efficiency of at least 95 percent. The proposed standards would also require weekly

visual inspections of the seals on light liquid pumps in order to identify failure of the outer seal. Repair of the pump would be required within 15 days after a seal failure or leak was detected unless repair would require a process unit shutdown. The first attempt at repairing the pump would be required within 5 days after detection of the leak. If a pump could not be equipped with dual mechanical seals and a barrier fluid system, a closed vent system would be required to transport leakage to a control device having a VOC control efficiency of at least 95 percent.

The proposed standards would require compressors to be equipped with seals having a barrier fluid system that prevents leakage of the process fluid to the atmosphere. The barrier fluid would be required to be something other than a light liquid or gaseous VOC. These standards would also require each barrier fluid system either to operate at a pressure greater than the compressor seal area pressure or to be equipped with a barrier fluid degassing reservoir. The degassing reservoir would be connected by a closed vent system to a control device having a VOC control efficiency of at least 95 percent. The proposed standards would require each barrier fluid system to be equipped with a sensor so that seal failures may be detected. When seal failure is detected, repair would be required within 15 days unless repair would require a process unit shutdown. An initial attempt at repair would be required within 5 days. If a compressor could not be equipped with a barrier fluid system, a closed vent system would be required to transport leakage from the seal to an enclosed combustion source or vapor recovery system having a VOC control efficiency of at least 95 percent.

The proposed standards would require that VOC's purged from sampling connections be recycled to the process by a closed sampling loop. Alternatively these VOC's could be collected in a closed collection system for recycle or disposal without VOC emissions to atmosphere *In-situ* sampling systems would be exempt from these requirements.

The proposed standards would require that safety/relief valves have "no detectable emissions" of VOC except in cases of pressure relief. "No detectable emissions" of VOC in this case means 200 ppm or less above the background level as measured by Reference Method 21. After each overpressure relief, the proposed standards would require the safety/relief valves to be returned to a state of no detectable emissions within 5 days.

Open-ended lines would be required to be sealed with a second valve, cap, blind flange or plug except when the open-ended line is in use. If a second valve is used, the valve on the process side would be required to be closed first to avoid trapping VOC between the valves.

Cooling towers, agitator seals, and equipment not in VOC service would not be covered by the proposed standards. Flanges, safety/relief valves in liquid service, equipment operating at subatmospheric pressures and all equipment components in "heavy liquid" VOC service, would be excluded from the routine monitoring requirements of the proposed standards. Heavy liquids are defined as VOC liquids with vapor pressure less than 0.3 kPa at 20°C. However, the proposed standards would require VOC leaks which were visually or otherwise detected from these sources in VOC service to be repaired within 15 days after the leak is confirmed using Reference Method 21.

Compliance with the proposed leak detection and repair program and equipment requirements would be assessed through review of records and reports and by inspection. Each owner/operator would report quarterly the number of leaks found and repaired during the quarter. Each owner/operator would also submit quarterly a signed report stating that all monitoring had been performed in accordance with the standards, all specified equipment had been installed and operated in accordance with the standards, and all emission limits had been met.

Under the proposed standards, any owner or operator of a facility subject to the standards could request that the Administrator determine the equivalence of any alternative means of emission limitation to the equipment, design, operational, and work practice requirements of the proposed standards. Upon receiving a request for determination of equivalence, the Administrator would provide an opportunity for public hearing. After such a hearing, the Administrator would make a decision and publish the decision in the Federal Register.

Summary of Environmental, Energy, and Economic Impacts

The proposed standards of performance would reduce fugitive emissions of VOC from new and modified process units in SOCMI by approximately 87 percent in comparison to those emissions that would result in the absence of the proposed standards. In the fifth year after implementation the proposed standards would reduce the total uncontrolled fugitive emissions from new, reconstructed and modified process units from approximately 200 to 26 gigagrams (Gg).

The proposed standards of performance would not increase the energy usage of SOCMI process units. In general, the controls required by the standards do not require much energy. Furthermore, the effect of the standards would be to increase efficiency of raw material usage, so that a net positive energy impact would result. Implementation of the proposed standards could result in a minor negative contribution to solid waste. However, the standards would also cause a positive impact on water quality by containment of potential liquid leaks.

The economic impact of the proposed standards would be reasonable. The proposed standards would require of the producers of SOCMI chemicals a capital investment ranging from $41 million in 1981 to $52 million in 1985. The total industry-wide capital investment over the five-year period would be approximately $232 million. The industry-wide net annualized cost would range from about $2 million in 1981 to about $11 million in 1985. This net annualized cost includes a credit resulting from "recovered" fugitive emissions. The costs would be distributed among 830 facilities affected during the five year period. Industry-wide price increases are not expected to result from implementation of these standards.

Rationale

Selection of Sources and Pollutants

The synthetic organic chemical manufacturing industry (SOCMI) source category ranked first on the Priority List, 40 CFR 60.16 (44 FR 49222, August 21, 1979), of 59 major source categories for which standards of performance are to be promulgated by 1982. The Priority List consists of categories of air pollution sources that, in the judgment of the Administrator, cause or contribute significantly to air pollution which may reasonably be anticipated to endanger public health or welfare.

The segment of the organic chemical industry covered by the proposed standards should be a readily identifiable portion or subgroup of the organic chemical industry. EPA has identified a list of organic chemicals produced in a segment of this industry. The products of this industry segment are derived from about ten basic petrochemical feedstocks and are used as feedstocks in a number of synthetic products industries. Organic chemicals such as acetone, methyl methacrylate,

toluene, and glycine are produced in this segment of SOCMI. Large quantities of SOCMI products are used in the production of plastics, fibers, surfactants, pharmaceuticals, synthetic rubber, dyes, pesticides, and specialty organics. They are typically intermediates, although they may be used as final products. Many of these products are high volume chemicals. The Administrator is proposing the list of organic chemicals in Appendix E as the segment of SOCMI covered by the proposed standards.

The total VOC emissions from SOCMI were estimated to be about 1,000 Gigagrams/year (Gg/yr) in 1976 or about 5 percent of the 19,000 Gg total annual VOC emissions from stationary sources in this country. Fugitive emissions of VOC are a significant portion of the total VOC emissions from SOCMI. Fugitive emissions of VOC from smaller SOCMI process units are about 70 Mg/yr and larger SOCMI process units are about 800 Mg/yr. It is estimated that approximately 400 Gg/yr of the total emissions of VOC from SOCMI are currently attributable to fugitive emission sources. Fugitive emissions are unintentional emissions caused by leaks in processing equipment. Fugitive emission sources include pumps, valves, compressors, flanges, and agitators. Other potential sources of VOC emissions in this industry include process sources, storage and handling equipment sources, and secondary emission sources. Standards are currently under development for some of these VOC emission sources. Other pollutants emitted from SOCMI include particulate matter, carbon monoxide (CO), nitrogen oxides (NO_x), sulfur oxides (SO_x), sulfuric acid (H_2SO_4) and hydrochloric acid (HCl) as well as other chemicals. Most particulate matter, NO_x and (SO_x) emissions from this industry are regulated under combustion and process standards that have been developed or are under development.

VOC emissions from SOCMI contribute to the production of ozone which is one of the criteria pollutants for which an ambient air quality standard exists under Section 109 of the Clean Air Act. Because fugitive emissions of VOC are a significant portion of the total SOCMI emissions of VOC, the Administrator is proposing standards of performance that are intended to reduce fugitive emissions of VOC from SOCMI. These proposed standards would reduce emissions of VOC by about 175 Gg/yr in 1985. The VOC that would be regulated by the proposed fugitive emissions standards are compounds which participate in atmospheric photochemical reactions or can be measured by Reference Method 21 which is being proposed with the standards. In addition to reducing fugitive emissions of VOC from SOCMI, the proposed standards would reduce emissions of organic chemicals that are toxic and in some cases potentially carcinogenic. However, specific VOC which the Administrator lists as hazardous air pollutants would be regulated under Section 112 of the Clean Air Act rather than under this regulation.

Selection of Regulatory Approach and Affected Facilities

Two general regulatory approaches could be used in developing standards for SOCMI. The first approach involves the development of standards applicable to each specific chemical process; this approach has historically been the most commonly used approach in developing standards of performance for new stationary sources. Following this approach would involve establishing standards for each specific chemical process.

The second approach involves the development of standards on the basis of similar types of emission sources and applicable emission control techniques. The second approach is more resource efficient than the first approach because a large number of specific chemical processes can be covered by one regulation.

SOCMI plants contain similar fugitive emission sources. In general, a few fugitive emission sources within SOCMI process plants contribute the greatest proportion of fugitive emissions. Leaks from fugitive emission sources generally occur randomly and are not related to process variables. These similarities in the behavior of fugitive emission sources in SOCMI allow the same control techniques to be applied to all of the processes. Therefore, because the control techniques can be applied to the entire industry group and because regulating the entire group would be more resource efficient, a single regulation is being proposed for controlling fugitive emissions from SOCMI.

An affected facility for standards of performance is an emission source or group of emission sources to which the standard applies. Affected facilities for fugitive emissions standards could be defined as individual emission sources (equipment components), groups of equipment components that are operated in conjunction with each other (process units), or groups of process units at one location (plant sites). The selection of one of these definitions for affected facilities is influenced by the fact that the provisions of the proposed standards would apply to new, modified or reconstructed facilities.

An existing facility, as defined in 40 CFR 60.2, is a facility that was constructed or modified before the proposal date of the applicable standards of performance. However, an existing facility that is modified or reconstructed after the date of proposal of the standards becomes an affected facility and then is subject to applicable standards of performance.

Modification is defined in 40 CFR 60.14(a) as any physical or operational change of an existing facility which increases the emission rate of any pollutant to which a standard applies. Exemptions to this definition include an increase in production rate, if such an increase can be made without capital expenditure; an increase in the hours of operation; the use of an alternative fuel or raw material if the facility was designed to accommodate the alternate fuel or raw material prior to the standards; the addition of air pollution control equipment; routine maintenance, repair, and replacement; and relocation or change in ownership.

Reconstruction is defined in 40 CFR 60.15 as any replacement of components in an existing facility where the fixed capital cost of the new components exceeds 50 percent of the fixed capital cost that would be required to construct a comparable entirely new facility. Under such conditions, the Administrator would determine whether an existing facility would become an affected facility. Fixed capital cost means the capital needed to provide all depreciable components of the facility.

The three different alternatives for defining affected facilities and the implications of each one were considered in selecting the definition. If the affected facilities covered by the proposed standards were defined on the basis of individual equipment components, any replacement of an equipment component (pump, valve, etc.) would be considered a new source and would be subject to the new source standards. Under this definition situations would result in which replaced equipment components in existing process units would be subject to new source standards, while adjacent components would not be subject to the standards. Determining which components were subject to requirements of the standards could be difficult for the owner/operator and for EPA.

Designating affected facilities on the basis of process units would combine individual fugitive emission sources

within the process unit into a unified group. Any like-for-like replacement of fugitive emission sources within an existing unit would not increase the overall emission rate, and would be a small capital expenditure compared to the cost of the entire unit. Therefore, the unit would not be subject to the standards due to modification or reconstruction considerations. Defining an affected facility as a process unit would reflect industry construction practices. Almost all new construction in SOCMI is by process unit. Furthermore, most reconstruction and modification occurs by process units.

Affected facilities could also be defined as plant sites, i.e., all process units at each plant site. If affected facilities were defined as plant sites, construction of new process units at existing sites could make the entire site subject to the standards. This broad coverage would be an unreasonable burden for owner/operators that have existing plant sites that may consist of many process units. The burden could be so severe that expansion might be limited at existing sites. If an entire process unit were replaced within an existing plant site, no emission increase would result, and, therefore, the unit and site would not be subject to the standards under modification considerations. If the plant site consisted of many process units, the replacement of one unit would probably not exceed 50 percent of the replacement cost of the affected facility (all process units at the site), and therefore the unit and site would not be subject to the standards.

After carefully considering each of the above alternatives, the Administrator selected process units as the basis for defining affected facilities. This definition allows for routine equipment replacement and minor changes or expansions in existing facilities without subjecting either single emission sources or entire plant sites to requirements of the proposed standards while also providing for full coverage for all new process units.

A disadvantage of implementing a decision to designate the process unit as the affected facility is that some small, routine changes and additions in an existing SOCMI unit could result in the unit's being modified and, therefore, subject to the standards of performance. These changes and additions may increase the number of fugitive emission sources within an existing facility, thereby increasing the fugitive emissions by a small amount. In most cases it would be feasible to control fugitive emissions from some other fugitive emission sources within the existing facility to keep fugitive emissions to their original level. In cases where existing facilities are already operating with a good fugitive emission control program, however, it might not be possible to control fugitive emissions from another fugitive emission source.

Standards of performance for new SOCMI sources are not intended to cover existing plants making routine and minor additions. There are two exceptions to the modifications provisions in the General Provisions of 40 CFR Part 60 which may exclude some plants making such additions. Exemptions are made for routine replacement and for additions made to increase production rate if they can be accomplished without capital expenditures. There are many specific reasons for routine additions and changes made in a SOCMI unit. For example, a small number of fugitive emission sources might be added in making changes to increase productivity, to increase ease of maintenance, to improve plant safety, and to correct minor design flaws. While the two reasons for exemptions included in the General Provisions might be interpreted to cover these types of changes, there may be different interpretations. To clarify the intent that existing SOCMI units making routine changes and additions would not be covered, the proposed standards would exempt additions made for process improvements if they are made without incurring a "capital expenditure" as defined in the General Provisions.

The General Provisions define "capital expenditure" as an expenditure for a physical or operational change to an existing facility which exceeds the product of the applicable "annual asset guideline repair allowance percentage" specified in the latest edition of Internal Revenue Service Publication 534 and the existing facility's basis, as defined by Section 1012 of the Internal Revenue Code. However, the total expenditure for a physical or operational change to an existing facility must not be reduced by any "excluded addition" as defined in IRS Publication 534, as would be done for tax purposes.

Using the process unit as the basis for an affected facility, an affected facility would be a group of all fugitive emission sources within a process unit. In this way, the process unit is used as the basis for defining an affected facility, but coverage is restricted to fugitive emission sources. A process unit is specifically defined as equipment assembled to produce one or more of the chemicals listed in proposed Appendix E which can operate independently if supplied with sufficient feed or raw materials and sufficient storage facilities for the final product. A process unit includes intermediate storage or surge tanks and all fluid transport equipment connecting the reaction, separation and purification devices. All equipment within the battery limits is included. However, offsite fluid transport and storage facilities are excluded. Under this definition, if a number of SOCMI process units were integrated into a continuous operation, each would be considered a separate process unit. For example, if chemical A was produced as a feedstock for the production of chemical B and chemical B, in turn, was used as a feedstock to produce chemical C, the whole continuous operation would consist of three process units. If A, B, and C were SOCMI chemicals, there would be three affected facilities.

Selection of Regulatory Alternatives

Fugitive emissions of VOC can be reduced by two types of control techniques: (1) leak detection and repair programs and (2) equipment, design, and operational specifications. Four regulatory alternatives which would achieve different levels of emission reduction using various combinations of leak detection and repair programs and equipment, design, and operational requirements were considered.

Control Techniques. The leak detection and repair programs included in the various regulatory alternatives consist of two phases. The initial phase involves monitoring potential fugitive emission sources within a process unit to detect fugitive emissions of VOC. After detection of the leak, the second phase involves repair or replacement of the fugitive emission source.

Several leak detection methods were considered in the development of the regulatory alternatives. Methods considered included the use of VOC detection instruments and soap bubble solutions to locate individual leaking sources. Different modes of monitoring were also considered. Included were periodic monitoring for fugitive emission leaking sources on an individual component or an area basis and continuous automatic instrument monitoring of ambient air at multiple sites within a facility. As detailed in the Selection of Test Methods section of this preamble, the individual component survey using a portable VOC detection instrument has been selected as the leak detection method for the proposed standards. This method requires that the VOC concentration at the surface of each fugitive emission source would be

monitored with a portable VOC detection instrument.

The effectiveness of an individual source leak detection program would depend not only on the detection method, but also on the frequency of the monitoring schedule. More frequent monitoring would allow leaks to be detected earlier and thus allow more frequent maintenance and a corresponding reduction in fugitive emissions.

The second phase of a leak detection and repair program consists of repair or replacement of leaking fugitive emission sources. Repair or replacement of a fugitive emission source would be required within a specified period of time after the detection of a VOC concentration equal to or in excess of a predetermined level. These repair and replacement procedures would vary for each fugitive emission source. Fugitive emissions from packed seals on a pump or compressor, for example, could be reduced by tightening the packing gland. However, the packing could deteriorate to a point where further tightening would no longer reduce, but instead, would increase the emission rate. At this point, the packing would have to be replaced. Mechanical seals on pumps and compressors would need to be removed for repair. Replacement of these seals would be included in their repair, if necessary.

Many valve leaks can be repaired while the equipment is in service. Most process valves have a packing gland which could be tightened while the valve is in service. Tightening of the packing gland would normally reduce fugitive emissions from a leaking valve, but the emission rate could increase if the packing is old and brittle or if the packing were overly tightened. When this orrurs, the packing would have to be replaced. Plug valves might be repaired by addition of grease.

Some valves could not be repaired while in service. These valves include control valves, which may be excluded from in-service repair by operating or safety considerations, and block valves, whose removal for repair or replacement might require a process shutdown. Other valves, such as control valves with a manual bypass loop, could be isolated for repair or removal. The repair of a leaking safety/relief valve normally requires that it be removed from service.

Leaks from flanges could often be reduced by tightening of the flange bolts. Most flanges could not be isolated from the process to permit replacement of the gasket.

Fugitive emissions of VOC also could be reduced by installing certain equipment. Requiring installation of certain equipment was considered for the following fugitive emission sources in the development of the regulatory alternatives: pumps, compressors, pressure relief devices, open-ended lines, sampling connections, and valves.

Fugitive emissions from pumps occur primarily at the pump seal. These emissions could be reduced by installation of the following equipment: sealless pumps, pumps with improved seals (e.g., dual mechanical seals), or closed vent systems for collection and control of emissions.

Because of process condition limitations, sealless pumps are not suitable for all pump applications but would reduce emissions whenever applicable. Enclosing the seal area and venting the captured emissions to a control device is an alternative control technique for pumps; however, it is not generally used because such a system is costly.

Dual mechanical seals are currently used in many SOCMI process applications. These seals characteristically include a barrier fluid between the seals. If the pressure in the barrier fluid system is higher than that in the pump seal area, VOC would not leak from the seal. If, however, the pressure in the pump seal area is higher, VOC could leak into the barrier fluid and later be emitted to the atmosphere through degassing vents on the barrier fluid reservoir. Connecting the degassing vents to a control device (enclosed combustion or vapor recovery system) could effectively control fugitive emissions originating from the double mechanical seals. The control efficiency would vary with the condition of the mechanical seals and the type of control device used, but control efficiencies approaching 100 percent can be achieved. Consequently, a system combining dual mechanical seal systems equipped with controlled degassing vents were considered as the equipment for pumps.

Emissions from compressors also occur primarily at the seal. An enclosed seal area or replacement of the seal with an improved seal (mechanical) could be specified to reduce emissions from compressors. Enclosing the seal area and venting the captured emissions to a control device is an alternative control technique for compressors; however, it is not generally used because it is too costly. The use of mechanical seals on compressors and connection of the barrier fluid reservoir to a control device (enclosed combustion or vapor recovery system) with a closed vent system could provide control efficiencies approaching 100 percent. If the barrier fluid pressure is higher than the compressor seal area pressure, there would be no VOC emissions to atmosphere. However, if the pressure in the barrier fluid system is lower than that in the compressor seal area, the degassing vents on the barrier fluid reservoir should be connected to a control device to effectively control fugitive emissions. Therefore, a system combining mechanical seals and controlled degassing vents was considered as the equipment for compressors.

Safety/relief valves may emit fugitive VOC due to defects in valve seating surfaces, improper reseating after relieving, or process operation near the relief valve set point. Equipment considered for controlling fugitive VOC emissions from relief valves include closed vent systems connected to a control device or rupture disks upstream of safety/relief valves.

A closed vent system can be used to transport the relief valve discharge (and fugitive emissions) to a control device such as a flare. These types of systems are currently used in SOCMI process units; however, under certain applications, such as flaring halogenated compounds, these systems could result in undersirable emissions. The control efficiency of a closed vent and control device system is mostly dependent on the effectiveness of the control device. For example, a closed vent system is about 100 percent effective in VOC capture, and a typical flare process is about 60 to 99 percent effective for VOC destruction; thus, the overall efficiency would be about 60 to 99 percent, depending on the turn-down capability of the flare.

Rupture disks can be installed upstream of safety-relief valves to prevent the emission of VOC through the valve seat during normal processing conditions. The use of a rupture disk upstream of a safety/relief valve results in no emissions of VOC from the valve. Rupture disks would provide more control than systems vented to a control device because the control device could not achieve 100 percent VOC emissions reduction, whereas rupture disks could. Consequently, rupture disks were considered as the equipment for safety/relief valves.

When process samples are taken for analysis, obtaining a representative stream sample requires purging some process fluid through the sample connection. This sample purge could be vented to the atmosphere if the fluid were gaseous, and liquid sample purges could be drained onto the ground or into open collection systems where evaporative emissions could result. There is no leakage from in-site sampling systems but they may not be

applicable in all situations. Fugitive emissions from other sampling connections can be reduced by using a closed-loop sampling system that eliminates atmospheric purging of process material.

Fugitive emissions of VOC from open-ended lines can be controlled by installing a cap, plug, blind flange, or second valve on the open end of the line. Capping of open-ended lines and closed-loop sampling are common industrial practices applied in SOCMI which exhibit control efficiencies for fugitive emissions of VOC of approximately 100 percent. The actual control efficiencies will depend on site-specific factors. Because the equipment is readily available, commonly used, and inexpensive, caps, plugs, blinds, or valves were considered for open-ended lines, and closed-loop sampling was considered for sampling connections.

Fugitive emissions from valves occur at the stem or gland area of the valve body. These emissions can be controlled by using valves which have actuating mechanisms isolated from the process fluid such as diaphragm or bellows valves. Although the control effectiveness of diaphragm or bellows seal valves is about 100 percent, their use is limited. Because the application of these valves would be limited to certain services, they were not considered and, therefore, no equipment was considered for valves in the regulatory alternatives.

Regulatory Alternatives. Four regulatory alternatives, which represent different levels of emission reduction achievable by combining various leak detection and repair programs, operational and design requirements and equipment specifications, were considered in the development of the proposed standards. Regulatory Alternative I is the baseline alternative and represents the level of control that would exist in the absence of any standards of performance. Under Regulatory Alternative I SOCMI facilities located in areas attaining the National Ambient Air Quality Standard for ozone would not be subject to any VOC fugitive emission regulations; however, facilities in nonattainment areas would be subject to applicable SIP regulations. Only a few states have developed or are considering near-term development of these specific regulations. Under Regulatory Alternative I fugitive emissions of VOC could also be controlled to some extent by OSHA health standards or controls based on provisions of insurance policy for fire and/or explosion protection. Estimates of emissions from fugitive emission sources have been developed based on existing levels of fugitive emission control. Thus, Regulatory Alternative I was based on current levels of control, considering possible new regulatory controls, and represents the level of control that would exist in the absence of any standards of performance.

Regulatory Alternative II includes the same monitoring requirements and equipment specifications included in the petroleum refinery Control Techniques Guidelines (CTG) document (EPA-450/2-78-036). These requirements and specifications are:

1. Quarterly monitoring of all in-line valves, open-ended valves and safety/relief valves in gas service (relief valves would also be monitored after overpressure relief to check for proper reseating);
2. Annual monitoring of all in-line valves and open-ended valves in light liquid service;
3. Quarterly monitoring of compressor seals;
4. Annual monitoring of light liquid service pumps (such pumps would also be inspected visually for liquid leaks each week; immediate instrument monitoring of visually leaking pumps would be required); and
5. Installation of caps, blinds, plugs, or second valves to seal all open-ended lines.

Regulatory Alternative III specifies a more frequent equipment monitoring schedule than Regulatory Alternative II, thereby providing for more stringent control of fugitive emissions of VOC. For instance, Regulatory Alternative III would require monthly, rather than quarterly or annual monitoring. Monthly monitoring would result in a reduction of emissions from residual leaking sources, i.e., those sources which are found to be leaking and are repaired but begin to leak again before the next inspection and those previously non-leaking sources that begin leaking between inspections. Regulatory Alternative III would also require the use of caps, plugs, or second valves on open-ended lines.

Of the four alternatives, Regulatory Alternative IV would provide the greatest level of control for fugitive emissions of VOC through the use of equipment specifications for some fugitive emission sources. The implementation of equipment specifications for the various potential fugitive emission sources would lessen the need for periodic monitoring. The monitoring and equipment specifications requirements of Regulatory Alternative IV are:

1. Monthly monitoring of all in-line valves and open-ended valves in gas and light liquid service;
2. Installation of rupture disks upstream of as service safety/relief valves that vent to the atmosphere (the disk would be replaced if disk failure were detected);
3. Installation of closed vents and control devices for compressor seal areas and/or degassing vents from compressor barrier fluid reservoirs;
4. Installation of dual mechanical seals on pumps in light liquid service and installation of closed vent control devices for degassing vents from barrier fluid reservoirs of all pumps in light liquid service (weekly visual inspections of pumps in light liquid service would also be required, with subsequent instrument monitoring required for those pumps with visible liquid leaks);
5. Installation of closed loop sampling systems; and
6. Installation of caps, blinds, plugs, or second valves to seal all open-ended lines.

Selection of Basis for the Proposed Standard

The Clean Air Act requires that standards for performance be based on the best system of continuous emissions reduction, considering costs, energy usage, and environmental impact. Selection of a regulatory alternative as the basis for the proposed standards was made after considering estimated fugitive emission reductions, energy savings or usage, and cost and economic impacts of the regulatory alternatives. SOCMI, with approximately 1,680 operating process units in the United States in 1980, is projected to grow at an annual rate of 5.9 percent. Based on this growth rate, approximately 2,240 process units will be in operation in 1985. Approximately 830 of these facilities would be subject to the proposed standards in 1985 due to new construction. Of this total, about 560 facilities would be newly constructed and subject to the standards on this basis. The remaining 270 facilities would result from replaced facilities which would be subject to the standards.

To examine the environmental impacts of the regulatory alternatives, estimates of fugitive emissions of VOC are required. To make these estimates for SOCMI, fugitive emissions data developed in petroleum refineries have been used. Transferring data in this way is justified because the fugitive emission sources and the substances processed in the two industries are similar. Both industries use the same types of pumps, compressors, valves, flanges and other chemical processing equipment.

Furthermore, both industries process VOC. Leak rates of VOC from similar fugitive emission sources are similar; leak frequencies in the two industries are similar. Available EPA data as presented in the Background Information Document shows this to be true. To further verify this similarity, EPA is currently gathering more data in SOCMI units for comparison to the refinery data. These data will be in the docket before the end of the comment period. These data and comments on this data will be fully considered before promulgation of these standards.

Regulatory Alternative II would reduce fugitive emissions of VOC from the 830 affected facilities in 1985 from an uncontrolled level of 200 Gg/yr to approximately 73 Gg/yr, or by 63 percent. The total energy associated with a VOC being processed is made up of the energy value of the compound and the energy expended to process (condense, pump, vaporize, etc.) the compound. The total energy associated with the VOC would be lost if the VOC were to leak to the atmosphere. This energy loss could be reduced if the VOC were combusted in an enclosed combustion system because some of the energy released during combustion could be recovered. If the VOC could be kept within the process and sold as product, the energy loss would be eliminated. Regulatory Alternative II reduces the energy loss that would result in the absence of any standards.

During the first five years after implementation of Regulatory Alternative II, SOCMI's cumulative capital costs would be $21 million. In the firth year, Regulatory Alternative II would result in an annualized net credit of $29 million due to the value of the recovered product. Implementation of Regulatory Alternative II would tend to hold individual price increases down because it would result in a net annualized credit. Implementation of Regulatory Alternative II could have a slight positive impact on wastewater from SOCMI facilities because leak detection would result in the identification and repair of liquid VOC leaks, and therefore, reduction of VOC's in wastewater from SOCMI facilities. Regulatory Alternative II would have no impact on any solid wastes associated with SOCMI.

Regulatory Alternative III would result in a fugitive emission rate of approximately 62 Gg/yr from the 830 affected facilities in 1985; this represents a 69 percent reduction over the baseline, or Regulatory Alternative I level. Regulatory Alternative III, like Regulatory Alternative II, reduces the energy loss that would result from SOCMI in the absence of any standards. SOCMI would incur cumulative capital costs of $21 million during the first five years after implementation of this alternative. However, due to the increased cost of implementing a more frequent monitoring schedule, Regulatory Alternative III would result in a smaller annualized net credit than Regulatory Alternative II. Implementation of Regulatory Alternative III would result in an annualized net credit of $21 million in 1985. As with Regulatory Alternative II, an annualized net credit would tend to hold individual price increases down. Regulatory Alternative III would have the same potential positive impact on wastewater from SOCMI facilities as Regulatory Alternative II, and no impact on solid waste.

Regulatory Alternative IV would reduce fugitive emissions of VOC from the 830 affected facilities in 1985 to 26 Gg/yr; this represents an 87 percent reduction from the Regulatory Alternative I level. Regulatory Alternative IV would minimize the energy loss that would result from SOCMI in the absence of any standards.

For Regulatory Alternative IV the cumulative capital costs would be about $232 million after the first five years of implementation. The net annualized cost for this regulatory alternative would be $11 million in 1985. These costs should not significantly increase the prices of SOCMI products because net annualized costs of control are extremely small (less than 0.03 percent) relative to the value of total industry output. Implementation of Regulatory Alternative IV could have a slight positive impact on wastewater for the same reasons as Regulatory Alternatives II and III. A wastewater containing suspended solids and some solid waste could result from the use of various control processes such as carbon adsorption units with the equipment specifications implemented under this alternative. However, the impact of these waste streams would be slight. Solid waste impact would also be minimal.

The Administrator selects a regulatory alternative as the basis for the proposed standards of performance after considering emission reductions, energy requirements, and cost and economic impacts of the regulatory alternative. This selection is based on choosing the best system of continuous emission reduction considering costs, energy and environmental impacts. Regulatory Alternative IV would reduce fugitive emissions of VOC by 170 Gg/yr in 1985. Of all the regulatory alternatives, Regulatory Alternative IV would achieve the greatest reduction of VOC fugitive emissions. The costs and economic impacts of Regulatory Alternative IV, as presented above, are reasonable. Energy requirements and nonair quality impacts of Regulatory Alternative IV would be similar to those of the other regulatory alternatives. Therefore, Regulatory Alternative IV represents the best system of emission reduction considering cost, energy requirements, and environmental impact and the Administrator selected Regulatory Alternative IV as the basis for the proposed standards.

Selection of Format for the Proposed Standards

Several formats could be used to implement Regulatory Alternative IV. Section 111 of the Clean Air Act requires that standards of performance be prescribed unless, in the judgement of the Adminsitrator, it is not feasible to prescribe or enforce such standards. Section 111(h) defines two conditions under which it is not feasible to prescribe or enforce a performance standard. These conditions are (1) if the application of measurement methodology to a particular class of sources is not practicable due to technological or economic limitations, or (2) if the pollutants cannot be emitted through a conveyance device. If a standard of performance is not feasible to prescribe or enforce, then the Administrator may instead promulgate a design, equipment, work practice, or operational standard, or combination thereof as provided in Section 111(h).

For most SOCMI fugutive emission sources, it is not feasible to prescribe a performance standard. Except in those cases in which standard can be set at "no detectable emissions", the only way to measure emissions from such SOCMI fugitive emission sources as pumps, pipeline valves, and compressors would be to use a bagging technique for each of the pipeline sources in a process unit. The great number of such sources and their dispersion over large areas would make such a requirement economically impracticable. Therefore, the Administrator has not selected this format in prescribing the proposed standards.

Another approach to prescribing a standard would be to specify a number or percent of fugitive emission sources that would be allowed to leak. This approach would be qualitative. It differs from the performance standard appoach which is based on quantitive emissions measurements (e.g. bagging). However, it would have some of the same benefits

of flexibility provided by performance standards. The only fugitive emission source for which a leak frequency limit would be applicable is valves. However, the variability in the percentage of valves leaking among process units limits the setting of an allowable percentage of valves leaking which could be achieved by all process units within SOCMI. This variability is observed even among units in which leak detection and repair programs are being implemented. Even so, establishing an allowable percentage of valves leaking based on data collected for that unit, may be feasible for each individual process unit. This approach is discussed in more depth in Alternative Standards for Valves in the next section of this preamble as one which would add desirable flexibility to the proposed standard.

Another possible regulatory format is an equipment standard. For those sources for which performance standards cannot feasibly be prescribed, work practices, design standards, operational standards, or equipment standards may be prescribed. Each of these formats has its own advantages and disadvantages. Equipment standards provide well-documented reductions. Compliance monitoring would require only an initial check to insure that the equipment had been installed properly and periodic checks to insure that equipment was continuing to operate properly. However, an inherent disadvantage associated with this type of format is that less site-specific flexibility is provided than with a performance standard and innovation may be stymied. Design and operational standards have similar advantages and disadvantages as those for equipment standards.

Another format is work practices. An example of this format would be a program for detecting and repairing leaks. Inspection methods, inspection time intervals, and time allowed for repair would be defined in detailing the work practices. Compliance with a work practice standard would be determined by judging success in implementing the work practices. Some recordkeeping and reporting would be needed to serve as the basis for judging this success.

The proposed standards could incorporate all of the potential regulatory formats. Different formats are required for different fugitive emission sources because characteristics of the emission sources, the available emission control options, and the applicability of proposed Reference Method 21 differ among the sources. In the next section the rationale for selecting a particular format is explained for each type of fugitive emission source. For each fugitive emission source, the feasibility of prescribing or enforcing a performance standard is discussed. If a performance standard is not feasible, the rational for selecting another format is presented.

Selection of Emission Limit, Equipment, Work Practice, Design and Operational Standards

Safety relief valves. Section 111(h) of the Clean Air Act requires that a standared of performance be promulgated unless it is not feasible to prescribe or enforce. Thus, control techniques included in Regulatory Alternative IV were first evaluated to determine if a performance standard could be proposed. The conclusion of this evaluation is that the only fugitive emission sources for which it would be feasible to prescribe and enforce a performance standard are safety/relief valves, and in certain cases, fugitive emission sources which are designed not to leak.

Rupture disks were evaluated as the equipment specification for gas service service safety/relief valves under Regulatory Alternative IV. When the integrity of rupture disks is maintained, fugitive emissions through the relief valve are eliminated. Rupture disks maintain their integrity unless an overpressure occurs. After an overpressure, replacement of the rupture disk once again eliminates fugitive emissions through the safety relief valve.

For control techniques the eliminate fugitive emissions, and emission limit measurement for "no detectable emissions" is feasible by the proposed Reference Method 21. Measurement methods for determing the quantitative emission rate from safety/relief valves are not feasible because they would require bagging each piece of equipment. However, Method 21, while it does not allow quantitative measurement of emissions, does allow the detection of leaks of fugitive VOC emissions from safety/relief valves. Therefore, the proposed standard for safety/relief valves in gas service is "no detectable emissions." The "no detectable emission" limit would not apply to discharges through the safety/relief valve during pressure relief because the function of relief valves is to discharge process fluid, thereby reducing dangerous high pressures within the equipment. The Standard would specify, however, that the relief valve be returned to a state of no detectable emissions within 5 days after such a discharge. It would further require an annual test to verify the "no detectable emissions" status of the safety relief valves. Also, a test would be required when the Administrator makes such a request.

A test to determine if a fugitive emission source is complying with a "no detectable emissions" requirement is a performance test. Performance tests require three separate runs, unless otherwise specified in an applicable subpart, as required in 40 CFR 60.8(f). A test to determine if a fugitive emission source is complying with a "no detectable emissions" requirement does not require three runs. Thus, tests to determine "no detectable emissions" would be exempted from 40 CFR 60.8(f) in the proposed standards.

In addition to three runs, performance test requirements include a notification to the Administrator 30 days before each performance test. For fugitive emission sources, tests to determine "no detectable emissions" may occur throughout a year and at least, after each over pressure relief. Requiring an owner or operator to notify the Administrator, as required in 40 CFR 60.8(d), is not considered reasonable for these standards. Thus, to reduce the reporting burden on industry, owners or operators of affected facilities are exempted from 40 CFR 60.8(d) in the proposed standards.

Pumps. It is not feasible to prescribe a performance standard for pumps because application of measurement technology to pumps is technologically and economically impractical. First, even though pump seals can be designed to release emissions into a conveyance mechanism, measurement of these emissions is not practicable. Dilution of the fugitive emissions in a conveyance mechanism limits the economical and technological application of measurement methods. Second, determining emission levels from each pump would require the time-consuming, expensive and impractical method of bagging each pump as described in the Selection of Test Method section of this preamble. Furthermore, a "no detectable emission" limit is not feasible because dual mechanical pump seals leak on occasion.

After determining that a performance standard for pumps would not be practicable because of technological and economic limitations, equipment standards were evaluated. Equipment specifications evaluated for pumps were dual mechanical seals with closed vents for the barrier fluid degassing reservoirs, closed vents for the pump seal areas, and sealless pumps. After evaluation, dual mechanical seal systems that include barrier fluid systems and

sensors to detect failure of either seal or barrier fluid system were selected as the basis for the equipment specifications for pumps in Regulatory Alternative IV. They are frequently used in SOCMI pump applications. If the barrier fluid system is maintained at a pressure greater than the stuffing box pressure, no VOC leakage would occur because all leaks would be inward into the process fluid. If the stuffing box pressure is greater than the barrier fluid pressure, the barrier fluid between the two seals collects leakage from the inner seal, and the VOC collected by the barrier fluid is controlled by connecting the barrier fluid reservoir to a control device (enclosed combustion or vapor recovery) with a closed vent system or by returning it to the process. The dual mechanical seals with controlled degassing vents system is the most universally applicable of the three options evaluated. Thus, because they provide the best control efficiency (dependent upon the efficiency of the control device) considering costs, the equipment requirement for pumps is the use of dual mechanical seals with closed barrier fluid degassing vents connected to a control device or designed to return the VOC to the process.

Section 111(h) of the Clean Air Act requires that when equipment standards are established, requirements must also be established to insure the proper operation and maintenance of the equipment. Such provisions have been made in the proposed regulation. An indicator on the barrier fluid system would reveal any catastrophic failure of the inner or outer seal or barrier fluid system. The failure indication criterion would be determined, for each piece of equipment. Leakage through the outer seal could be detected by weekly visual inspections and would be limited by the barrier fluid. Although the intent of the standards would best be preserved by inspections as frequent as possible, weekly inspections were specified to keep the requirement from being burdensome. Detection of any leaks should be followed by repair within 15 days.

The barrier fluid would be either a non-VOC fluid or a heavy-liquid VOC. The use of light liquid VOC as a barrier fluid could result in emissions of VOC of the same magnitude as those which would occur if product VOC were allowed to leak past the seals. Leakage of process fluid through the inner seal would be captured and controlled by the barrier fluid/closed vent system.

Sealless pumps, such as diaphragm or canned pumps, do not have a potential leak area, and therefore should achieve approximately 100 percent control. However, sealless pumps may not be suitable for use in some SOCMI process applications due to throughput, pressure, or fluid composition constraints. Sealless pumps were not selected under Regulatory Alternative IV and, therefore, were not selected as required equipment for the proposed standards.

Sealless pumps are at least equivalent to dual mechanical seals with barrier fluid degassing vents connected to control devices in controlling fugitive emissions. Therefore, the proposed standards allow them for owners/operators who wish to use them. Seallesss pumps would be required to operate under a "no detectable emission" limit as discussed in *Leakless Equipment* in this section.

The seal area of a pump could be completely enclosed, and this enclosed area could be connected to a control device (enclosed combustion or vapor recovery) with a closed vent system. The control efficiency of this arrangement is dependent on the control efficiency of the vapor recovery system or enclosed combustion device. The closed vent system could require a flow inducing device to transport emissions from the seal area to the control device. Because of safety or operating limitations, enclosure of the pump seal area may not be feasible in all cases.

There may be isolated and unusual pump applications which require pumps which cannot be equipped with mechanical seals. For example, if a reciprocating pump is required, mechanical seals may not be possible. The enclosed seal area would be the best control option for such pumps. Therefore, enclosed seal areas connected to a control device with a closed vent system would be allowed for pumps that cannot be equipped with dual mechanical seal systems. Although enclosing seal areas would be as effective in reducing emissions as other effective techniques, this option would most likely be used on a limited basis.

Compressors. As in the case for pumps, a performance standard for compressors is not feasible. Even though compressor seals can be designed to release fugitive emissions into a conveyance mechanism, measurement of these emissions would be limited by technological and economical factors. Measuring emissions from each compressor would require bagging each seal area. This method is time-consuming and expensive and is therefore, impracticable. An emission limit of "no detectable emissions" using proposed Reference Method 21 as the measurement method, is not feasible because mechanical contact seals leak on occasion.

Because performance standards cannot feasibly be prescribed for compressors, the several alternative formats were considered and equipment standards found to be most appropriate. Equipment specifications evaluated for compressors were sealless compressors, mechanical contact seals equipped with barrier fluid system with the barrier fluid degassing reservoirs vented to control devices, and closed vents for the compressor seal area vented to a control device. Dual seal systems that include barrier fluid systems and sensors to detect failure of either seal or barrier fluid system were selected as the basis for Alternative IV. Some compressors in current SOCMI applications have a seal system with a circulating barrier fluid system. This barrier fluid system is similar to the system described for pumps with dual mechanical seals, although the compressor seals may be mechanical contact, oil film, or another type of seal. If the barrier fluid system is maintained at a pressure greater than the stuffing box pressure, no VOC leakage would occur because all leaks would be towards process fluid. If the stuffing box pressure is greater than the barrier fluid pressure, the barrier fluid between the two seals collects leakage from the inner seal. Leakage through the seal results in the presence of VOC in the barrier fluid which would be a non-VOC fluid or gas or a heavy VOC. The use of a light liquid VOC or VOC gas a barrier fluid could result in emissions of VOC of the same magnitude as those which would occur if product VOC were allowed to leak past the seals. VOC trapped in the barrier fluid would be emitted from the barrier fluid reservoir. However, this VOC could be collected and directed to a control device (enclosed combustion or vapor recovery system) or returned to the process (probably the suctions of the compressor) by a closed vent system that is connected to the barrier fluid reservoir. A seal system which uses a barrier fluid system provides a high control efficiency and is the most applicable effective control technique for compressors.

Section 111(h) of the Clean Air Act requires that proper maintenance and operation of equipment specified in a regulation be insured. To provide this insurance the proposed standard requires visual inspection and monitoring of the barrier fluid system to detect seal failure or barrier fluid system failure and the use of non-VOC or heavy VOC liquids for the barrier fluid. The

failure indication criterion would be determined for each piece of equipment.

Although sealless compressors would achieve approximately 100 control, sealless compressors are not readily available in capacities large enough for most SOCMI process applications, and therefore, have limited use in SOCMI. Consequently, sealless compressors were not considered under Regulatory Alternative IV and were not selected as equipment specifications for the proposed standards.

However, sealless compressors are at least equivalent to compressors equipped with barrier fluid systems and degassing vents connected to control devices because VOC emissions are eliminated and, therefore, can be used as an alternative. Leakless compressors would be required to operate under a "no detectable emissions" limit as discussed in the *Leakless Equipment* section.

There are some cases in which seals with barrier fluid systems cannot be utilized. A barrier fluid system cannot be used under all process conditions due to pressure limitations. For those cases, enclosure of the seal area would be the best option. The enclosed area would be connected to a control device (enclosed combustion or vapor recovery) with a closed vent system. Therefore, enclosed seal areas connected to a control device with a closed vent system would be allowed for compressors that cannot utilize a barrier fluid system. Although enclosing seal areas would be as effective in reducing emissions as other effective techniques, this option would most likely be used on a limited basis.

Open-ended valves. The equipment chosen for open-ended valves as the basis for Regulatory Alternative IV was equipment which would effect enclosure of the open end. Because performance standards cannot feasibly be prescribed for open-ended valves, the several alternative formats were considered and equipment standards found to be most appropriate. An emission limit is not feasible because open-ended valves are generally not designed to emit fugitive emissions into a conveyance mechanism and because they would require bagging, which is economically impracticable, as previously explained in the Selection of Formats section. A "no detectable emissions" level could not be selected as the basis for the proposed standard because VOC's could leak through the valve seat and become trapped in the line between the valve and enclosure. These trapped VOC's would be emitted when the enclosure was removed for operation of the valves and open-ended valve.

After consideration and rejection of the possibilities for performance standards for open-ended valves, equipment standard options were considered. Equipment specifications considered included improved valve seat technology and enclosure of the open end. Improved valve seat technology was not selected because the effectiveness of such technology could be nullified by operating variables such as incomplete closure of the valve by operating personnel.

Specific equipment which would be required to close the open end would be a cap, plug, blind flange, or a second valve. The control efficiency associated with these techniques is approximately 100 percent.

To insure the proper operation of the equipment, open-ended lines are also covered by operational standards. If a second valve is used to close the open end, the proposed standards would require the upstream valve to be closed first. After the upstream valve is completely closed, the downstream valve would be closed. This operational requirement is necessary in order to prevent trapping process fluid between the two valves, which could result in a situation equivalent to the uncontrolled open-ended line.

Sampling connections. Closed loop sampling was considered as the equipment specification for sampling connections. Closed loop sampling systems eliminate emissions due to purging by either returning the purge material directly to the process or by collecting the purge in a collection system which is not open to the atmosphere for recycle or disposal. An emission limit was not specified because measuring mass emissions from each sampling system would require bagging each system, a measurement method which is time-consuming, costly, and impractical. A "no detectable emissions" limit is not feasible because although the VOC control efficiency of a closed loop sampling system is approximately 100 percent, some VOC could be emitted during its transfer to a closed collection device or during its ultimate disposal.

Because performance standards cannot feasibly be prescribed for sampling connections, the several alternative formats were considered and equipment standards found to be most appropriate. The equipment standards in the proposed standards require the use of closed loop sampling equipment. In addition to closed loop sampling systems any system that collects all the VOC purged in the sampling and either recycles or disposes of this VOC without emissions to atmosphere is allowed. *In situ* sampling systems are exempted from these requirements.

Valves. Work practices consisting of periodic leak detection and repair programs were considered for valves in Regulatory Alternative IV.

A performance standard for valves was considered and found infeasible. Valves are not designed to release fugitive emissions into a conveyance mechanism. Furthermore, determining mass emissions from each valve would require bagging each valve. This measurement method would be time-consuming and prohibitively expensive, especially considering the number of valves in a SOCMI process unit. A "no detectable emissions" limit is not feasible for valves because some percent of the valves are expected to lead.

Since performance standards were found to be infeasible for valves, equipment standards were considered. Equipment specifications considered for valves were diaphragm valves and bellows-sealed valves. These equipment specifications would not be suitable for all SOCMI process applications, and therefore, were not selected as part of Regulatory Alternative IV. However, use of these valves would be at least equivalent because they eliminate leakage of VOC. The use of such valves is allowed as an alternative. These valves would be required to operate with "no detectable emissions" as described in *Leakless Equipment* in this section.

Work practices were selected as the format for control of fugitive VOC emissions from valves. Several factors influence the level of emission reduction that can be achieved by a leak detection and repair program. The three main factors are the monitoring interval, leak definition, and repair interval. Training and diligence of personnel conducting the program, repair methods attempted, and other site-specific factors may also influence the level of emission reduction achievable; however, these factors are less quantifiable than the three main factors.

The monitoring interval is the frequency at which individual component monitoring is conducted. The length of time between inspections should be determined by the rate at which new leaks occur and the rate at which repaired leaks recur. More frequent inspections could then be required for souces which tend to leak more often. Available data with which to quantify the frequency of occurrence and recurrence of leaks from valves are limited. However, more frequent monitoring would result in greater emissions reduction because more

frequent monitoring would allow leaks to be detected earlier and thus allow more immediate repair.

Monthly monitoring was considered for Regulatory Alternative IV. Test data indicate that leaks would be found with monthly inspections. More frequent intervals were not considered because the large number of valves in certain SOCMI process units limits the practical minimum for the monitoring intervals. For example, a typical large process unit, Model Unit C (defined in the Background Information Document), includes 2800 valves (in gas and light liquid service) requiring periodic monitoring. Each leak detection and repair survey for a single process unit would require approximately 95 man hours for monitoring and 16 man hours for repair. If the monitoring were performed by a two man team more than one week would be required to complete the monitoring. A week would clearly be too short a time interval to select for monitoring. Since some time would be required to schedule repair after a leak is detected, monitoring intervals shorter than one month could result in a situation where a detected leak could not be repaired before the next monitoring was required. One month was selected as the required monitoring interval because it would provide the greatest emission reduction potential without imposing difficulties in implementing the leak detection and repair program.

Industry representatives argued at the National Air Pollution Control Techniques Advisory Committee meeting (a public meeting held during the development of standards of performance) that monitoring all valves monthly would be an inefficient expense of time and manpower for valves that leak infrequently or less often than other valves. The analysis in the BID assumed that about half the valves found leaking at any given time are valves which have been repaired and which have begun leaking again. This assumption emphasizes the importance of valve leak recurrence. If this assumption is correct, more monitoring effort should be expended on valves found leaking and less on those found leaking infrequently. Therefore, the proposed standard would require monthly monitoring of valves unless they are not found leaking for two successive months. If a valve were not found leaking for two successive months, an owner or operator would have the option to exclude that valve from monitoring until the first month of the next quarterly period. Thereafter, the valve could be monitored once every quarter until a leak was detected. If a valve leak were detected, monthly monitoring of that valve would be required until it had been shown leak free for two successive months.

EPA wants to make clear that this proposed standard is based on the assumption that recurrence is an important factor in predicting valve leaks. This assumption was used to develop a monitoring program which would result in a level of fugitive emission control comparable to that which would result from monthly monitoring. It is not EPA's intent in this action to propose a monitoring plan which would be comparable in effect to quarterly monitoring. This would be the case under the proposed standard if occurrence rather than recurrence is the more important factor.

EPA is currently collecting data concerning the importance of valve leak recurrence. The data being collected will be available before promulgation. If the data shows that recurrence is not a significant contributor to the total number of leaks, the proposed program will be reassessed and consideration will be given to returning to monthly monitoring.

The leak definition is the VOC concentration observed during monitoring that defines leaking sources that require repair. Two primary factors affect the selection of the leak definition. These factors are: (1) the percent of total mass emissions which can potentially be controlled by the leak detection/repair program, and (2) the ability to repair the leaking components.

As the leak definition decreases, the maximum potential emission reduction increases due to the increasing number of sources that have VOC concentrations that are greater than the decreasing leak definitions. The overall emission reduction of a leak detection and repair program depends on several factors as noted above. Each of these factors limits the effectiveness of the program. If each of the factors considered in selecting the leak detection and repair program is 90 percent effective, then the overall effectiveness would be about 73 percent. Each factor is a limiting factor to the overall effectiveness. Thus, the most restrictive definition that is reasonable for each factor should be selected. In order to maximize control effectiveness of the leak detection and repair program, the lowest leak definition which is feasible in terms of monitoring and controlling effectively without being unreasonably burdensome should be selected.

The leak definition selected for leak detection monitoring was 10,000 ppm. Preliminary data show that attempting on-line repair of valves at or above a leak definition of 10,000 ppm could result in a few cases where the attempted repair would increase the emission rate from the valve, but these cases do not offset emission reductions achieved by repair of other valves. When repair does not reduce the VOC concentration to less than 10,000 ppm, the valve would require a more extensive repair effort than tightening or regreasing the packing. Replacement of the valve may be necessary. Preliminary data also show that attempting the repair of valves in the 1,000–10,000 ppm range (low level) could result in more cases in which individual valve emission rates increase after repair when compared to the number of such cases which would result from attempting to repair valves in the over 10,000 ppm range. If such increases were to occur, the attempted repair of "low level" leaks could result in a lower overall emission reduction at a leak definition of 1,000 ppm than at 10,000 ppm. Because the 10,000 ppm action level may provide a higher overall emission reduction than the 1,000 ppm action level, 10,000 ppm was selected as the leak definition for leak detection monitoring.

The repair interval is defined as the length of time allowed between the detection of a leak and repair of the leak. In order to provide the maximum effectiveness of the leak detection and repair program, the repair interval should require expeditious reduction of the fugitive emission but should also allow the owner/operator to maintain a reasonable degree of flexibility in overall maintenance scheduling.

The length of the repair interval would affect emission reductions achievable by the leak detection and repair programs because leaking sources would be allowed to continue to leak for a given length of time. Repair intervals of 1, 5, 10, 15, 30 and 45 days were evaluated. The effect on the maximum emission reduction potential is proportional to the number of days the source is allowed to leak between detection and repair. Estimates of emission reduction efficiency as a function of repair interval are presented in the Background Information Document.

The repair interval selected for the leak repair program was 15 days. A repair interval of one day would cause problems in coordinating activities of personnel involved in leak detection and leak repair and in certain circumstances, would not be technically feasible. A one day repair interval would essentially

require repair of each component as soon as the leak was discovered.

Some valves may not be repairable by simple field maintenance. These valves may require spare parts or removal from the process for repair. Repair intervals of 5 and 10 days could cause problems in obtaining acceptable repair for these valves. However, a 15-day interval provides the owner/operator with sufficient time for flexibility in repair scheduling, and provides time for better determination of methods for isolating pieces of leaking equipment for repair. In general, a 15 day repair interval allows more efficient handling of repair tasks while maintaining an effective reduction in fugitive emissions and was, therefore selected as the repair interval. A repair interval of 30 or 45 days was not selected because a 15 day repair interval provides the most effective emission reduction without being burdensome.

However, the first attempt at repair of a leaking source would be required as soon as practicable after detection of the leak, and no later than 5 days after discovery. Most repairs can be done quickly, and 5 days should provide sufficient time to schedule maintenance and repair a leaking source. Attempting to repair the leak within 5 days will help to identify the leaks that cannot be repaired within the 15 day repair interval. Delay of repair beyond 15 days would be allowed for leaks which could not be repaired without a process unit shutdown.

Alternative Standards. In an effort to provide as much flexibility as possible, two alternative standards are being proposed for valves in gas and light liquid service. Owners or operators of affected facilities could identify and elect to comply with either of the alternative standards which allow tailoring of fugitive emissions control programs to their own operations. This would be accomplished by carrying out a monthly monitoring program for at least one year. Then, a plant owner or operator could elect to comply with one of the alternative standards which would be based on information gathered during the one year's implementation of monthly monitoring.

The first alternative standard would provide an allowable percentage of valves leaking. This type of standard would provide the flexibility of a performance standard by setting a limit which could be achieved by the most efficient and practical methods for a particular operation. As previously pointed out in the Selection of Format for the Proposed Standards section of this preamble, an industry-wide allowable leak percentage was not possible for valves because of the variability in valve leak frequency among plants within the industry. However, the alternative standard would allow each affected facility to comply with an allowable percentage of valves leaking which is determined by their individual performance based on monthly monitoring in the leak detection and repair program.

The allowable percentage of leakers would be determined by averaging the percentage of valves found leaking in each month of the last six months of monitoring, excluding those which could not be repaired without a process unit shutdown. To this average would be added the additional percentage of leaks which would occur if valves found leaking were monitored monthly and those found not leaking for two successive months were monitored quarterly. The resulting sum would be the performance standard for the percentage of valves leaking which would be allowed at any time. If an owner or operator elected to comply with an allowable percentage of valves leaking, he would be required to meet this standard at any point in time, even though his allowable percentage would be based on his average performance of a leak detection and repair program. Choosing this alternative standard would allow for the possibility of different monitoring and maintenance programs and substitution of engineering controls at the discretion of the owner or operator. It would also eliminate a large part of the recordkeeping and reporting associated with the proposed standard for valves.

This alternative would require a minimum of one performance test per year. Additional performance tests could be requested by EPA. If the results of a performance test showed a percentage of valves leaking higher than the allowable limit, the process unit would be in violation. Reporting would consist of submitting performance test results to the Administrator; quarterly reporting would be eliminated for valves.

The second alternative standard would provide for the use of different work practices which would achieve the same level of control as the standard for valves described in proposed § 60.482(f). After performing monthly monitoring for at least a year, the data collected would be used to devise work practices which would achieve the same control as the work practices specified in the proposed standards. Using this approach an owner or operator could optimize labor and capital costs to achieve the required level of control by varying monitoring intervals or installing valves with lower probabilities of leaking. Quarterly reporting would be required under this alternative as it is under the proposed standard in § 60.482(f).

An owner or operator would request approval from EPA to use either of the alternative standards for valves. A request for approval would be accompanied by a description of the standard being selected for compliance and data and calculations supporting the basis for the alternative standard. The Administrator would either approve or disapprove the request for the use of the alternative standard within ninety days after the request is submitted. A denial from the Administrator would be accompanied by his reasoning for denial. Until the alternative is approved, an owner or operator would be required to comply with the work practice standard propsoed for valves.

The approach of providing optional standards would be reassessed before promulgation of the proposed standards and if promulgated would be reviewed at the fourth year review. At that time, changing, eliminating, or continuing the alternative standards would be considered.

Control device. Control devices would be used to dispose of VOC captured in closed vent systems from barrier fluid degassing systems and enclosed pump and compressor seal areas. In all cases, these control devices would receive streams with low and intermittent flow rates. These control devices would in some cases be designed to dispose of organic streams from other sources in the plant, so that the VOC streams may contribute a very small percentage of the total loading on the control device. Because it would be technologically and economically impracticable to measure very low-flow streams and differentiate these streams from others, an emission standard was not proposed for these control devices.

Design requirements for control devices were considered to insure that appropriate emission reductions would be achieved from control devices used in conjunction with closed vent systems. Enclosed combustion sources and vapor recovery systems were considered as control devices for the closed vent system. Enclosed combustion was specified because open flares may only be 60 percent efficient for VOC destruction of these low flow intermittent streams. The design requirements specified in the proposed standard for enclosed combustion are the attainment of a minimum temperature of 816°C for 0.75 seconds. Under these conditions, at least 95 percent VOC destruction is achieved.

Vapor recovery systems were also evaluated as control devices for VOC from closed vent systems used with pumps and compressors. A control efficiency of at least 95 percent was chosen as the design requirement because it is the highest reasonable control efficiency practically achievable for vapor recovery systems such as carbon adsorption or condensation units used for fugitive emission sources. The design requirement selected for control devices was at least 95 percent VOC emission reduction. This control efficiency can be achieved by boiler furnaces, incinerators, process heaters, and carbon adsorption units.

Leakless equipment. As discussed in the previous sections, leakless equipment was considered for several of the fugitive emission sources to which these proposed standards apply. Sealed-bellows and diaphragm valves, canned and diaphragm pumps, and sealless compressors were considered for equipment standards. Although use of this equipment achieves excellent control (100 percent) of fugitive VOC emissions, its specification in the proposed standards was rejected because it is not widely applicable to SOCMI processes. However, use of leakless equipment is clearly equivalent if not better than the proposed standards for pumps, compressors, and valves and the proposed standards would allow the use of such equipment as an alternative to the required practices.

Leakless equipment would be required to operate with "no detectable emissions" at all times when it is in service. "No detectable emissions" of VOC means 200 ppm or less above background. The 200 ppm limit resulted from the measurement method of proposed Reference Method 21 as discussed in the Selection of Test Methods section of this preamble. Because leaks are not expected to occur in leakless equipment, the proposed standards require that its leakless status need only be verified annually using Method 21.

Exclusions. Flanges in all services, relief valves in light liquid service, and all components in "heavy liquid" (VOC fluids with vapor pressures less than 0.3 kPa at 20°C) VOC service were excluded from the routine monitoring and inspection requirements. However, if leaks are detected from these sources, the same allowable repair interval which applies to pumps, valves, and compressors would apply. These sources would be excluded from routine monitoring on the basis of data from EPA testing in petroleum refineries. Flanges in refineries have very low emission rates, and although they represent 61 percent of the total sources in refineries, their total contribution to overall emissions is about 2.2 percent. In EPA testing of fugitive emission sources in refineries, safety/relief valves in liquid VOC service also exhibited very low emission rates. These valves contribute only 0.2 percent of all emissions from refineries. Components in "heavy liquid" VOC service have emission rates that are much lower than "light liquid" or gas service components. Since all three of these types of sources contribute a very small portion of overall emission, including them in the monitoring and equipment requirements was not considered reasonable.

Also excluded would be equipment operating under a vacuum because leaks to atmosphere would not occur while the equipment operated at subatmospheric internal pressures.

Selection of Recordkeeping and Reporting Requirements

Recordkeeping and reporting would be required by the proposed standards to provide documentation for the assessment of compliance with (1) work practice standards, (2) equipment standards, (3) designs standards, (4) emission standards, and (5) operational standards. Review of records and reports would provide information for enforcement personnel to assess implementation of the proposed standards.

Compliance with the proposed standards would be determined by inspection and review of records. The General Provisions of 40 CFR Part 60 state that compliance with standards of performance, other than opacity standards, shall be determined only by performance tests. However, the proposed standards are, in general, not standards of performance and performance tests are not applicable. Therefore, an amendment to 40 CFR 60.11 is being proposed which would add a provision that allows compliance to be determined by review of records and inspection. The proposed standards then specify that compliance with the standards other than those for safety/relief devices will be determined by review of records and inspection.

Recordkeeping. Three recordkeeping alternatives were considered in evaluating the amount of recorded information needed to assess compliance with the proposed standards. These alternatives represent varying levels of the amount of information which could be recorded during activities associated with complying with the standards. Consequently, these alternatives represent varying levels of resource requirements for industry.

The first alternative would be to require no formal recordkeeping other than the recordkeeping required by the General Provisions of 40 CFR 60.7 for notification of construction or modification; reconstruction; and start-up, and shutdown or malfunction. Failure to require recorded documentation of the proposed work practice, equipment, design, and operational standards would not provide a mechanism for checking the thoroughness of the implementation of the proposed standards and, therefore, would not ensure fugitive emission reduction. Because the effectiveness of the proposed standards is dependent upon the thoroughness of industry's efforts, this alternative was not chosen as the basis of the recordkeeping requirements.

The second alternative would require recordkeeping to document results of the leak detection and repair program and information relating to equipment, design, and operation requirements. Information would be recorded in sufficient detail to enable owners/operators to demonstrate compliance with the standards and therefore provide reasonable assurance of adequate reduction of fugitive emissions. This alternative would require the maintenance of quantitiative records of repaired and unrepaired leaking fugitive emission sources. This alternative would require only the minimum amount of records on the equipment, design, emission, and operational standards and the work practice leak detection and repair program necessary to ensure the effective implementation of the proposed standards.

The third alternative would require recordkeeping of all the information generated by the proposed standards e.g., the number of fugitive emission sources detected at a concentration less than 10,000 ppmv. Much of this information would not be necessary to insure the implementation of the proposed standards. The level of recordkeeping in the third alternative is more appropriate for requirements to establish equivalent methods for emission limitation.

The second alternative was selected as the basis for the recordkeeping requirements of the proposed standards. This alternative would require the minimum industry resources to provide the necessary records to ensure effective implementation of the proposed standards. This alternative would also provide a basis for efficient reporting.

The proposed standards would require recording of specific information pertaining to the monthly monitoring for the work practice standards. Also information pertaining to repair of leaking pumps and compressors would be recorded. Each leaking fugitive emission source would be identified with readily visible weatherproof identification bearing the I.D. number of the fugitive emission source. The identification could be a tag or any other marking which allows ready location of the equipment. It could be removed after the fugitive emission source was repaired and verified non-leaking in two successive months. A log would be maintained for information pertaining to the leaking sources. The log would contain the instrument and operator identification numbers for valve monitoring, the leaking source identification number, the date of detection of the leak, the date of each attempt to repair the leak, and the maximum screening value after each attempt. The log would be kept for 2 years following the survey.

The proposed standards would require that "repair delayed" be recorded in the log for that particular fugitive emission source if repair were delayed beyond 15 calendar days after the date of detection. The reasons for unsuccessful repair, date of detection, repair methods attempted and the expected date of repair of the leak and the maximum screening value observed after repair would be recorded in the log. These records would be needed to establish a data base to provide the information necessary to allow enforcement personnel to assess compliance with the work practice standards.

The proposed standards would require no records for valves which were found not to leak. Similarly, no records would need to be maintained of the weekly pump inspections if no leaks were observed visually.

For the design standards, the proposed standards would require records to be maintained of the location of materials documenting control device design criteria, such as design specifications for a vapor recovery system or an incinerator. When the control equipment was modified or replaced, the date of replacement and new design criteria would be recorded.

A record of the source identification numbers for those fugitive emission sources operating under "no detectable emissions" limits would be required. Fugitive emission sources included in this category would be all safety relief valves and leakless equipment which has been designated for operation under "no detectable emissions" such as diaphragm valves or sealless pumps. Records of each measurement made to verify "no detectable emissions" would be required. The dates of the verification tests, ambient background VOC concentration measured, and the maximum VOC concentration measured at the source would be recorded.

The proposed standards contain very specific requirements concerning recordkeeping. These requirements are in addition to the requirements set forth in the General Provisions (40 CFR 60.7). Some of the requirements in § 60.7 are duplicated in the proposed standards. Also § 60.7 requires some records that may be unnecessary to determining compliance with the proposed standards. To eliminate redundancy and unnecessary recordkeeping, the proposed standards state that §§ 60.7 (b) and (d) would not be applicable to owners or operators affected by the proposed standards. A revision to the General Provisions is also being proposed to provide a mechanism to exclude the coverage of §§ 60.7 (b) and (d).

Reporting. Three reporting alternatives were considered in evaluating the amount of reported information needed to assess compliance with the proposed standards. These alternatives represent varying levels of enforcement monitoring of the proposed standards. They also represent varying levels of resources required for industry and enforcement personnel. Enforcement personnel would review the reports submitted by industry personnel on the status of implementing the proposed standards. This review procedure reduces the need for in-plant inspections.

The first alternative would require minimum reporting of information which was recorded to monitor compliance with the proposed standards. Recorded information would be available at the plant to enforcement personnel, but the owner/operator would be required only to supply a report testifying that all equipment, design, emission, and operational standards had been met, that all components had been monitored and that those with leaks had been repaired. The more detailed recorded information would then be available upon specific request or plant visit by enforcement personnel. This alternative would not provide a mechanism for checking the thoroughness of the industry's efforts to reduce VOC fugitive emissions without a visit to the plant site. Thus, assessment of compliance with the standards would be intermittent and somewhat random since it would mainly be determined through in-plant inspections rather than through submittal of information to enforcement agencies.

The second reporting alternative would require the submittal of information in sufficient detail to insure compliance with the proposed work practice, equipment, design, emission, and operational standards. Included in the reports would be summarized data concerning leaks detected during the reporting period. This requirement would provide enforcement personnel with an overview of the repair of leaks. A report signed by the plant owner/operator attesting to the validity of the results of the monitoring surveys and instrument calibration procedures would allow enforcement personnel to assess the compliance of facilities with the work practice standards. This report would also attest to the proper application, operation, and maintenance of the equipment required by the proposed equipment, design, emission, and operational standards. These requirements would not necessarily include all records kept by industry. Only information that would be necessary to assess the implementation of the equipment standards would be required.

The third reporting alternative would require the submittal of all the information obtained while conducting leak detection and repair programs. This information would include the information reported in the second alternative and, additionally, comprehensive information on all tested components. This reporting alternative would necessitate the reporting of all information included in the recordkeeping requirements. The extensiveness of the reported information would require the SOCMI to report data that would be more appropriate for demonstrating equivalency of alternate methods of emission control than for establishing compliance with proposed standards.

The second alternative was selected as the reporting requirement for the proposed standards. This alternative provides sufficient information to review compliance without requiring excessive resources from industry. The first alternative was not selected because the compliance with work practice standards and the implementation of equipment design, emission, and operational standards could not be adequately assessed by enforcement personnel to insure that reductions in fugitive emissions were achieved. The third reporting alternative

was not selected because the additional resources expended by industry would not facilitate assessment of compliance and implementation of work practice, equipment, design, emission and operational standards.

Under the proposed standards quarterly reports would be submitted. The reports would contain summary data of the number of leaks found and repaired within the reporting period. The number of leaks not repaired within 15 days, reasons for their non-repair, and anticipated dates of repair would also be required. The owner or operator would be required to sign the report stating whether or not the process unit was operated in full compliance with all work practice, design and operational, and equipment provisions of the standard. If the owner or operator had more than one affected facility, he could submit one statement of compliance for all of them. Example report formats are shown in Figures 1, 2, 3, and 4 in the proposed standards. These are examples only. The required information could be submitted in any other useful form.

As stated previously in the Safety/Relief Valves section of this preamble, performance tests generally require three runs and notification of the Administrator 30 days before the test. However, this prenotification is not reasonable for the proposed standards because tests to determine no detectable emissions must occur within five days after an overpressure relief. Because of this conflict in reporting requirements, affected facilities have been exempted from 40 CFR 60.8(d).

Impacts of reporting requirements. In addition to requirements of the General Provisions of Subpart A of 40 CFR Part 60, the proposed standards would require quarterly reports including information pertaining to the required work practices. Estimates of the efforts associated with the reporting requirements indicate that the industry would incur manpower expenditures of approximately 53 manyears in 1985 to fulfill the requirement which would apply to about 830 affected facilities. No overlapping data requirements with other government agencies are anticipated.

Equivalence of Alternative Means of Emission Limitation

Under the provisions of Section 111(h) of the Clean Air Act, if the Administrator establishes work practices, equipment, design or operational standards, then the Administrator must allow the use of alternative means of emission limitations if they achieve a reduction in air pollutants equivalent to that achieved under requirements of a standard of performance. Sufficient data would be required to show equivalency and a public hearing would be required.

Individual owners/operators in SOCMI could request alternatives beyond those now provided for specific requirements such as the proposed equipment and the proposed leak detection and repair program. Sufficient information would have to be collected by a facility to demonstrate that the alternative control techniques would be equivalent to the control techniques required by the proposed standards. This information would then be submitted to EPA in a request for a determination of equivalence. A public hearing notice would be published in the **Federal Register.**

The data submitted in a request for equivalency of alternative control measures would take the form of test data to substantiate equivalency. To obtain permission to use alternate types of equipment, VOC emissions test data would be supplied for comparison to emissions data from the specified equipment. Application for equivalence of work practices would require submission of twelve months' data for the leak detection and repair program specified in the standards and data for the alternate system.

After public notice and opportunity for public hearing, the Administrator would determine the equivalence of an alternative means of emission limitation and would publish his determination in the **Federal Register.**

Selection of Test Methods

Several fugitive emission measurement and monitoring methods were identified and analyzed in the development of the proposed standards. Evaluation of these alternative methods was based upon results of emission testing conducted at petroleum refineries and synthetic organic chemical manufacturing plants.

One method of emission measurement is the direct measurement of mass per unit time, e.g. kg/hr, from each source. For the wide variety of sources subject to this standard, direct measurement would require "bagging" techniques for the measurement of mass emissions. "Bagging" means to enclose a fugitive emission source with a shroud in order to capture all of the emissions from the source. The shroud must be attached securely to the source in order to insure complete capture of emissions, and a flow measurement device is needed to measure the volumetric emission rate. After an appropriate equilibration time, which depends on the shroud and the leak rate (5–30 minutes), a sample of the effluent from the shroud is taken to determine the VOC concentration. The VOC mass emission rate is then calculated based on the low volumetric flow rate and VOC concentration. Because of the large numbers of sources in an affected facility as well as the different physical configurations and diverse locations, direct measurements of leak rates would be costly, time-consuming, and impractical for routine testing. Therefore, direct measurement of leak rates was not selected as the emission measurement method for the proposed standard.

Indirect emission measurement methods or monitoring methods that would yield qualitative indications of leaks were reviewed. These monitoring methods are: (1) a periodic individual component survey that would monitor all fugitive emission sources using portable VOC detectors; (2) a periodic area, or walkthrough survey that would monitor ambient concentrations of VOC using portable VOC detectors; and (3) a continuous fixed-point monitoring system that would consist of stationary sensing devices with a remotely located central readout or a central analyzer system (gas chromatograph) with remote sample collection.

Individual component surveys using portable VOC detectors would be the most efficient method for detecting all leaks. The periodic individual component survey could be done in a reasonable amount of time by monitoring personnel and could be accomplished with relative ease. The cost of leak detection equipment for an individual component survey would be reasonable.

Two individual component survey methods were identified: (1) leak detection by spraying each component with a soap solution and observing bubble formation; and (2) leak detection by measuring VOC concentration with a portable VOC detector. The magnitude of leak rates based on bubble formation is difficult to assess. In addition, soap bubble formation does not distinguish VOC emissions from other leaking gases or vapors, and bubble formation is subject to component temperature and component configuration restraints. Therefore, measurement of VOC concentration with a portable VOC detector was selected as the method for monitoring individual components.

A periodic area, or walkthrough survey of ambient VOC concentrations with a portable VOC detector and recorder would be a less effective method for detecting specific leaks than an individual component survey. Interference due to local meteorological

conditions and leaks from adjacent units would probably prevent the detection of all leaks within a process unit. In fact, previous studies have indicated that the area survey is suitable only for locating large leaks. In order to have a walkthrough method that is as sensitive to leaks as an individual component survey, the "action level" indicating the need to do a complete survey of equipment within a specific area would necessarily need to be very low. It would also probably need to be unit and meteorology specific (different action levels for different wind speeds). With an action level this low the background level of VOC could cause considerable interference and leaks would undoubtedly be indicated almost everywhere in the unit. An individual component survey would in many cases be necessary to locate the actual leak. Therefore, since it is not possible to provide an industry-wide action level indicative of leaks for a given process unit, and, since any action level that was determined could give so many false indications of leaks that an essentially complete individual component survey would be necessary to detect the actual leaks, walkthrough testing was not judged to be a reasonable approach for leak detection.

Implementation of a continuous fixed-point monitoring system would require a portable VOC detector to locate specific leaking components in addition to multiple stationary monitors or sample collectors. This system may be less efficient than the other methods for detecting VOC emissions. Possible meteorological interference and problems with measuring VOC concentrations of remotely collected samples would limit the efficiency of leak detection by a fixed-point system. Except for possible monitoring equipment calibration problems, the fixed-point system would be operated with relative ease by monitoring personnel, who would still be required to use portable VOC detection equipment to find the individual leaking components indicated by the fixed-point monitoring system. Implementation of a continuous fixed-point monitoring system would be capital-intensive, although leak detection labor costs would probably be the least of the three monitoring methods.

Some characteristics of the three indirect emission measurement methods are similar, including safety considerations and ease of operation for monitoring personnel. Some aspects of the three methods are different. Capital and operating costs vary, as do the efficiencies of the methods in detecting VOC leaks. The individual component method is characterized by a superior leak detection efficiency and reasonable costs. Considering these factors, the individual component method was selected as the monitoring method for the proposed standards.

Selected Test Procedure. The proposed test method, Method 21, would incorporate the use of a portable VOC detector to measure the concentration of VOC at a source to yield a qualitative or semiquantitative indication of the VOC emission rate from the source. The general approach of this technique assumes that if a VOC leak exists, there is an increased VOC concentration in the vicinity of the leak. Tests in petroleum refineries have established general concentration versus mass emission relationships for various fugitive emission sources. Also, tests have indicated that local conditions cause variations in concentration readings at points removed from the surface of the interface on the component where leaking occurs. Therefore, the proposed method requires the concentration to be measured at the leak interface.

As discussed in the Selection of Emission Limit, Equipment, Work Practice, Design, and Operational Standards section in this preamble, a definition of a leak for valves was selected to be 10,000 ppm. This concentration level is measured at the leak interface and qualitatively relates to emission rates. Also discussed in that section is the definition of no detectable emissions. A concentration for no detectable emissions needs to be defined such that when emissions occur they can be detected and when emissions are not occuring they are not mistakenly detected. Based on considerations of the calibration procedures and monitor variability at low meter deflections, two percent of the definition of a leak was selected as the definition of no detectable emissions. Thus, in this case, no detectable emissions means a VOC concentration of less than 200 ppm above background concentration at the leak interface.

The portable VOC detector used in the proposed monitoring program would be required to conform to several specifications to insure consistent industry-wide monitoring, effective VOC emission reduction efforts, and safe leak detection programs. Equipment specifications are proposed in Method 21 as follows: (1) The instrument should respond to total hydrocarbons or combustible gases. Detector types which may meet this requirement include catalytic oxidation, flame ionization, infrared absorption, and photoionization; (2) the instrument should be safe for operation in explosive atmospheres; (3) the instrument should incorporate an appropriate range or dilution option so that concentration levels of 10,000 ppmv can be measured; (4) the instrument should be equipped with a pump so that a continuous sample can be provided to the detector. The nominal sample flow rate should be 1-3 liters per minute; (5) the scale of the instrument readout meter should be readable to ±5 percent at 10,000 ppmv.

The proposed standards would require that the monitoring instrument be calibrated before each monitoring survey. The proposed standards would require that the monitoring instrument be calibrated with methane. The required calibration gases would be a zero gas (air, 3 ppmv VOC) and a methane-air mixture of approximately 10,000 ppmv methane. If cylinder calibration gas mixtures would be used, they would have to be analyzed and certified by the manufacturer to within ±2 percent accuracy as required in proposed Method 21. Calibration gases prepared by the user according to an accepted gaseous standards preparation procedure would also have to be accurate within ±2 percent, as required in proposed Method 21.

Proposed Method 21 requires that the monitoring instrument would be subjected to other performance requirements prior to being placed in service for the first time. The instrument would be subjected to these performance criteria every six months and after any modification or replacement of the instrument detector.

Public Hearing

A public hearing will be held to discuss these proposed standards in accordance with Section 307(d)(5) of the Clean Air Act. Persons wishing to make oral presentations should contact EPA at the address given in the ADDRESSES section of this preamble. Oral presentations will be limited to 15 minutes each. Any member of the public may file a written statement with EPA before, during, or within 30 days after the hearing. Written statements should be addressed to the Central Docket Section address given in the ADDRESSES section of this preamble.

A verbatim transcript of the hearing and written statements will be available for public inspection and copying during normal working hours at EPA's Central Docket Section in Washington, D.C. (see ADDRESSES section of this preamble).

Docket

The docket is an organized and complete file of all the information submitted to or otherwise considered by EPA in the development of this proposed rulemaking. The principal purposes of the docket are (1) to allow interested parties to readily identify and locate documents so that they can intelligently and effectively participate in the rulemaking process and (2) to serve as the record in case of judicial review.

Miscellaneous

As prescribed by Section 111, establishment of standards of performance for the synthetic organic chemical manufacturing industry was preceded by the Administrator's determination (40 CFR 60.16, 44 FR 49222, dated August 21, 1979) that sources within this industry contribute significantly to air pollution which may reasonably be anticipated to endanger public health or welfare. In accordance with Section 117 of the Act, publication of this proposal was preceded by consultation with appropriate advisory committees, independent experts, and Federal departments and agencies. The Administrator will welcome comments on all aspects of the proposed standards, including economic and technological issues, and on the proposed Appendix E and Method 21.

It should be noted that standards of performance for new sources established under Section 111 of the Clean Air Act reflect:

> * * * application of the best technological system of continuous emission reduction which (taking into consideration the cost of achieving such emission reduction, and nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated [Section 111(a)(1)].

Although there may be emission control technology available that can reduce emissions below those levels required to comply with standards of performance, this technology might not be selected as the basis of standards of performance because of costs associated with its use Accordingly, standards of performance should not be viewed as the ultimate in achievable emission control. In fact, the Act requires (or has the potential for requiring) the imposition of a more stringent emission standard in several situations.

For example, applicable costs do not necessarily play as prominent a role in determining the "lowest achievable emission rate" for new or modified sources locating in nonattainment areas, i.e., those areas where statutorialy mandated health and welfare standards are being violated. In this respect, Section 173 of the Act requires that new or modified sources constructed, in an area where ambient pollutant concentrations are above the National Ambient Air Quality Standard (NAAQS), must reduce emissions to the level that reflects the "lowest achievable emission rate" (LAER), as defined in Section 171(3) for such category of source. The statute defines LAER as that rate of emissions based on the following, whichever is more stringent:

> (A) The most stringent emission limitation which is contained in the implementation plant of any State for such class or category of source, unless the owner or operator of the proposed source demonstrates that such limitations are not achievable, or
>
> (B) The most stringent emission limitation which is achieved in practice by such class or category of source.

In no event can the emission rate exceed any applicable new source performance standard (Section 171(3)).

A similar situation may arise under the prevention of significant deterioration of air quality provisions of the Act (Part C). These provisions require that certain sources [referred to in Section 169(1)] employ "best available control technology" (BACT) as defined in Section 169(3) for all pollutants regulated under the Act. Best available control technology must be determined on a case-by-case basis, taking energy, environmental and economic impacts, and other costs into account. In no event may the application of BACT result in emissions of any pollutants which will exceed the emissions allowed by an applicable standard established pursuant to Section 111 (or 112) of the Act.

In all cases, State Implementation Plans (SIP's) approved or promulgated under Section 110 of the Act must provid for the attainment and maintenance of NAAQS designed to protect public health and welfare. For this purpose, SIP's must in some cases require greater emission reduction than those required by standards of performance for new sources.

Finally, States are free under Section 116 of the Act to establish even more stringent emission limits than those established under Section 111 of those necessary to attain or maintain the NAAQS under Section 110. Accordingly, new sources may in some cases be subject to limitations more stringent than standards of performance under Section 111, and prospective owners and operators of new sources should be aware of this possibility in planning for such facilities.

This regulation will be reviewed four years from the date of promulgation as required by the Clean Air Act. This review will include an assessment of such factors as the need for integration with other programs, the existence of alternative methods, enforceability, and improvements in emission control technology, and reporting requirements. The reporting requirements in this regulation will be reviewed as required under EPA's sunset policy for reporting requirements in regulations.

Section 317 of the Clean Air Act requires the Administrator to prepare an economic impact assessment for any new source standard of performance promulgated under Section 111(b) of the Act. An economic impact assessment was prepared for the proposed regulations and for other regulatory alternatives. All aspects of the assessment were considered in the formulation of the proposed standards to insure that the proposed standards would represent the best system of emission reduction considering costs. The economic impact assessment is included in the Background Information Document.

Dated: December 18, 1980.

Douglas M. Costle,

Administrator.

It is proposed to amend 40 CFR Part 60 as follows:

1. By adding paragraph (f) to § 60.7 to Subpart A—General Provisions as follows:

§ 60.7 Notification and recordkeeping.

* * * * *

(f) Individual subparts of this part may include specific provisions which clarify or make inapplicable the provisions set forth in this section.

(Sec. 111, 114, 301(a) of the Clean Air Act, as amended (42 U.S.C. 7411, 7414, 7601(a)))

2. By adding paragraph (f) to § 60.11 to Subpart A—General Provisions as follows:

§ 60.11 Compliance with standards and maintenance requirements.

* * * * *

(f) Special provisions set forth under an applicable subpart of this part shall supersede any conflicting provisions of this section.

(Sec. 111, 301(a) of the Clean Air Act, as amended (42 U.S.C. 7411, 7601(a)))

3. By adding Subpart VV as follows:

Subpart VV—Standards of Performance for Fugitive Emission Sources in the Synthetic Organic Chemicals Manufacturing Industry

Sec.

60.480 Applicability and designation of affected facility.

Sec.
60.481 Definitions.
60.482 Standards.
60.483 Alternative Standards.
60.484 Equivalence of alternative means of emission limitation.
60.485 Test methods and procedures.
60.486 Recordkeeping requirements.
60.487 Reporting requirements.

Authority: Sec. 111, 301(a) of the Clean Air Act as amended [42 U.S.C. 7411, 7601(a)], and additional authority as noted below.

Subpart VV—Standards of Performance for Fugitive Emission Sources in the Synthetic Organic Chemicals Manufacturing Industry

§ 60.480 Aplicability and designation of affected facility.

(a) The provisions of this subpart apply to affected facilities within the synthetic organic chemicals manufacturing industry. An affected facility is the group of all fugitive emission sources within a process unit.

(b) Any facility under paragraph (a) of this section that commences construction or modification after January 5, 1981 would be subject to the requirements of this subpart.

(c) Addition or replacement of fugitive emission sources for the purpose of process improvement which is accomplished without a capital expenditure shall not by itself be considered a modification under this subpart.

§ 60.481 Definitions.

As used in this subpart, all terms not defined here shall have the meaning given them in the Act and in Subpart A of Part 60, and the following terms shall have the specific meanings given them.

"Closed Vent System" means a system which is not open to the atmosphere and which is composed of piping, connections, and, if necessary, flow inducing devices that transport gas or vapor from a fugitive emission source to an enclosed combustion device or vapor recovery system.

"Enclosed Combustion Device" means any combustion device which is not open to the atmosphere such as a process heater or furnace, but not a flare.

"First Attempt at Repair" means to take rapid action for the purpose of stopping or reducing leakage of organic material to atmosphere using best modern practices.

"Fugitive Emission Source" means each pump, valve, safety/relief valve, open-ended valve, flange or other connector, compressor, or sampling system.

"In Gas/Vapor Service" means that the fugitive emission source contains process fluid that is in the gaseous state at operating conditions.

"In Light Liquid Service" means that the fugitive emission source contains a liquid that meets the conditions specified in § 60.485(c).

"Open-Ended Valve" means any valve, except safety/relief valves, with one side of the valve seat in contact with process fluid and one side that is open to the atmosphere, either directly or through open piping.

"Process Improvement" means routine changes made for safety and occupational health requirements, for energy savings, for better utility, for ease of maintenance and operation, for correction of design deficiencies, for bottleneck removal, for changing product requirements, or for environmental control.

"Process Unit" means equipment assembled to produce, as intermediates or final products, one or more of the chemicals listed in Appendix E of this part. A process unit can operate independently if supplied with sufficient feed or raw materials and sufficient storage facilities for the final product.

"Quarter" means a three month period. The first quarter concludes at the end of the last full month during the 180 days following initial startup.

"Repaired" means that a fugitive emissions source is adjusted or otherwise altered in order to reduce fugitive emissions below the level that indicates the necessity for repair as required in § 60.482.

"Synthetic Organic Chemicals Manufacturing Industry" means the industry that produces, as intermediates or final products, one or more of the chemicals listed in Appendix E of this part.

"In Vacuum Service" means that a fugitive emission source is operating at an internal pressure which is continuously less than 100 kPa.

"Vapor Recovery System" means any type of control device capable of removing VOC vapor from a gas stream, such as carbon adsorption, vapor compression, and vapor refrigeration systems.

"Volatile Organic Compound (VOC)" means any organic compound, which participates in atmospheric photochemical reactions or is measured by the applicable test methods described in Reference Method 21.

"In VOC Service" means that a fugitive emission source contains or contacts a process fluid that is at least 10 percent VOC by weight as determined according to the provisions of § 60.485(d).

§ 60.482 Standards.

Each owner or operator subject to the provisions of this subpart shall comply with the following requirements for fugitive emission sources in VOC service, except those in vacuum service.

(a) Pumps in light liquid service.

(1) Each pump shall be equipped with a dual mechanical seal system that includes a barrier fluid system except as provided in § 60.482(a)(7), § 60.482(a)(8), or § 60.482(j).

(2) Each fluid system as required in § 60.482(a)(1) shall be equipped with a sensor that will detect failure of the seal system, the barrier fluid system, or both. The barrier fluid shall not be a light liquid or gaseous VOC.

(3) Each dual mechanical seal system as required in § 60.482(a)(1) shall be—

(i) Operated with the barrier fluid at a pressure that is at all times greater than the pump stuffing box pressure;

(ii) Equipped with a barrier fluid degassing reservoir that is connected by a closed vent system to an enclosed combustion device designed for a minimum VOC residence time of 0.75 seconds at 816°C or to a vapor recovery system designed for a minimum of 95 percent capture of VOC input to the vapor recovery system; or

(iii) Equipped with a system to purge the barrier fluid into a process stream, with no VOC emission to atmosphere.

(4) Each pump shall be checked by visual inspection, each calendar week, for indications of liquids dripping from the pump seal. If indications of liquids dripping from the pump seal are seen, then a leak is detected.

(5) Each sensor as required in § 60.482(a)(2) shall be checked daily or shall be equipped with an audible alarm. Based on design considerations and operating experience, a criterion that indicates failure of the seal system or the barrier fluid system, or both shall be determined for each dual mechanical seal system. If this criterion is registered by the sensor, a leak is detected.

(6) When a leak is detected, it shall be repaired as soon as practicable, but not later than 15 calendar days after it is detected except as provided in § 60.482(h). A first attempt at repair shall be made no later than 5 calendar days after each leak is detected.

(7) Any pump that is not equipped as required in § 60.482(a)(1) shall be equipped with a closed vent system capable of transporting any leakage from the seal to an enclosed combustion device designed for a minimum VOC residence time of 0.75 seconds at 816°C or to a vapor recovery system designed for a minimum of 95 percent capture of the VOC input to the system. Closed vent systems, enclosed combustion

devices and vapor recovery systems used to comply with this requirement shall be operated at all times when VOC emissions could occur.

(8) Any pump that is designated as required in § 60.486(d)(1) for emissions having a concentration of less than 200 ppm above background, as determined by the methods specified in § 60.485(b), is exempt from the requirements of §§ 60.482(a)(1)–(7) if the pump—

(i) Has no externally actuated shaft penetrating the pump housing,

(ii) Is operated with emissions less than 200 ppmv above background as measured by the methods specified in § 60.485(b), and

(iii) Is tested for compliance with § 60.482(a)(8)(ii) annually and at the request of the Administrator.

(9) Closed vent systems, enclosed combustion devices, and vapor recovery systems used to comply with §§ 60.48a(3) (ii) and (iii) shall be operated at all times when VOC emissions may occur.

(b) Compressors.

(1) Each compressor shall be equipped with a seal system that includes a barrier fluid system and that prevents leakage of process fluid to the atmosphere, except as provided in § 60.482(b)(6), § 60.482(b)(7), or § 60.482(j)

(2) Each barrier fluid system as required in § 60.482(b)(1) shall be equipped with a sensor that will detect failure of the seal system. The barrier fluid shall not be a light liquid or gaseous VOC.

(3) Each seal system as required in § 60.482(b)(1) shall be—

(i) Operated with the barrier fluid at a pressure that is greater than the compressor stuffing box pressure;

(ii) Equipped with a barrier fluid system that is connected by a closed vent system to an enclosed combustion device designed for a minimum VOC residence time of 0.75 seconds at 816°C or to a vapor recovery system designed for a minimum of 95 percent capture of VOC input to the system; or

(iii) Equipped with a system to purge, with no VOC emission to atmosphere, the barrier fluid into a process stream.

(4) Each sensor as required in § 60.482(b)(2) shall be checked daily or shall be equipped with an audible alarm. Based on design considerations and operating experience, a criterion that indicates failure of the seal system, the barrier fluid system or both shall be determined for each dual mechanical seal system. If this criterion is attained and is registered by the sensor, a leak is detected.

(5) When a leak in detected it shall be repaired as soon as practicable, but not later than 15 calendar days after it is detected except as provided in § 60.482(h). A first attempt at repair shall be made no later than 5 calendar days after each leak is detected.

(6) Any compressor that is not equipped as required in § 60.482(b)(1) shall be equipped with a closed vent system capable of transporting any leakage from the seal to an enclosed combustion device designed for a minimum VOC residence time of 0.75 seconds at 816°C or to a vapor recovery system designed for a minimum of 95 percent capture of VOC input to the vapor recovery system. Closed vent systems, enclosed combustion devices and vapor recovery systems used to comply with this requirement shall be operated at all times.

(7) Each compressor that is designated as required in § 60.486(d)(1) for concentrations of emissions less than 200 ppm above background, as determined by the methods specified in § 60.485(b), is exempt from the requirements of §§ 60.482(b)(1)–(6) if it is operated with emissions having concentrations of less than 200 ppmv above background, as measured by the methods specified in § 60.485(b) and if it is tested for compliance annually.

(8) Closed vent systems, enclosed combustion devices, and vapor recovery systems used to comply with §§ 60.482(b)(3) (ii) and (iii) shall be operated at all times when VOC emissions may occur.

(c) Safety/relief valves in gas/vapor service.

(1) Each safety/relief valve in gas/vapor service shall be operated at a state of emissions having a concentration of less than 200 ppm above background, as determined by the methods specified in § 60.485(b), except during pressure releases.

(2) Each safety/relief valve shall be returned to a state of emissions having a concentration of less than 200 ppm above background after each emergency pressure release as soon as practicable, but no later than 5 calendar days, after each episode of pressure release.

(d) Sampling systems.

(1) Each sampling system shall be equipped with a closed purge system.

(2) Each closed purge system as required by § 60.482(d)(1) shall return the purged process fluid directly to the process line, or shall collect the purged process fluid for recycle or disposal without VOC emissions to the atmosphere.

(3) *In-situ* sampling systems are exempt for §§ 60.482(d)(1) and (2).

(e) Open-ended valves.

(1) Each open-ended valve shall be equipped with a cap, blind flange, plug, or a second closed valve which is attached to seal the open end at all times except during operations requiring process fluid flow through the open-ended line.

(2) Each open-ended valve equipped with a second valve attached to the open end of the process valve, as required in § 60.482(e)(1), shall be operated such that the process side valve is closed first, after operations requiring flow through the open-ended valve.

(f) Valves in gas/vapor service and valves in light liquid service.

(1) Each valve shall be monitored monthly to detect leaks by the methods specified in § 60.485(a).

(2) If a VOC concentration of 10,000 ppm or greater is measured, a leak is detected.

(3) Any valve for which a leak is not detected for two successive months may be monitored the first month of every quarter beginning with the next quarter by the methods specified in § 60.485(a) until a leak is detected. If a leak is detected, the valve shall be monitored monthly until a leak is not detected for two successive months.

(4) When a leak is detected it shall be repaired as soon as practicable, but no later than 15 calendar days after it is detected except as provided in § 60.482(h). A first attempt at repair shall be made no later than 5 calendar days after each leak is detected.

(5) First attempts at repair include, but are not limited to, the following best modern practices if practicable:

(i) Tightening of bonnet bolts.

(ii) Replacement of bonnet bolts.

(iii) Tightening of packing gland nuts.

(iv) Injection of lubricant into lubricated packing.

(6) Any valve that is designated as required in § 60.486(d)(1) for emissions having a concentration of less than 200 ppm above background as determined by the methods specified in § 60.485(b) is exempt from the requirements of §§ 60.482(f)(1) and (3) if the valve—

(i) Has no external actuating mechanism in contact with the process fluid;

(ii) Is operated with emissions having a concentration of less than 200 ppm above background as determined by the method specified in § 60.485(b); and

(iii) Is tested for compliance with § 60.482(f)(6)(ii) annually and at the request of the Administrator.

(g) Pumps and valves in heavy liquid service, safety/relief valves in light liquid and heavy liquid service, and flanges and other connectors shall be monitored within 5 days by the method specified in § 60.485(a) if evidence of a potential leak is found by visual,

audible, olfactory, or any other detection method, as follows:

(1) If a VOC concentration of 10,000 ppm or greater is measured, a leak is detected.

(2) When a leak is detected, it shall be repaired as soon as practicable, but not later than 15 calendar days after it is detected. The first attempt at repair shall be made no later than 5 calendar days after each leak is detected.

(h) Delay of repair of fugitive emission sources for which leaks have been detected will be allowed only if the repair is technically infeasible without a complete or partial process unit shutdown. Delay of repair will not be allowed beyond a process unit shutdown.

(i) Compliance with §§ 60.482 (a), (b), (c), (d), (e), (f), and (h) in this subpart shall be determined by review of records and inspection. Compliance with §§ 60.482 (a)(8), (b)(7), (c), and (f)(6) shall be determined by the methods specified in § 60.485(b). Compliance shall be achieved within 180 days of initial startup.

(j) A determination of equivalence of alternative means of emission limitation to the requirements of §§ 60.482 (a), (b), (d), (e), (f), or (g) may be requested as provided in § 60.484. If the Administrator determines that an alternative means of emission limitation is at least equivalent to the requirements of §§ 60.482 (a), (b), (d), (e), (f), or (g), the requirements of that determination shall apply.

§ 60.483 Alternative standards.

(a) Valves in gas/vapor and valves in light liquid service—allowable percentage of valves leaking.

(1) After performing a monthly leak detection and repair program in accordance with §§ 60.482(f) (1), (2), (4), and (5) for at least twelve months, an owner or operator may request approval from the Administrator to comply with an allowable percentage of valves leaking in gas/vapor and light liquid service.

(2) The following requirements shall be met if an owner or operator wishes to comply with an allowable percentage of valves leaking.

(i) An owner or operator must request approval of the Administrator to comply with an allowable percentage of valves leaking.

(ii) An owner or operator must have performed a monthly leak detection and repair program in accordance with §§ 60.482 (f), (1), (2), (4), and (5) for at least twelve months before a request for approval is submitted.

(iii) A request of approval of an allowable percentage of valves leaking must be accompanied by data and calculations which describe the methodology used for determining the allowable percentage of valves leaking.

(iv) A performance test as specified in § 60.483(a)(4) shall be conducted annually and at the request of the Administrator. A written report of the results of the performance test shall be submitted to the Administrator within a time interval specified by the Administrator.

(v) If a valve leak is detected, an attempt must be made to repair it.

(3) The allowable percentage of leaks shall be determined by adding the monthly baseline percentage of leaks demonstrated during the last six months under monthly monitoring and the monthly incremental percentage of leaks which would have occured if the provisions of § 60.482(f)(3) had been followed.

(i) The monthly baseline percentage of leaks shall be determined by obtaining a monthly average of the percentage of leaks found in an affected facility during the last six months of operation under monthly monitoring.

(ii) The monthly incremental percentage of leaks shall be determined by averaging the percentage of valves for which leaks had been detected in the second and third months of the last two quarters but which had not been detected during the first months of the last two quarters.

(iii) A percentage of leaks shall be determined by dividing the total number of leaks by the total number of valves in an affected facility, excluding those leaks for which repair has been delayed because a process unit shutdown would be required as provided in § 60.482(h) and excluding those valves which are complying with the provisions of § 60.482(f)(6).

(4) Performance tests shall be conducted in the following manner.

(i) All valves within the affected facility shall be monitored by the methods specified in § 60.485(a).

(ii) If a VOC concentration of 10,000 ppm or greater is measured, a leak is detected.

(iii) The leak percentage shall be determined by dividing the number of valves for which leaks are detected by the number of valves within the affected facility, excluding valves for which repair has been delayed because a process unit shutdown would be required, and excluding those which are complying with the provisions of § 60.482(f)(6).

(iv) For those valves for which repair has been delayed because a process unit shutdown would be required, records of attempted repair must be provided at the request of the Administrator. Records of attempted repair for those valves for which repair has been delayed shall be kept for two years.

(5)(i) The Administrator will either approve or disapprove the request for the use of the alternative standard within ninety days after the request is submitted.

(ii) If the Administrator denies the use of this alternative, the owner or operator will be notified of the reasons for the denial.

(iii) If the Administrator is reviewing a request for the use of this alternative as specified in §§ 60.483(a) (1) and (2), additional information may be requested of the owner or operator seeking approval of this option.

(iv) Until this alternative is approved, the owner or operator shall be subject to the requirements of § 60.482(f).

(6) The reporting provisions of §§ 60.487(b), (2), (3), (4), (5), (6) and (9) would not apply to owners or operators complying with an allowable percentage of valves leaking.

(b) Valves in gas/vapor and valves in light liquid service—alternative work practices.

(1) After performing a monthly leak detection and repair program in accordance with §§ 60.482(f), (1), (2), (4) and (5) for at least twelve months, an owner or operator may request approval of the administrator to comply with an alternative work practice for valves in gas/vapor and valves in light liquid service which differs from the work practice required in §§ 60.482(f) (1) and (3).

(2) The following requirements shall be met if an owner or operator wishes to comply with an optional work practice.

(i) An owner or operator must request approval of the Administrator to comply with an optional work practice standard.

(ii) An owner or operator must have performed a monthly leak detection and repair program in accordance with §§ 60.482(f) (1), (2), (4) and (5) for twelve months before a request for approval is submitted.

(iii) A request for approval of an optional work practice standard must be accomplished by data and calculations showing that the optional work practice complies with the requirements of § 60.487(b)(3).

(3) The optional work practice program shall be designed to accomplish the emission reduction associated with the required program in §§ 60.482(1)(f), (2), (3), (4) and (5). To demonstrate this reduction, an owner or operator shall determine the leak occurrence and recurrence for each program. These data shall be used to show that the expected

percentage of valves leaking in the affected facility under the optional program is equal to or less than the expected percentage of valves leaking under the required program.

(4) (i) The Administrator may deny the use of this option for any owner or operator within 90 days of the request for approval. If disapproval is not given within 90 days of the request for approval, the request is approved.

(ii) If the Administrator denies the use of this option, the owner or operator will be notified of the reasons for the denial.

(iii) If the Administrator is reviewing a request for the use of this alternative as specified in §§ 60.483(a) (1) and (2), additional information may be requested of the owner or operator seeking approval of this alternative.

(iv) Until this alternative is approved, the owner or operator shall be subject to the requirements of § 60.482(f).

§ 60.484 Equivalence of alternative means of emission limitation.

(a) Each owner or operator subject to the provisions of this subpart may apply to the Administrator for determination of equivalence for any alternative means of emission limitation that achieves a reduction in emissions of VOC at least equivalent to the reduction in emissions of VOC achieved by the controls required in §§ 60.482 (a), (b), (d), (e), (f), and (g).

(b) Determination of equivalence to the equipment requirements of §§ 60.482 (a), (b), (d), and (e) will be evaluated by the following guidelines:

(1) Each owner or operator applying for an equivalence determination shall be responsible for collecting and verifying test data to demonstrate equivalence of any alternative means of emission limitation to the requirements of §§ 60.482 (a), (b), (d), or (e).

(2) The Administrator will compare test data for the alternative means of emission limitation to test data for the equipment requirements of §§ 60.482 (a), (b), (d), or (e).

(3) The Administrator may condition the approval of equivalence on requirements that may be necessary to assure operation and maintenance to achieve the same emission reduction as the requirements of §§ 60.482 (a), (b), (d), or (e).

(c) Determination of equivalence to the work practices required in § 60.482(f) will be evaluated by the following guidelines:

(1) Each owner or operator applying for a determination of equivalence shall be responsible for collecting and verifying test data to demonstrate equivalence of an alternative means of emission limitation to the requirements of § 60.482(f).

(2) For each affected facility for which a determination of equivalence is requested, the emission reduction achieved by the requirements of § 60.482(f) shall be demonstrated for a minimum period of 12 months. A quantitative performance level shall be determined that describes the emission reduction achieved by the requirements of § 60.482(f).

(3) For each affected facility, the emission reduction achieved by any alternative means of emission limitation shall be demonstrated.

(4) Each owner or operator applying for a determination of equivalence shall commit to compliance with a performance that provides for emission reductions equal to or greater than the emission reductions achievable by the requirements of § 60.482(f).

(5) The Administrator will compare the demonstrated emission reduction for the alternative means of emission limitation to the demonstrated emission reduction for the work practices required in § 60.482(f) and will consider the commitment in § 60.484(c)(4).

(6) The Administrator may condition the approval of equivalence on requirements that may be necessary to assure operation and maintenance to achieve the same emission reduction as the requirements of § 60.482(f).

(d) After a request for determination of equivalence is received, the Administrator will publish a notice in the Federal Register and provide the opportunity for public hearing. After notice and opportunity for public hearing, the Administrator will determine the equivalence of an alternative means of emission limitation and will publish the determination in the Federal Register.

§ 60.485 Test methods and procedures.

Each owner or operator subject to the provisions of this subpart shall comply with the following test method and procedure requirements:

(a) Fugitive emission monitoring as required in § 60.482(f) shall comply with the following requirements.

(1) Monitoring shall comply with Reference Method 21.

(2) The VOC detection instrument shall meet the performance criteria of Reference Method 21.

(3) The instrument shall be calibrated before use on the day of its use by the methods specified in Method 21.

(4) Calibration gases shall be:

(i) Zero air (less than 3 ppm of VOC in air); and

(ii) A mixture of methane and air at a concentration of approximately 10,000 ppmv methane.

(5) The instrument probe shall be traversed around all potential leak interfaces as close to the interface as possible as described in Reference Method 21.

(b) When fugitive emission sources are tested for emissions having a concentration of less than 200 ppm above background as required in §§ 60.482 (a), (b), (c), and (f), the testing shall comply with the following requirements:

(1) The requirements of §§ 60.485(a) (1), (2), and (3) shall apply.

(2) The background level shall be determined, as set forth in Reference Method 21.

(3) The instrument probe shall be traversed around all potential leak interfaces as close to the interface as possible as described in Reference Method 21.

(4) The provisions of § 60.8(f) do not apply to affected facilities subject to the provisions of this subpart.

(c) A fugitive emission source is in light liquid service if the following conditions apply:

(1) The vapor pressure of one or more of the components is greater than 0.3 kPa at 20°C. Vapor pressures may be obtained from standard reference texts or may be determined by ASTM Method D-2879.

(2) The total concentration of the pure components having a vapor pressure greater than 0.3 kPa at 20°C is equal to or greater than 10 percent by weight; and

(3) The fluid is a liquid at operating conditions.

(d) For purposes of determining the percent VOC in the process fluid within a fugutive emission source, procedures that conform to the general methods described in ASTM methods E-260, E-168, and E-169 shall be used.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414))

§ 60.486 Recordkeeping requirements.

Each owner or operator subject to the provisions of this subpart shall comply with the following recordkeeping requirements.

(a) When each leak is detected as specified in §§ 60.482 (a), (b), (f), and (g); the following recordkeeping requirements apply:

(1) Weatherproof and readily visible identification, marked with the source identification number, shall be attached to the leaking source.

(i) The identification may be removed if the fugitive emission source has been monitored for two successive months as

specified in § 60.482(f)(3) and no leak has been detected during those two months.

(b) When each leak is detected as specified in §§ 60.482 (a), (b), (f), and (g), the following information shall be recorded in a log and shall be kept for two years in a readily accessible location:

(1) The instrument and operator identification numbers and the fugutive emission source identification number.

(2) The date the leak was detected and the dates of each attempt to repair the leak.

(3) Repair methods applied in each attempt to repair the leak.

(4) "Above 10,000" if the maximum VOC concentrations measured by the methods specified in § 60.485(a) after each repair attempt is greater than 10,000 ppm.

(5) "Repair delayed" if a leak is not repaired within 15 calendar days after discovery of the leak.

(6) The signature of the owner/operator whose decision it was that repair could not be effected without a process shutdown.

(7) The expected date of successful repair of the leak if a leak is not repaired within 15 days.

(8) The date of successful repair of the leak.

(c) The following information pertaining to the design requirements for closed vent systems, enclosed combustion devices, and vapor recovery systems required in §§ 60.482 (a) and (b) shall be recorded and kept in a readily accessible location:

(1) Detailed schematics, design specifications, and piping and instrumentation diagrams.

(2) The dates and descriptions of any changes in the design specifications.

(3) Periods when the enclosed combustion devices and vapor recovery systems required in §§ 60.482 (a) and (b) are not functioning as designed and dates of startups and shutdowns.

(d) The following information pertaining to all fugitive emission sources subject to the requirements in §§ 60.482 (a), (b), (c), and (f) shall be recorded in a log that is kept in a readily accessible location:

(1) A list of identification numbers for fugutive emission sources that are designated for emissions having a concentration of less than 200 ppm above background under the provisions of §§ 60.482 (a)(8), (b)(7), and (f)(7). The designation of these sources as subject to the requirements of §§ 60.482 (a)(8), (b)(7), or (f)(6) shall be signed by the owner or operator.

(2) A list of source identification numbers for safety/relief valves required by § 60.482(c) to meet no detectable emissions.

(3) The dates of each verification test for "no detectable emissions" status as determined by the methods specified in § 60.485(b).

(4) The background level measured during each verification test as required in § 60.485(b).

(5) The maximum VOC concentration measured at the source during each verification test as required in § 60.485(b).

(e) The following information shall be recorded in a log that is kept in a readily accessible location: (1) the design criterion required in § 60.482(a)(5) and § 60.482(b)(4), and (2) any changes to this criterion and the reasons for this change.

(f) The provisions of §§ 60.7(b) and (d) do not apply to affected facilities subject to the provisions of this subpart.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414))

§ 60.487 Reporting requirements.

Each owner or operator subject to the provisions of this subpart shall comply with the following reporting requirements.

(a) A summary of the information recorded as required in § 60.486(b) shall be reported quarterly to the Administrator.

(b) Quarterly reports as required in § 60.487(a) shall be similar to the forms as shown in Figures 1, 2, 3, and 4 and shall include the following information:

(1) Process unit identification.

(2) Number of valves in the process unit excluding those designated for emissions having a concentration of less than 200 ppm above background under the provisions of § 60.482(f)(5).

(3) Number of valves for which leaks were detected by the monitoring method specified in § 60.485(a) during each month of the reporting quarter.

(4) Number of valves repaired.

(5) Number of valves not repaired within 15 days as required in § 60.482(f)(4).

(6) Reasons for non-repair of valves within 15 days as required in § 60.482(f)(4).

(7) Number of pumps for which leaks were detected during the reporting quarter as specified in §§ 60.482(a)(4) and (a)(5).

(8) Number of compressors for which leaks were detected during the reporting quarter as specified in § 60.482(b)(4).

(9) Statement signed by the owner or operator stating whether all provisions of 40 CFR 60 Subpart VV had been fulfilled during the reporting quarter.

(c) The provisions of § 60.8(d) do not apply to affected facilities subject to the provisions of this subpart.

(d) In the first report submitted as required in §§ 60.487(a), the report shall include a reporting schedule stating the months that quarterly reports shall be submitted. Subsequent reports shall be submitted according to that schedule unless a revised schedule has been submitted in a previous quarterly report.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414))

BILLING CODE 6560-26-M

Figure 1

QUARTERLY REPORT FOR PROCESS UNIT
FUGITIVE EMISSION SOURCES OPERATING UNDER THE
PROVISIONS OF 40 CFR Part 60, Subpart VV, §60.484(b)

Date_____

Company Name_____

Plant Location (City, State)_____

Mailing Address_____

_____

Telephone Number_____

Reporting Period_____

This report filed_____
(Process Unit Name)

Producing_____
(Chemical product(s))

EXAMPLE

Figure 2

SUMMARY STATISTICS FOR LEAK DETECTION
AND REPAIR REQUIREMENTS
OF 40 CFR Part 60, Subpart VV, §60.484(b)

1. Process Unit Name_____
(one report required for each affected facility)

2. Number of valves covered under the leak detection and repair program. _____

3. Number of valves found leaking during the reporting period. _____

4. Number of leaking valves repaired during the reporting period. _____

5. Number of pumps found leaking during the reporting period. _____

6. Number of compressors found leaking during the reporting period. _____

EXAMPLE

Figure 3

INFORMATION REQUIRED BY 40 CFR Part 60, Subpart VV, §60.484(b)(6)
FOR LEAKING VALVES NOT REPAIRED WITHIN 15 DAYS

1. Process Unit Name_____
2. Total number of valves not repaired within 15 days _____
3. Number of valves not repaired for the following reasons.
   (a) New parts required. _____
   (b) Off-line repair required. Critical, in-service valve. Bypass impossible. _____
   (c) Other (Explain reasons for non-repair) _____
4. Date of next schedule turn-around or shutdown _____

_____
Signature of Plant Manager
or Manager Designate

EXAMPLE

Figure 4

CERTIFICATION
AS REQUIRED IN §60.484(b)(10)

I hereby certify that process unit _____ owned (operated)
(Name)
by _____ located in _____
(company name) (city, state)
_____ operated in compliance with the
(has been/has not been)
requirements of Subpart VV, 40 CFR Part 60 which contains Standards of Performance for New Stationary Sources in the Synthetic Organic Chemical Manufacturing Industry.

All required equipment and control devices have been operated and maintained in compliance with the standards. All required work practices have been followed. Monitoring has been done as specified in Method 21. All required records have been made and are kept in _____
(location in plant)
_____ for review by EPA.

_____
(signature of owner or operator)

_____
(title)

_____
(date)

EXAMPLE

BILLING CODE 6560-26-C

4. By adding Reference Method 21 to Appendix A as follows:

Appendix A—Reference methods

* * * * *

Method 21. Determination of Volatile Organic Compound Leaks

1. *Applicability and Principle*

1.1 Applicability. This method applies to the determination of volatile organic compound (VOC) leaks from organic process equipment. These sources include, but are not limited to, valves, flanges and other connections, pumps and compressors, pressure relief devices, process drains, open-ended valves, pump and compressor seal system degassing vents, accumulator vessel vents, and access door seals.

1.2 Principle. A portable instrument is used to detect VOC leaks from individual sources. The instrument detector is not specified, but it must meet the specifications and performance criteria contained in paragraph 2.1.

2. *Apparatus*

2.1 Monitoring Instrument. The monitoring instrument shall be as follows:

2.1.1 Specifications.

a. The VOC instrument detector shall respond to the organic compounds being processed. Detectors which may meet this requirement include, but are not limited to, catalytic oxidation, flame ionization, infrared absorption, and photoionization.

b. The instrument shall be intrinsically safe for operation in explosive atmospheres as defined by the applicable U.S.A Standards (e.g., National Electrical Code by the National Fire Prevention Association).

c. The instrument shall be able to measure the leak definition concentration specified in the regulation.

d. The instrument shall be equipped with a pump so that a continuous sample is provided to the detector. The nominal sample flow rate shall be 1–3 liters per minute.

e. The scale of the instrument meter shall be readable to ±5 percent of the specified leak definition concentration.

2.1.2 Performance Criteria. The instrument must meet the following performance criteria. The definitions and evaluation procedures for each parameter are given in Section 4.

2.1.2.1 The instrument response time must be 30 seconds or less. The response time must be determined for the instrument system configuration to be used during testing, including dilution equipment. The use of a system with a shorter response time than that specified will reduce the time required for field component surveys.

2.1.2.2 Calibration Precision: The calibration precision must be less than or equal to 10 percent of the calibration gas value.

2.1.2.3 Quality Assurance. The instrument shall be subjected to response time and calibration precision tests prior to being placed in service. The calibration precision test shall be repeated every 6 months thereafter. If any modification or replacement of the instrument detector is required, the instrument shall be retested and a new 6 month quality assurance test schedule will apply. The response time test shall be repeated if any modifications to the sample pumping system or flow configuration is made that would change the response time.

2.3 Calibration Gases. The monitoring instrument is calibrated in terms of parts per million by volume (ppmv) of the compound specified in the applicable regulation. The calibration gases required for monitoring and instrument performance evaluation are a zero gas (air, 3 ppmv VOC) and a calibration gas in air mixture approximately equal to the leak definition specified in the regulation. If cylinder calibration gas mixtures are used, they must be analyzed and certified by the manfacturer to be within ±2 percent accuracy. Calibration gases may be prepared by the user according to any accepted gaseous standards preparation procedure that will yield a mixture accurate to within ±2 percent. Alternative calibration gas species may be used in place of the calibration compound if a relative response factor for each instrument is determined so that calibrations with the alternative species may be expressed as calibration compound equivalents on the meter readout.

3. *Procedures*

3.1 Calibration. Assemble and start up the VOC analyzer and recorder according to the manufacturer's instructions. After the appropriate warmup period and zero or internal calibration procedure, introduce the calibration gas into the instrument sample probe. Adjust the instrument meter readout to correspond to the calibration gas value.

If a dilution apparatus is used, calibration must include the instrument and dilution apparatus assembly. The nominal dilution factor may be used to establish a scale factor for converting to an undiluted basis. For example, if a nominal 10:1 dilution apparatus is used, the meter reading for a 10,000 ppm calibration would be set at 1,000. During field surveys, the scale factor of 10 would be used to convert measurements to an undiluted basis.

3.2 Individual Source Surveys.

3.2.1 Case I—Leak Definition Based on Concentration Value. Place the probe inlet at the surface of the component interface where leakage could occur. Move the probe along the interface periphery while observing the instrument readout. If an increased meter reading is observed, slowly probe the interface where leakage is indicated until the maximum meter reading is obtained. Leave the probe inlet at this maximum reading locations for approximately two times the instrument response time. If the maximum observed meter reading is greater that the leak definition in the applicable regulation, record and report the result as specified in the regulation reporting requirements. Examples of the application of this general technique to specific equipment types are:

a. Valves—The most common source of leaks from valves is at the seal between the stem and housing. Place the probe at the interface where the stem exists the packing gland and sample the stem circumference. Also, place the probe at the interface of the packing gland take-up flange seat and sample the periphery. In addition, survey valve housings of multipart assembly at the surface of all interfaces where leaks can occur.

b. Flanges and Other Connections—For welded flanges, places the probe at the outer edge of the flange-gasket interface and sample around the circumference of the flange. Sample other types of nonpermanent joints (such as threaded connections) with a similar traverse.

c. Pumps and Compressors—Conduct a circumferential traverse at the outer surface of the pump or compressor shaft and seal interface. If the source is a rotating shaft, position the probe inlet within one centimeter of the shaft-seal interface for the survey. If the housing configuration prevents a complete traverse of the shaft periphery, sample all accessible portions. Sample all other joints on the pump or compressor housing where leakage can occur.

d. Pressure Relief Devices—The configuration of most pressure relief devices prevents sampling at the sealing seat interface. For those devices equipped with an enclosed extension, or horn, place the probe inlet at approximately the center of the exhaust area to the atmosphere for sampling.

e. Process Drains—For open drains, place the probe inlet at approximately the center of the area open to the atmosphere for sampling. For covered drains, place the probe at the surface of the cover interface and conduct a peripheral traverse.

f. Open-Ended Lines or Valves—Place the probe inlet at approximately the center of the opening to the atmosphere for sampling.

g. Seal System Degassing Vents and Accumulator Vents—Place the probe inlet at approximately the center of the opening to the atmosphere for sampling.

h. Assess Door Seals—Place the probe inlet at the surface of the door seal interface and conduct a peripheral traverse.

3.2.2. Case II-Leak Devinition Based on "NO Detactable Emission".

a. Determine the local ambient concentration around the source by moving the probe inlet randomly upwind and downwind at distance of one to two meters from the source. If an interference exists with this determination due to a nearby emission or leak, the local ambient concentration may be determined at distances closer to the source, but in no case shall the distance be less than 25 centimeters. Note the ambient concentration and then move the probe inlet to the surface of the source and conduct a survey as described in 3.2.1. If a concentration increase greater than 2 percent of the concentration-based leak definition is obtained, record and report the results as specified by the regulation.

b. For those cases where the regulation requires a specific device installation, or that specified vents be ducted or piped to a control device, the existence of these conditions shall be visually confirmed. When the regulation also requires that no detectable emissions exist, visual observations and sampling surveys are required. Examples of this technique are:

i. Pump or Compressor Seals—If applicable, determine the type of shaft seal. Perform a survey of the local area ambient VOC concentration and determine if detectable emissions exist as described in 3.2.2.a.

ii. Seal system degassing vents, accumulator vessel vents, pressure relief

devices—If applicable, observe whether or not the applicable ducting or piping exists. Also, determine if any sources exist in the ducting or piping where emissions could occur prior to the control device. If the required ducting or piping exists and there are no sources of where the emissions could be vented to the atmosphere prior to the control device, then it is presumed that no detectable emissions are present.

4. Instrument Performance Evaluation Procedures

4.1 Definitions.

4.1.1 Calibration Precision. The difference between the average VOC concentration indicated by the meter readout for consecutive repetitions and the know concentration of a test gas mixture.

4.1.2 Response time. The time interval from a step change in VOC concentration at the input of the sampling system to the time at which 90 percent of the corresponding final value is reached as displayed on the instrument readout meter.

4.2 Evaluation Procedures. At the beginning of the instrument performance evaluation test, assemble and start up the instrument according to the manufacturer's instructions for recommended warmup period and preliminary adjustments. If a dilution apparatus is used during field surveys, the evaluation procedure must be performed on the instrument-dilution system combination.

4.2.1. Calibration Precision Test. Make a total of nine measurements by alternately using zero gas and the specified calibration gas. Record the meter readings (example data sheet shown in Figure 21-1).

4.2.2 Response time Test Procedure. Introduce zero gas into the instrument sample probe. When the meter reading has stabilized, switch quickly to the specified calibration gas. Measure the time from concentration switching to 95 percent of final stable reading. Perform this test sequence three times and record the results (example data sheet given in Figure 21-2).

4.3 Calculations. All results are expressed as mean values, calculated by:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^{n} x_i$$

Where:

x_i = **VALUE OF THE MESUREMENTS.**

Σ = Sum of the individual values.

$\bar{x}$ = Mean value.

n = Number of data points.

BILLING CODE 6560-26-M

Instrument ID _____

Calibration Gas Data

Calibration = _____ppmv

Run No.	Instrument Meter Reading, ppm	Difference[1] ppm
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		

Mean Difference _____

Calibration Error = $\frac{\text{Mean Difference}^{(2)}}{\text{Calibration Gas Concentration}} \times 100$ _____

[1] Calibration Gas Concentration - Instrument Reading

Figure 21-1. Calibration Error Determination

Instrument ID _____

Calibration Gas Concentration _____

90% Response Time:

1. _____ Seconds

2. _____ Seconds

3. _____ Seconds

Mean Response Time _____ Seconds

Figure 21-2. Response Time Determination

BILLING CODE 6560-16-C

5. By adding Appendix E as follows:

Appendix E—Synthetic Organic Chemicals Manufacturing Industry

OCPDB No.*	Chemical
20	Acetal.
30	acetaldehyde.
40	Acetaldol.
50	Acetamide.
65	Acetanilide.
70	Acetic acid.
80	Acetic anhydride.
90	Acetone.
100	Acetone cyanohydrin.
110	Acetonitrile.
120	Acetophenone.
125	Acetyl chloride.
130	Acetylene.
140	Acrolein.
150	Acrylamide.
160	Acrylic acid and esters.
170	Acrylonitrile.
180	Adipic acid.
185	Adiponitrile.
190	Alkyl naphthalenes.
200	Allyl alcohol.
210	Allyl chloride.
220	Aminobenzoic acid.
230	Aminoethylethanolamine.
235	p-Aminophenol.
240	Amyl acetates.
250	Amyl alcohols.
260	Amyl amine.
270	Amyl chloride.
280	Amyl mercaptans.
290	Amyl phenol.
300	Aniline.
310	Aniline hydrochloride.
320	Anisidine.
330	Anisole.
340	Anthranilic acid.
350	Anthraquinone.
360	Benzaldehyde.
370	Benzamide.
380	Benzene.
390	Benzenedisulfonic acid.
400	Benzenesulfonic acid.
410	Benzil.
420	Benzilic acid.
430	Benzoic acid.
440	Benzoin.
450	Benzonitrile.
460	Benzophenone.
480	Benzotrichloride.
490	Benzoyl chloride.
500	Benzyl alcohol.
510	Benzyl amine.
520	Benzyl benzoate.
530	Benzyl chloride.
540	Benzyl dichloride.
550	Biphenyl.
560	Bisphenol A.
570	Bromobenzene.
580	Bromonaphthalene.
590	Butadiene.
592	1-butene.
600	n-butyl acetate.
630	n-butyl acrylate.
640	n-butyl alcohol.
650	s-butyl alcohol.
660	t-butyl alcohol.
670	n-butylamine.
680	s-butylamine.
690	t-butylamine.
700	p-tert-butyl benzoic acid.
710	1,3-butylene glycol.
750	n-butyraldehyde.
760	Butyric acid.
770	Butyric anhydride.
780	Butyronitrile.
785	Caprolactam.
790	Carbon disulfide.
800	Carbon tetrabromide.
810	Carbon tetrachloride.
820	Cellulose acetate.
840	Chloroacetic acid.
850	m-chloroaniline.
860	o-chloroaniline.
870	p-chloroaniline.
880	Chlorobenzaldehyde.
890	Chlorobenzene.
900	Chlorobenzoic acid.
905	Chlorobenzotrichloride.
910	Chlorobenzoyl chloride.
920	Chlorodifluoroethane.
921	Chlorodifluoromethane.
930	Chloroform.
940	Chloronapthalene.
950	o-chloronitrobenzene.
951	p-chloronitrobenzene.
960	Chlorophenols.
964	Chloroprene.
965	Chlorosulfonic acid.
970	m-chlorotoluene.
980	o-chlorotoluene.
990	p-chlorotoluene.
992	Chlorotrifluoromethane.
1000	m-cresol.
1010	o-cresol.
1020	p-cresol.
1021	Mixed cresols.
1030	Cresylic acid.
1040	Crotonaldehyde.
1050	Crotonic acid.
1060	Cumene.
1070	Cumene hydroperoxide.
1080	Cyanoacetic acid.
1090	Cyanogen chloride.
1100	Cyanuric acid.
1110	Cyanuric chloride.
1120	Cyclohexane.
1130	Cyclohexanol.
1140	Cyclohexanone.
1150	Cyclohexene.
1160	Cyclohexylamine.
1170	Cyclooctadiene.
1180	Decanol.
1190	Diacetone alcohol.
1200	Diaminobenzoic acid.
1210	Dichloroaniline.
1215	m-dichlorobenzene.
1216	o-dichlorobenzene.
1220	p-dichlorobenzene.
1221	Dichlorodifluoromethane.
1240	Dichloroethyl ether.
1244	1,2-dichloroethane (EDC).
1250	Dichlorohydrin.
1270	Dichloropropene.
1280	Dicyclohexylamine.
1290	Diethylamine.
1300	Diethylene glycol.
1304	Diethylene glycol diethyl ether.
1305	Diethylene glycol dimethyl ether.
1310	Diethylene glycol monobutyl ether.
1320	Diethylene glycol monobutyl ether acetate.
1330	Diethylene glycol monoethyl ether.
1340	Diethylene glycol monoethyl ether acetate.
1360	Diethylene glycol monomethyl ether.
1420	Diethyl sulfate.
1430	Difluoroethane.
1440	Diisobutylene.
1442	Diisodecyl phthalate.
1444	Diisooctyl phthalate.
1450	Diketene.
1460	Dimethylamine.
1470	N,N-dimethylaniline.
1480	N,N-dimethyl ether.
1490	N,N-dimethylformamide.
1495	Dimethylhydrazine.
1500	Dimethyl sulfate.
1510	Dimethyl sulfide.
1520	Dimethyl sulfoxide.
1530	Dimethyl terephthalate.
1540	3,5-dinitrobenzoic acid.
1545	Dinitrophenol.
1550	Dinitrotoluene.
1560	Dioxane.
1570	Dioxolane.
1580	Diphenylamine.
1590	Diphenyl oxide.
1600	Diphenyl thiourea.
1610	Dipropylene glycol.
1620	Dodecene.
1630	Dodecylaniline.
1640	Dodecylphenol.
1650	Epichlorohydrin.
1660	Ethanol.
1661	Ethanolamines.
1670	Ethyl acetate.
1680	Ethyl aceatoacetate.
1690	Ethyl acrylate.
1700	Ethylamine.
1710	Ethylbenzene.
1720	Ethyl bromide.
1730	Ethylcellulose.
1740	Ethyl chloride.
1750	Ethyl chloroacetate.
1760	Ethylcyanoacetate.
1770	Ethylene.
1780	Ethylene carbonate.
1790	Ethylene chlorohydrin.
1800	Ethylenediamine.
1810	Ethylene dibromide.
1830	Ethylene glycol.
1840	Ethylene glycol diacetate.
1870	Ethylene glycol dimethyl ether.
1890	Ethylene glycol monobutyl ether.
1900	Ethylene glycol monobutyl ether acetate.
1910	Ethylene glycol monoethyl ether.
1920	Ethylene glycol monoethyl ether acetate.
1930	Ethylene glycol monomethyl ether.
1940	Ethylene glycol monomethyl ether acetate.
1960	Ethylene glycol monophenyl ether.
1970	Ethylene glycol monopropyl ether.
1980	Ethylene oxide.
1990	Ethyl ether.
2000	2-ethylhexanol.
2010	Ethyl orthoformate.
2020	Ethyl oxalate.
2030	Ethyl sodium oxalacetate.
2040	Formaldehyde.
2050	Formamide.
2060	Formic acid.
2070	Fumaric acid.
2073	Furfural.
2090	Glycerol (Synthetic).
2091	Glycerol dichlorohydrin.
2100	Glycerol triether.
2110	Glycine.
2120	Glyoxal.
2145	Hexachlorobenzene.
2150	Hexachloroethane.
2160	Hexadecyl alcohol.
2165	Hexamethylenediamine.
2170	Hexamethylene glycol.
2180	Hexamethylenetetramine.
2190	Hydrogen cyanide.
2200	Hydroquinone.
2210	p-hydroxybenzoic acid.
2240	Isoamylene.
2250	Isobutanol.
2260	Isobutyl acetate.
2261	Isobutylene.
2270	Isobutyraldehyde.
2280	Isobutyric acid.
2300	Isodecanol.
2320	Isooctyl alcohol.
2321	Isopentane.
2330	Isophorone.
2340	Isophthalic acid.
2350	Isoprene.
2360	Isopropanol.
2370	Isopropyl acetate.
2380	Isopropylamine.
2390	Isopropyl chloride.
2400	Isopropylphenol.
2410	Ketene.
2414	Linear alkyl sulfonate.
2417	Linear alkylbenzene.
2420	Maleic acid.
2430	Maleic anhydride.
2440	Malic acid.
2450	Mesityl oxide.
2455	Metanilic acid.
2460	Methacrylic acid.
2490	Methallyl chloride.
2500	Methanol.
2510	Methyl acetate.
2520	Methyl acetoacetate.
2530	Methylamine.
2540	n-methylaniline.
2545	Methyl bromide.
2550	Methyl butynol.
2560	Methyl chloride.
2570	Methyl cyclohexane.
2590	Methyl cyclohexanone.
2620	Methylene chloride.
2630	Methylene dianiline.
2635	Methylene diphenyl diisocyanate.
2640	Methyl ethyl ketone.
2645	Methyl formate.
2650	Methyl isobutyl carbinol.
2660	Methyl isobutyl ketone.
2665	Methyl methacrylate.
2670	Methyl pentynol.
2690	α-methylstyrene.
2700	Morpholine.
2710	α-naphthalene sulfonic acid.
2720	β-naphthalene sulfonic acid.
2730	α-naphthol.
2740	β-naphthol.

OCPDB No.*	Chemical
2750	Neopentanoic acid.
2756	o-nitroaniline.
2757	p-nitroaniline.
2760	o-nitroanisole.
2762	p-nitroanisole.
2770	Nitrobenzene.
2780	Nitrobenzoic acid (o,m, and p).
2790	Nitroethane.
2791	Nitromethane.
2792	Nitrophenol.
2795	Nitropropane.
2800	Nitrotoluene.
2810	Nonene
2820	Nonyl phenol.
2830	Octyl phenol.
2840	Paraldehyde.
2850	Pentaerythritol.
2851	n-pentane.
2855	1-pentene.
2860	Perchloroethylene.
2882	Perchloromethyl mercaptan.
2890	o-phenetidine.
2900	p-phenetidine.
2910	Phenol.
2920	Phenolsulfonic acids.
2930	Phenyl anthranilic acid.
2940	Phenylenediamine.
2950	Phosgene
2960	Phthalic anhydride.
2970	Phthalimide.
2973	β-picoline.
2976	Piperazine
3000	Polybutenes
3010	Polyethylene glycol.
3025	Polypropylene glycol.
3063	Propionaldehyde.
3066	Propionic acid
3070	n-propyl alcohol.
3075	Propylamine
3080	Propyl chloride
3090	Propylene.
3100	Propylene chlorohydrin.
3110	Propylene dichloride
3111	Propylene glycol.
3120	Propylene oxide.
3130	Pyridine.
3140	Quinone.
3150	Resorcinol.
3160	Resorcylic acid.
3170	Salicylic acid.
3180	Sodium acetate.
3181	Sodium benzoate.
3190	Sodium carbo: methyl cellulose.
3191	Sodium chloracetate.
3200	Sodium formate
3210	Sodium phenate.
3220	Sorbic acid.
3230	Styrene.
3240	Succinic acid.
3250	Succinonitrile.
3251	Sulfanilic acid.
3260	Sulfolane.
3270	Tannic acid.
3280	Terephthalic acid.
3290 and 3291	Tetrachloroethanes
3300	Tetrachlorophthalic anhydride.
3310	Tetraethyllead
3320	Tetrahydronapthalene
3330	Tetrahydrophthalic anhydride.
3335	Tetramethyllead
3340	Tetramethylenediamine.
3341	Tetramethylethylenediamine.
3349	Toluene
3350	Toluene-2,4-diamine.
3354	Toluene-2,4-diisocyanate.
3355	Toluene diisocyanates (mixture).
3360	Toluene sulfonamide
3370	Toluene sulfonic acids.
3380	Toluene sulfonyl chloride.
3381	Toluidines.
3390, 3391, and 3393	Trichlorobenzenes.
3395	1,1,1-trichloroethane
3400	1,1,2-trichloroethane.
3410	Trichloroethylene
3411	Trichlorofluoromethane
3420	1,2,3-trichloropropane.
3430	1,1,2-trichloro-1,2,2-trifluoroethane.
3450	Triethylamine
3460	Triethylene glycol.
3470	Triethylene glycol dimethyl ether
3480	Trisobutylene.
3490	Trimethylamine
3500	Urea.
3510	Vinyl acetate.
3520	Vinyl chloride.
3530	Vinylidene chloride.
3540	Vinyl toluene
3541	Xylenes (mixed).
3560	o-sylene.
3570	p-xylene.
3580	Xylenol.
3590	Xylidine

*The OCPDB Numbers are reference indices assigned to the various chemicals in the Organic Chemical Producers Data Base developed by EPA.

[FR Doc. 81-89 Filed 1-2-81; 8:45 am]

BILLING CODE 6560-26-M

Federal Register / Vol. 46, No. 71

Tuesday, April 14, 1981 / Proposed Rules

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 60

[AD-FRL 1804-3]

Standards of Performance for New Stationary Sources; VOC Fugitive Emission Sources; Synthetic Organic Chemical Manufacturing Industry; Extension of Comment Period

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule; notice of availability of reports and comment period extension.

SUMMARY: The comment period for the proposed standards of performance for volatile organic compound (VOC) fugitive emission sources in the Synthetic Organic Chemical Manufacturing Industry (SOCMI) has been extended. This extension will allow industry adequate time for commenting on certain reports originally planned and will allow them adequate time for commenting on additional reports and data which should be completed shortly.

DATES: *Comments.* Comments on the proposed standards must be received by July 31, 1981.

Documents. Requests for the reports referenced in this notice must be received before May 15, 1981, so that the requests can be filled during June, 1981.

ADDRESSES: *Comments.* Comments on the proposed standards of performance should be submitted (in duplicate if possible) to: Central Docket Section (A-130), Attention: Docket No. A-79-32, U.S. Environmental Protection Agency, 401 M Street, SW., Washington, D.C. 20460.

Documents. The reports referenced in this notice should be available in June, 1981. These reports may be obtained by requesting in writing a copy from: Standards Development Branch (MD-13), Attention: SOCMI Reports, U.S. Environmental Protection Agency; Research Triangle Park, North Carolina 27711. Please specify the report or reports requested by the report number referenced in this notice.

FOR FURTHER INFORMATION CONTACT:

Ms. Susan Wyatt, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5578. Do not call this telephone number to request reports.

SUPPLEMENTARY INFORMATION:

Standards of performance for fugitive emission sources of VOC within new, modified, or reconstructed process units within SOCMI were proposed on January 5, 1981 (46 FR 1136). As discussed in the preamble to the proposed standards (46 FR 1142), EPA was gathering additional data on fugitive emission sources that would be available to the public before the end of the comment period. EPA welcomed comments concerning the proposed rule in light of that data. These data were made available in two reports released before the public hearing which was held on March 3, 1981. The reports are titled: *Evaluation of Maintenance for Fugitive VOC Emissions Control* (Report 1) and *Frequency of Leak Occurrence for Fittings in Synthetic Organic Chemical Plant Process Units* (Report 2).

Industry representatives have requested additional time to consider the data presented in these two reports. They have expressed the belief that more time would enable them to prepare more complete comments. These comments would, in turn, better serve the rulemaking. The extension in comment time was also requested to allow industry to comment on additional reports and data which industry believes may be relevant and which should be available soon. The additional reports are described briefly in the numbered items below.

1. Correlation of various line and process parameters with leak frequency (Report 3). This report will contain an analysis of data to determine process parameters which may indicate a high leak potential for fugitive emission sources.

2. Response factors for SOCMI chemicals at a concentration of 10,000 ppm (Report 4). The results of this study will show how portable VOC monitors respond to different chemicals.

3. Response factors for mixtures of SOCMI chemicals with known concentrations (Report 5). The response of portable VOC monitors to known mixtures of SOCMI chemicals will be investigated.

4. Emission factor calculations (Report 6). Emission factors for SOCMI fugitive emission sources will be calculated for those pieces of equipment for which sufficient data exist. These emission factors may then be used to evaluate the emission estimates made for new SOCMI process units.

5. Response factor impact on leak frequency (Report 7). This study is designed to investigate the impact of response factors on the number of valves which would be defined as leakers in a new SOCMI process unit.

6. An analysis of fugitive emissions data from a high density polyethylene unit (Report 8). Leak frequency, emission factors, occurrence rates, recurrence rates, and repair effectiveness will be determined as the data allow. Although polyethylene is not a SOCMI chemical, industry representatives have requested that they be allowed to comment on this data.

7. Development of a methodology for measuring control efficiencies of flares (Report 9). Industry has requested that the data from this study be examined to determine combustion efficiencies for flares. It should be noted, however, that the data being generated in this study cannot be considered representative of field conditions. Flare types and gas mixtures chosen for this study were chosen for research purposes and are, in fact, atypical of field conditions. This measurement methodology study precedes a planned study of flare efficiency which is not scheduled to be completed until 1983.

All of the reports listed should be available in June. In view of the fact that industry representatives want the opportunity to comment on these reports and on data gathered by industry as they relate to the rulemaking, it is reasonable to provide the public an opportunity to review the reports and comment on them. Therefore, the comment period has been extended to close on July 31, 1981 instead of April 6, 1981.

This extension will allow industry adequate time for commenting on the two reports originally planned and will allow them adequate time for commenting on additional reports and data which should be completed shortly. The extension until July 31, 1981 should allow at least 30 days for reviewing and commenting on these reports.

Dated: April 8, 1981.

Edward F. Tuerk,

Acting Assistant Administrator for Air, Noise, and Radiation.

[FR Doc. 81-11294 Filed 4-13-81; 8:45 am]

BILLING CODE 6560-26-M

ENVIRONMENTAL PROTECTION AGENCY

■

STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

BEVERAGE CAN SURFACE COATING INDUSTRY

SUBPART WW

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 60

[AD FRL-1534-1]

Standards of Performance for New Stationary Sources; Beverage Can Surface Coating Industry

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule and notice of public hearing.

SUMMARY: The proposed standards would limit emissions of volatile organic compounds (VOC) from new, modified, and reconstructed beverage can surface coating operations. The proposed standards would limit VOC emissions from beverage can surface coating to those resulting from the use of waterborne coatings.

The standards implement Section 111 of the Clean Air Act and are based on the Administrator's determination that surface coating operations within beverage can manufacturing plants contribute significantly to air pollution that may reasonably be anticipated to endanger public health or welfare. The intent is to require new, modified, and reconstructed beverage can surface coating operations to use the best demonstrated system of continuous emission reduction, considering costs, nonair quality health, and environmental and energy impacts.

DATE: *Comments:* Comments must be received on or before February 5, 1981.

Public Hearing: A public hearing will be held on January 6, 1981 beginning at 9:00 a.m.

Request to Speak at Hearing. Persons wishing to present oral testimony must contact EPA by December 30, 1980.

ADDRESSES: *Comments:* Comments should be submitted (in duplicate if possible) to Central Docket Section (A-130), Attention: Docket Number A-80-4, U.S. Environmental Protection Agency, 401 M Street, SW., Washington, D.C. 20460.

Public Hearing: The public hearing will be held at EPA Environmental Research Center Auditoruim (ERC), Research Triangle Park, North Carolina. Persons wishing to present oral testimony should notify Ms. Deanna Tilley, Standards Development Branch (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5477.

Background Information Document. The background Information Document (BID) for the proposed standards may be obtained from the U.S. EPA Library (MD-35), Research Triangle Park, North Carolina 27711, telephone number (919) 541-2777. Please refer to *Beverage Can Surface Coating Operations, Background Information for Proposed Standards,* EPA-450/3-80-036a.

Docket. Docket No. A-80-4, which contains supporting information used in developing the proposed standards, is available for public inspection and copying between 8:00 a.m. and 4:00 p.m., Monday through Friday, at EPA's Central Docket Section, West Tower Lobby, Gallery 1, Waterside Mall, 401 M Street, SW., Washington, D.C. 20460. A reasonable fee may be charged for coping.

FOR FURTHER INFORMATION CONTACT: Mr. Gene Smith, Standards Development Branch, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5477.

SUPPLEMENTARY INFORMATION:

Proposed Standards

The proposed standards would apply to all new, modified, and reconstructed beverage can surface coating operations. The proposed standards define a beverage can as any two-piece steel or aluminum container or any three-piece steel container in which soft drinks or beer (including malt liquors) are packaged. Containers in which fruit or vegetable juices are packaged are excluded. Existing facilities would not be subject to the standards unless they undergo a modification or reconstruction as defined in 40 CFR 60.14 or 60.15. The standards would limit VOC emissions from the surface coating of two-piece beverage cans to 0.29 kilogram of VOC per litre of coating solids from each exterior base coating operation except clear base coating, 0.46 kg of VOC per litre of coating solids from each overvarnish coating operation and each clear base coating operation, and 0.89 kg of VOC per litre of coating solids from each inside spray coating operation. VOC emissions from the surface coating of three-piece cans would be limited to 0.50 kg of VOC per litre of coating solids from each exterior base coat operation, 0.50 kg of VOC per litre of coating solids from each interior base coat operation, 0.46 kg of VOC per litre of coating solids from each overvarnish coating operation, and 0.64 kb of VOC per litre of coating solids from each inside spray-coating operation. VOC emissions from the surface coating of metal sheets for steel or aluminum ends would be limited to 0.50 kg of VOC per litre of coating solids from each interior coating operation and 0.50 kg of VOC per litre of coating solids from each exterior coating operation. Each affected facility would consist of a coating application station, flashoff area, and curing oven.

The proposed emission limits are based on the emission levels obtainable through the use of best available waterborne coatings. The standards could also be achieved through the use of solvent-borne coatings in combination with an emission control system.

The performance test specified in the proposed standards requires the calculation of a volume-weighted average of the mass of VOC per volume of coating solids used each calendar month for each affected facility. Procedures for making these calculations are included in the proposed standards. Data on VOC and coating solids content, density, and volume of each of the coatings used, and volume and density of each diluent VOC used for each affected facility during each calendar month are necessary in conducting the monthly performance tests. Information provided by coating manufacturers, or analysis performed using Reference Method 24, is the source of coating formulation data. Coating and diluent VOC consumption data are obtained from the owner's or operator's records. Reference Method 25 would be used to determine the percentage reduction of VOC emissions achieved through the use of an emission control device. Both reference methods are promulgated in the **Federal Register** of October 3, 1980 (45 FR 65956).

The performance test and compliance provisions include procedures for conducting the performance test when only coatings with VOC content equal to or less than the proposed emission limiktations are used, when some coatings with VOC content greater than proposed emission limitations are used, and when a capture system and a control device are required for compliance.

An affected facility is in compliance when the volume-weighted average mass of VOC per volume of coating solids applied, calculated on a calendar month basis, is equal to or less than the proposed emission limitations.

The proposed standards would specify monitoring requirements only when a capture system and emission control device are used to comply with the proposed standards. For incineration systems the proposed standards require continuous monitoring of incinerator temperatures.

The proposed standards would require that the owner or operator

maintain at the source for a period of at least two years records of all data, calculations, and test results necessary to support the calculations of volume-weighted average of the total mass of VOC per volume of coating solids used in each calendar month for each affected facility.

The proposed standards would require reporting the results of the initial performance test and thereafter reporting each month in which an affected facility is not in compliance, by the tenth day of the following month. Affected facilities using a capture system and an incinerator would be required to report, quarterly, all periods during which the average temperature, while can are being processed, is significantly below the average temperature of the device during the most recent performance test.

Summary of Environmental, Energy, and Economic Impacts

Environmental, energy, and economic impacts of standards of performance are normally expressed as incremental differences between the impacts from a facility complying with the proposed standard and the impacts for a facility complying with a typical State Implementation Plan (SIP) emission standard. In beverage can surface coating operations, the incremental differences will depend, in some cases, on the control levels required by revised SIPs. Revision to most SIPs are currently in progress.

Many existing beverage can surface coating operations are located in areas that are considered nonattainment areas for purposes of achieving the National Ambient Air Quality Standard (NAAQS) for ozone. New facilities are expected to locate in similar areas. In revising their SIPs, most States are expected to use the Control Technique Guideline (CTG) document, *Control of Volatile Organic Emissions from Existing Stationary Sources, Volume II: Surface Coating of Cans, Coils, Paper, Fabrics, Automobiles, and Light-Duty Trucks* (EPA-450/2-77-088 [CTG]). Therefore, the incremental impacts are measured from the CTG-recommended emission levels.

The environmental, energy, and economic impacts of the proposed standards are based on the anticipated growth of the industry discussed in Chapter 7 of the Background Information Document. Other projections exist that would change the impact assessments. For example, some industry sources project the demise of the three-piece beverage can over the next five years. Others indicate that while use of three-piece beverage cans will drop, they will still represent a significant share of the market. The latter projection was used in assessing the impact of the proposed standards.

In addition to achieving reductions in emissions beyond that required by a typical SIP, standards of performance have other benefits. They establish a degree of national uniformity to avoid situations in which some States may attract industries by having less stringent air pollution standards relative to other States. Standards of performance also improve the efficiency of case-by-case determinations of best available control technology (BACT) for new facilities locating in attainment areas and of lowest achievable emission rates (LAER) for new facilities locating in nonattainment areas, by providing a starting point for the basis of these determinations. This results from the process for developing standards of performance, which involves a comprehensive analysis of alternative emission control methods. Detailed cost and economic analyses of various regulatory alternatives are presented in the supporting documents.

The proposed standards would reduce VOC emissions by approximately 32 percent from the CTG baseline emission level. For plants coating two-piece beverage cans, the proposed standard would result in a 47-percent reduction in VOC emission from the exterior base coat operation, a 15 percent emission reduction from the overvarnish coating operation, and a 26-percent emission reduction from the inside spray coating operation. For plants coating three-piece beverage cans, VOC emissions from the exterior base coat operation would be reduced by 8 percent. Emissions from the interior base coat operation, overvarnish coating operation, and inside spray coating operation would be reduced by 5, 13, and 82 percent, respectively. VOC emissions from the exterior and interior coating operation for steel or aluminum end sheets would be reduced by 2 and 60 percent, respectively. Annual nationwide VOC emissions would be reduced by about 4,800 Mg (5,280 tons) by 1986.

Little or no incremental water pollution impact from new, modified, or reconstructed beverage can surface coating operations would result from implementation of the proposed standards. In addition, those plants discharging toxic pollutants listed under Section 307 of the Water Act could be subject to pretreatment requirements also under development.

The proposed standards would also have little or no incremental solid waste impact.

Based on industry growth projections, application of the proposed standards would result in a net energy reduction of about 36,000 gigajoules in 1985. The net energy reductions result from the use of less coating per can because of higher solids content of the waterborne coatings upon which the standards are based.

The proposed standards are expected to have little economic impact on the beverage can industry. The proposed standards contain at least one control option for each affected facility whose cost is equal to or less than the cost of compliance with the baseline level of control.

Rationale

Selection of Source

Industrial coating operations are a significant source of VOC emissions, accounting for about 2 million Mg of VOC each year. Beverage can surface coating operations are among the largest individual operations producing VOC emissions in the industrial coating category, contributing an estimated 77,000 Mg of VOC emissions in 1977. This represents about 4 percent of total VOC emissions from all industrial surface coating operations.

Studies have been conducted to investigate the effect standards of performance would have on nationwide VOC emissions from stationary sources. Can surface coating operations are ranked second on a list of 59 sources considered for control, published August 21, 1979 (44 FR 49222). Beverage cans represent over half of the can production in the United States today and are the fastest growing segment of the can industry, with a projected annual growth of 5.5 percent. Food cans have shown a slight decline in shipments between 1976 and 1979. Projected annual growth through 1990 is estimated to be less than 1 percent. Little, if any, modification or reconstruction of food can plants is expected during this period. Food cans are predominately three-piece. As the two-piece can captures a greater share of the beverage market, three-piece capacity now used for beverage cans will become available for the manufacture of food cans. This increased availability should reduce the requirements for upgrading food can lines and the number of facilities that would be subject to the modification and reconstruction provisions of 40 CFR 60. Consequently, food cans are not included in the proposed standards. Should the situation change, consideration will be given to the development of standards for food cans.

VOC are the major air pollutants emitted from beverage can surface coating operations and result primarily from the use of organic solvents. Particulate matter generated from this surface coating process is minimal. Technology is currently available to reduce VOC emissions from beverage can surface coating operations. The use of waterborne coatings, the use of solvent-borne coatings coupled with an add-on emission control device, or the use of other control options would reduce VOC emissions by approximately 32 percent from all new, modified and reconstructed sources. Consequently, beverage can surface coating operations have been selected for the development of a new source standard of performance.

Selection of Pollutant

Volatile organic compounds are the primary air pollutants emitted from beverage can surace coating operations. Although some can coating operations may emit particulate matter, the quantity generated is not significant. VOC are defined as any organic compound which participates in atmospheric photochemical reactions, or which is measured by a reference method, or which is determined by procedures specified under any subpart. Photochemical oxidants result in a variety of adverse impacts on health and welfare, including impaired respiratory function, eye irritation, necrosis of plant tissue, and deterioration of some synthetic materials. Further information of these effects can be found in the U.S. Environmental Protection Agency (EPA) document entitled *Air Quality Criteria for Ozone and Other Photochemical Oxidants* (EPA-600/8-78-004). Therefore, only VOC were selected for inclusion in the proposed standards.

Sources of VOC Emissions at Beverage Can Plants

In beverage can surface coating operations, VOC emissions result from the use of coatings containing organic solvents that evaporate during the drying process. For the purpose of establishing standards and determining compliance, all VOC contained in a coating are assumed to evapoate during the coating process. Industry estimates that well over 90 percent of the VOC consistently evaporates during the coating process. Therefore, this assumption is considered to be valid. VOC content of coatings are generally specified by the coating supplier and calculated by a material balance of the coating ingredients. Manufacturers of beverage cans employ a wide variety of coatings to protect the contents of the can and to protect the beverage can from the environment. Typical coatings applied to beverage cans include expoxies, epoxy-acrylics, acrylics, and polyester enamels. These coatings generally contain organic solvents such as ketones, esters, ethers, and aromatics.

Surface coatings are applied to beverage cans in a series of operations, depending on the type can to be manufactured. In the manufacture of two-piece cans, surface coatings are usually applied to beverage can bodies in three steps: (1) application of an exterior base coat, (2) application of an overvarnish coating, and (3) application of an inside spray coating. Each coating operation is followed by an oven cure, except where radiation-curable overvarnish coatings are applied. A coating may be applied to the exterior bottom of the can either as part of the overvarnish coating or inside spray coating operation. Two coats of inside spray are usually applied to steel two-piece cans, while aluminum two-piece cans usually require only one inside spray coat. The two inside spray coats for steel two-piece cans may be applied wet-on-wet or with an intervening oven cure. Aluminum ends for two-piece cans are formed from precoated metal coils or sheets. When made from precoated coals, the only operation resulting in VOC emission at the beverage can line is the application of end-sealing compound. In the production of three-piece cans, coating operations include the sequential application of an interior base coat, an exterior base coat, and an overvarnish coating to the steel sheets from which beverage can bodies are formed. After formation of the can body, the seam is protected by an inside and outside seam coating. The formed can is then coated with an inside spray. Interior and exterior coatings are also applied to the stock from which the steel ends used in the manufacture of three-piece cans are formed and from which aluminum ends used with three-piece and two-piece cans are formed. End-sealing compound is applied to the formed ends.

Except for inside spray operations for two-piece and three-piece beverage cans, transfer efficiencies approaching 100 percent are achieved. For inside spray operations transfer efficiencies of at least 90 percent are consistently achieved. Transfer efficiency is defined as the ratio of the amount of coating solids adhering to the coated surface to the amount of coating solids consumed. Because of the high and consistent transfer efficiencies experienced in beverage can surface coating operations, it was not deemed necessary to explicitly consider this parameter in the compliance procedures. However 90 percent transfer efficiencies were used in estimating emissions from inside spray.

Data provided by the Can Manufacturers Institute (CMI) indicate that VOC emissions from 1976 coating operations for both two-piece and three-piece cans were distributed in the following manner. Base coating operations accounted for 39 percent of total VOC emissions; overvarnish coating operations for 4 percent, inside spray operations for 38 percent, and end-sealing operations for 10 percent of total VOC emissions. The application of side seam coatings to three-pice cans accounted for 4 percent of total VOC emissions from surface coating operations. Analysis of the CMI data indicates that VOC emissions from miscellaneous sources, such as cleanup operations and the storage or handling of coatings and solvents, accounted for approximately 5 percent total VOC emissions.

Based on information contained in the permit application for a newly constructed two-piece beverage can plant using waterborne coating, distribution of emissions is estimated to be 10 percent from exterior base coat operations, 19 percent from lithography/overvarnish application, 1 percent from bottom-end coating, 55 percent from inside spray operations and 15 percent from the application of end-sealing compound to aluminum ends.

Data for a three-piece beverage can facility applying solvent-borne coatings without add-on controls indicate that the experior and interior base coat operation account for 48 percent (24 percent for each operation) of total plant VOC emissions. Another 15 percent is attributed to the overvarnish coating operation, and 15 percent is also generated from the inside spray coating operation. End-sealing operations account for 20 percent of total VOC emissions from the plant. The application of side-seam coatings account for only 2 percent of VOC emissions.

Analysis of each emission source resulted in the exclusion from the proposed standards of side-seam coating operations for three-piece cans, bottom-coating operations for two-piece cans, misscellaneous VOC emission source (cleanup operations and storage or handling of coatings and solvents) and end sealing operations. VOC emissions from side-seaming operations for three-piece cans account for 2 to 4 percent of total plant emissions.

Emissions from bottom-coating operations for two-piece cans are estimated to be about 1 percent of all VOC emissions from two-piece can lines. While emissions from cleanup operations are potentially significant where solvent-borne coatings are used, their significance has decreased and will continue to decrease as waterborne coatings replace solvent-borne coatings. Emissions from the storage and handling of coatings and solvents are considered negligible because of the wide use of sealed containers or closed coating circulation systems. While low-solvent end-sealing compounds that meet or exceed the CTG requirements are being tested, requisite qualification testing has not been accomplished. For this reason, emissions from the application of end-sealing compounds are excluded from the standards at this time.

Selection of Affected Facilities

The choice of the affected facility for this standard is based on the Agency's interpretation of Section 111 the Act, and judicial construction of its meaning.[1] Under Section 111, the NSPS must apply to "new sources;" "source" is defnied as "any building, structure, facility, or installation which emits or may emit any air pollutant" [Section 111(a)(3)]. Most industrial plants, however, consist or numerous pieces or groups of equipment which emit air pollutants, and which might be viewed as "sources." EPA therefore uses the term "affected facility" to designate the equipment, within a particular kind of plant, which is chosen as the "source" covered by a given standard.

In choosing the affected facility, EPA must decide which pieces or groups of equipment are the appropriate units for separate emission standards in the particular industrial context involved. The Agency must do this by examining the situation in light of the terms and purpose of Section 111. One major consideration in this examination is that the use of a narrower definition results in bringing replacement equipment under the NSPS sooner; if, for example, an entire plant were designated as the affected facility, no part of the plant would be covered by the standard unless the plant as a whole is "modified." If, on the other hand, each piece of equipment is designated as the affected facility, then as each piece is replaced, the replacement piece will be a new source subject to the standard. Since the purpose of Section 111 is to minimize emissions by the application of the best demonstrated control technology (considering cost, other health and environmental effects, and energy requirements) at all new and modified sources, there is a presumption that a narrower designation of the affected facility is proper. This ensures that new emission sources within plants will be brought under the coverage of the standards as they are installed. This presumption can be overcome, however, if the Agency concludes that the relevant statutory factors (technical feasibility, cost, energy, and other environmental impacts) point to a broader definition. The application of these factors is discussed below.

Four alternatives for the designation of an affected facility were considered in the development of the proposed standards. These alternatives include (1) designation of specific equipment such as the coating application station, flashoff area, and curing oven as separate affected facilities; (2) designation of each coating operation as an affected facility; (3) designation of an entire surface coating line as an affected facility; and (4) designation of the entire plant as the affected facility.

If each emission point (specific coating equipment) were designated as a separate affected facility, separate emission limits would have to be prescribed for each piece of equipment. However, each component of a coating operation is so closely linked, both physically and operationally, that separate emission limits for each piece of equipment would present technical and economic burdens on the plant owner or operator. In the manufacture of beverage cans, a coater and associated flashoff area and curing oven may be used to apply different types of coatings, each having a different allowable emission level, e.g., clear and pigmented base coat for two-piece cans or three-piece steel sheets. Designation of the emission points as the affected facility would require that the standards be based on either the highest VOC content coating that could be used or on an industry average of VOC content. This would penalize coaters that, for reasons of product performance, must use a coating with an above-average VOC content. In addition enforcement would be difficult because of the measurement problems associated with isolating the VOC emissions from each piece of equipment.

Treating an entire can line or an entire plant—multiple can lines—as an affected facility has the advantage of providing flexibility in approaches to compliance and ease of enforcement. It has the disadvantage of permitting compliance by the elimination of one or more coating steps and associated emissions without requiring the remaining operations to employ the best system of continuous emission reduction. Also, designation of an entire plant or line as an affected facility would require a much higher capital expenditure to trigger reconstruction considerations. A modification or reconstruction to any part of an existing line or plant could subject the entire surface coating operation (or the entire line or plant) to the provisions of the proposed standard.

Designating each coating operation as an affected facility would simplify enforcement and recordkeeping requirements. Although the equipment comprising each coating operation is closely associated, VOC emissions from coatings used in each operation can be readily separated for the purposes of enforcement and recordkeeping. In addition, the impact of modification and reconstruction provisions is considered more reasonable, as compared to the designation of the entire line or plant as the affected facility. A modification or reconstruction to an individual existing coating operation would not subject all other coating operations on the line or in the plant to the provisions of the proposed standards. Defining each coating operation as including all VOC emissions generated from the application of the coating through the curing process would ensure that the best system of continous emission reduction will be applied to all coating operations. Designation of a coating operation, e.g., equipment and coating, would accommodate situations in which the same equipment is used to apply different types of coatings, each having a different allowable emission level. While such a designation would result in additional affected facilities, no specific enforcement problems would result because coating usage and production data at the plant level are maintained from each type of coating.

The following coating operations have been selected as the affected facilities for control by the proposed standards, because these coating operations account for the bulk of VOC emissions from the beverage can surface coating process, and because control techniques exist for reducing VOC emissions from these operations.

For the manufacture of two-piece beverage cans, the affected facilities are each exterior base coat operation, overvarnish coating operation, and inside spray-coating operation. For the manufacture of three-piece beverage cans, the affected facilities would include each exterior base coat

[1] The most important case is *ASARCO, Inc.* v. *EPA*, 578 F.2d 319 (D.C. Cir. 1978).

operation, interior base coat operation, overvarnish coating operation, inside spray coating operation, and each interior and exterior coating operation for steel ends. For the manufacture of two- or three-piece beverage cans, each interior and exterior aluminum-end sheet coating operation would also be designated as affected facilities.

Selection of Basis of Proposed Standards

Emission control techniques

Two general emission control techniques have been identified as demonstrated emission reduction systems for beverage can surface coating operations: (1) low VOC content coatings, and (2) solvent-borne coating systems with emissions capture and control devices.

Elimination of the exterior base coat was also considered; however, this approach was rejected because it is not applicable to all beverage can surface coating operations. Numerous exceptions would be required, especially for merchant can plants, with each plant requiring a separate analysis. In some instances, base coats are required to provide corrosion resistance, especially where the packaged product is shipped by water transportation or stored in high-temperature, high-humidity areas. Elimination of a coating, however, is not precluded as a means of compliance with the proposed emission limitations if the owner or operator can use this option to meet the proposed emission limit for that operation.

Low VOC content coatings. Low VOC content coatings applicable to the can industry include waterborne materials, no-varnish ink, and UV-curable overvarish. Waterborne coatings have been demonstrated in the beverage can industry for all coating operations with the exception of end-sealing compounds. Research and development on water-based end sealants is being actively pursued. Discussions with vendors and canmakers indicate that acceptable water-based end-sealants will be available and demonstrated within two years.

VOC emissions from waterborne coatings (or other type coatings) are dependent on the solvent-to-solids ratio of the coating, thickness of film applied, units produced per hour, and the surface area of each unit. A variety of waterborne coatings is available. VOC content of waterborne coatings obtained from coating and beverage can manufacturers are summarized in Chapter 4 and Appendix C of the BID. For comparative purposes, equivalent VOC contents expressed as kg per litre of coating less water are also included in the BID. Discussions with the industry and examination of the literature indicate that the trend in beverage can surface coating is toward the use of waterborne coatings. With few exceptions, beverage can manufacturers either have converted or are in the process of converting from solvent-borne coatings to waterborne because of ease of control and cost considerations. All major canmakers, both merchant and capture, have reported plans to convert existing solvent-borne lines to waterborne, and indicate that all future facilities will use waterborne coatings.

No-varnish inks are specially formulated inks which cure with gloss and scuff resistance properties that, in some cases, eliminate the need for an overvarnish coating. The elimination of a coating step results in a decrease in solvent emissions from that operation to zero. However, cans made with no-varnish inks may not provide the corrosion resistance required when the filled cans are stored in high-humidity, high-temperature environments, or shipped by water transportation. Also, the use of no-varnish inks may not provide the mobility required in some existing filling lines. In these cases, beverage-can surface coaters may choose to apply an over-varnish coating. During the past year the use of no-varnish inks has dropped dramatically. One merchant canmaker reports a drop from 80 percent in 1979 to 5 percent in early 1980.

The use of ultraviolet (UV) curing has received a great deal of attention in recent years. UV curing is a radiation-initiated polymerization process for curing industrial finishes and printing inks. This technology has been used for "drying" inks applied in the can and packaging industries, and for curing fillers and coatings in the plywood and particle-board industry. In the beverage can industry, UV curing is used with specially prepared inks and to a lesser extent with overvarnishes for both two-piece and three-piece cans. UV-curable materials essentially contain no VOC. Emissions are relatively insignificant and result only from polymerization that occurs during the curing process. However, the use of UV curing is not applicable to all beverage can surface coating operations and, in fact, the trend is away from their use.

While high-solids coatings (approximately 80-percent solids), powder coatings, and coatings that can be applied by electrodeposition are in use for some industrial surface coating operations, their use in the beverage can industry is still in the experimental stage.

Emission control systems. Although carbon adsorption has been used to control VOC emissions from some industrial processes, its effectiveness on beverage can surface coating operations has not been demonstrated. The opinion of the beverage can industry is that carbon adsorption could be used to control VOC emissions, but that it would be prohibitively expensive because of the high temperatures of the gas stream to be controlled. The gas streams would have to be cooled several hundred degrees prior to entering the adsorption unit. This would necessitate an elaborate and energy-intensive cooling system. However, should the use of carbon adsorption become applicable to the industry in coming years, its use would not be precluded and provisions for determining compliance are included in the proposed standards.

The only emission control system that has been demonstrated as effectively controlling VOC emissions from beverage can surface coating operations is incineration. Both thermal and catalytic incinerators have been used successfully with solvent-borne coatings on both two-piece and three-piece beverage can lines. Thermal incinerators can achieve at least a 90 percent reduction in VOC emissions when operated at a temperature of about 750° C (1,400° F). However, large amounts of supplemental fuel may be required to raise the exhaust gases to incineration temperature. If heat recovery units are installed with the incinerator, the energy consumption may be reduced. Where control is required, the increasing cost of natural gas is driving the industry towards the use of waterborne coatings.

Catalytic incinerators are also capable of achieving VOC emission reductions in excess of 90 percent. Their use requires substantially less energy than the thermal incinerator because of the lower incineration temperature. If heat recovery is used in conjunction with the catalytic units, they become more attractive economically. However, there are restrictions on the applicability of catalytic incinerators because many of the coatings used in beverage can industry contain components that may foul or mask the catalyst. This may greatly reduce the active catalyst life, resulting in higher incinerator operating costs. Consequently, the use of catalytic incinerators is normally limited to those plants that use only a few different coating formulations with ingredients that do not have an adverse effect on the catalyst.

Regulatory alternatives

Based on the analysis of beverage can surface coating emission sources and pollutants, and with consideration of the environmental, energy, and economic impacts resulting from application of the control technology discussed above, three regulatory alternatives were selected for consideration. While the use of solvent-borne coating and appropriate emission control systems is an available control option, the trend in the industry is toward the use of waterborne coatings. With few exceptions, can plants constructed in the past five years use waterborne coatings. One canmaker who constructed solvent-borne lines within the past five years has recently announced plans to convert to waterborne coatings because of increasing energy costs. In addition, practically all major beverage can makers have either converted existing solvent-borne lines to waterborne or are in the process of doing so. Because of the industry trend to waterborne coatings, primarily because of energy considerations, the regulatory alternatives emphasize the use of best available waterborne coatings. However, for those operations where waterborne coatings may not provide the desired coating finish, some manufacturers may choose to use solvent-borne coatings in combination with thermal or catalytic incineration. This option is not precluded under the regulatory alternatives as long as equivalent emissions are equal to or less than those attainable from the use of waterborne coatings.

Regulatory Alternative I is to forego development of a New Source Performance Standard (NSPS) for beverage can surface coating operations. Under this alternative, emissions from beverage can plants would be controlled by State Implementation Plans (SIPs). Existing beverage can plants located in ozone nonattainment areas woud be subject to emission limitations based on recommendations in the control technique guideline (CTG) document for beverage can surface coating operations. New plants located in ozone nonattainment areas would be required to limit emissions to the lowest achievable emission rate (LAER) and new plants in attainment areas to best available control technology (BACT). The emission limits recommended in the CTG were based on the use of the best waterborne coatings available at that time. Since publication of the CTG, waterborne coatings with lower VOC content have been developed and commercialized.

Regulatory Alternative II is based on emission levels that would result from the use of best available waterborne coatings for all coating operations and water-based materials for end-sealing operations.

Regulatory Alternative III is identical to Regulatory Alternative II with the exception that no-varnish inks or UV-curable overvarnishes would be required in lieu of waterborne coatings for overvarnish coating operations.

Environmental impact

The environmental impact of each regulatory alternative was computed as the VOC emission reduction that would be achieved relative to the emissions allowed under State regulations based on the recommended CTG limits.

Regulatory Alternative I (no NSPS) is the baseline. The current level of VOC emissions from existing plants would be maintained, and new plants would be required to meet the same emission limits.

The implementation of Regulatory Alternative II (waterborne coatings) would result in an overall VOC emission reduction of about 4,800 Mg per year in the fifth year of applicability of the proposed standard, a 32 percent reduction from Regulatory Alternative I for new facilities. Specifically, VOC emissions from two-piece beverage can surface coating operations (exterior base coat, overvarnish coating and inside spray coating) would be reduced by 4,100 Mg in the fifth year, a 32 percent decrease from the baseline level of emissions. VOC emissions from three-piece beverage can sheet coating operations (interior base coat, exterior base coat, and overvarnish coatings) would be reduced by 54 Mg, an 8 percent reduction from the baseline emissions. VOC emissions from inside spray operations for three-piece cans would be reduced by 310 Mg in the fifth year, a reduction of 52 percent from the baseline. Emissions from the interior and exterior coatings applied to the sheets from which aluminum or steel ends are formed would be reduced by 333 Mg, a 52 percent decrease from the baseline.

The application of Regulatory Alternative III (waterborne coatings in combination with no-varnish inks or UV-curable overvarnish coatings) would result in a VOC emission reduction of about 6,200 Mg per year in the fifth year, as compared to the baseline. VOC emissions from two-piece can-coating operations would be reduced by 5,400 Mg in the fifth year, a 42 percent reduction from baseline. VOC emissions from three-piece can sheet-coating operations (interior, exterior, and overvarnish coatings) would be reduced by 150 Mg in the fifth year, a 23 percent reduction from the baseline. Emissions from the inside spray coating operation would be reduced by 311 Mg, the same reduction that would be achieved by Regulatory Alternative II. VOC emissions from the coating of steel or aluminum sheet stock for ends reduced by 333 Mg., the same reduction that would be achieved by Regulatory Alternative II.

No impact on water pollution, solid waste disposal, or noise pollution as compared to baseline levels is expected to occur from either Regulatory Alternative II or III.

Energy impact

The application of can coatings requires energy in the form of electricity, natural gas and, in some instances, other fossil fuels. Electricity is used to power coating equipment, sheet and can conveyors, ventilating blowers at the coater and flashoff areas, oven circulating and exhaust blowers, and incineration system blowers. Natural gas is used as fuel for drying and curing ovens.

Regulatory Alternative II (waterborne coatings) would result in an annual overall decrease in energy requirements of about 36,000 gigajoules in the fifth year. This net energy reduction results from the use of less coating per can because of higher solids content of the waterborne coatings upon which Regulatory Alternative II is based. The use of less coating reduces the amount of VOC and water that must be evaporated in the curing oven and therefore reduces energy requirements. The fifth-year impact would be a decrease in energy consumption equivalent to 34 million cubic feet of natural gas per year. Energy requirements for two-piece can coating operations would be reduced by 27,000 GJ by 1985, a 2 percent reduction from the baseline. Energy requirements for three-piece can sheet-coating operations (interior base coat, exterior base coat, and overvarnish coating) would be reduced by 4,500 GJ, a 5 percent reduction from the baseline. Energy requirements for the inside spray coating operation would be reduced by 1,000 GJ, a 2 percent reduction. Energy requirements for the coating of sheet stock for aluminum or steel ends would be reduced by 4,200 GJ by the fifth year, a 2 percent reduction. If solvent-borne coatings and incineration are used to attain the proposed standards, energy requirements for a two-piece can line would be increased by 160 percent over the base case and for a three-piece can

line by 140 percent. These percentages represent increases of energy requirements for the coating operations, not the entire can line.

The application of Regulatory Alternative III (waterborne coatings and no-varnish inks or UV-curable overvarnish coatings) would result in an annual decrease in energy requirements of about 920,000 gigajoules in the fifth year. The greatest part of the net energy reduction under this regulatory alternative results from the use of no-varnish inks or UV-curable overvarnish coatings. Two-piece can coating energy requirements would be reduced by 880,000 GJ, a 35 percent decrease from the baseline requirements. Energy requirements for three-piece can sheet-coating operations and forming operations (inside spray coating) would be reduced by 32,000 GJ and 1,000 GJ, respectively, a 36 and 2 percent decrease, respectively. Energy requirements for end coating operations would be reduced by 4,200 GJ in the fifth year, a 2 percent reduction, the same reduction as would be achieved by Alternative II. If solvent-borne coatings and incineration are used to attain the proposed standard, energy requirement for a two-piece can line would be increased by 73 percent over the base case and for a three-piece can line by 120 percent.

Economic impact

A discounted cash flow approach was used to analyze the economic impact of each regulatory alternative. Impacts are estimated for four types of beverage can production facilities: (1) three-piece sheet-coating operations, (2) three-piece can-forming (inside spray) operations, (3) steel and aluminum end coating operations, and (4) two-piece aluminum or steel can fabrication operations. Because the costs of applying end-sealing compound to steel or aluminum ends are essentially the same for solvent- and water-based materials, no economic impact analysis was considered necessary.

The regulatory alternatives assume current levels of capital requirements, annualized costs, and product prices (i.e., current return on investment [ROI]) would be maintained.

No economic impacts on the beverage can industry are expected to occur under Regulatory Alternative II or III. Among the control options considered for each production facility, there is at least one whose cost is equal to or less than the cost of complying with the baseline level of control. The use of low-solvent coatings upon which Regulatory Alternatives II and III are based does not require any capital expenditures over the base case and also requires less energy to evaporate VOC and water in the curing oven. If no standards were developed (Regulatory Alternative I), economic analysis shows that firms buiding new production facilities have an economic incentive to achieve a greater level of control than is currently required by the SIP's. However, if an owner or operator chooses to use solvent-borne coatings with add-on controls, an economic impact would result. This impact is discussed below.

The use of incineration would have an effect on product price or return on investment (ROI), and would require an additional capital outlay by three-piece can makers. Under Regulatory Alternative II, firms building new facilities involved in the production of three-piece cans (sheet coating operations, can forming operations, and end coating operations) would have to increase the output price by 1 percent, or absorb the additional costs and accept a cut in the rate of return from 1 to 10 percentage points. Under Regulatory Alternative III, output prices would increase about 1 percent If the additional costs were passed along to the customer. The ROI impacts would be roughly similar to those occurring under Regulatory Alternative II. Under both alternatives, adopting the incineration options would increase the capital requirements by approximately 10 percent for each of the three types of production facilities.

The use of incineration would also have an economic impact on two-piece canmakers. For either Regulatory Alternative II or III, if the additional costs were absorbed, ROI would decline from 2 to 6 percentage points, depending on plant size. Additional capital outlays would amount to between 2 and 5 percent of the capital required to meet the SIP level of control.

Some canmakers may elect to use solvent-borne coatings and incineration because of customer specifications or other reasons. In these cases, capital and operating costs would be higher than in the base case. While some negative economic impacts would result, they are considered acceptable and would not adversely affect the industry.

Selection of Best System of Continuous Emission Reduction

Although Regulatory Alternative III would result in greater reductions in VOC emissions and energy requirements than Regulatory Alternative II, implementation of Regulatory Alternative III would require the use of UV-curable coatings or no-varnish inks for overvarnish coating operations. However, UV-curable coatings and no-varnish inks cannot provide surface qualities and corrosion resistance necessary to meet all customer usages, and industry data indicate a trend away from the use of these coating. Furthermore, analysis of the industry indicates the infeasibility of segmenting the industry into discrete units that can or cannot use no-varnish inks or UV-curable overvarnishes. Because these coatings are not applicable to all segments of the industry, this alternative was not selected as the basis of the proposed standards.

Under Regulatory Alternative II, the use of waterborne coatings for all surface coating operations would reduce VOC emissions by about 4,800 Mg per year in the fifth year of applicability, a 32 percent reduction from the baseline represented by Regulatory Alternative I. No other adverse environmental impacts would result from implementation of this alternative. Energy requirements would be reduced by about 36,000 GJ/yr in the fifth year, a 2 percent reduction from the baseline. No adverse economic impact would result from application of Regulatory Alternative II unless the plant owner or operator chose to incinerate VOC emissions to achieve the proposed emission limits based on the use of waterborne coatings. Increased capital and operating costs associated with incineration are considered acceptable. Based on the assessment of environmental, energy, and economic impacts, Regulatory Alternative II was selected as the best system of continous emission reduction for the basis of the proposed standard.

Selection of Format for the Proposed Standards

A number of formats could be used to limit VOC emissions from beverage can surface coating operations. The format must be compatible with any of the compliance techniques that may be used in the industry and with any new techniques that might be developed in coming years. Standards for the control of VOC emissions could be expressed in terms of (1) the concentration of VOC in exhaust gases, (2) the mass of emissions per unit of production, (3) the mass of emissions per volume of coating applied, less water, (4) the mass of emissions per volume of coating solids applied, or (5) an overall percentage reduction.

One advantage of standards expressed in terms of the concentration of VOC in the exhaust gases would be that only a single sample would be needed to determine compliance. However, the concentration format would have several disadvantages. Emission testing would be necessary,

regardless of the compliance technique; emission tests would be required for every stack that exhausts gases to the atmosphere. Although the general provisions of 40 CFR 60 prohibit the addition of dilution air to exhaust gases, the presence of dilution air would be difficult to detect with certainty. Also, there are no currently available test methods to directly measure VOC concentrations in exhaust streams.

With a standard expressed in terms of mass of VOC per unit of production, compliance would be relatively simple to demonstrate when waterborne coatings are used, but would be more difficult with the use of a capture system and emission control device. For waterborne coatings a weighted averaged of the VOC content of each coating used would be determined and multiplied by the volume used over a given time period. This value would be divided by the production during that same time period to give the VOC emissions per unit of production. When emission control devices are used, the VOC emissions could be determined by stack test and the emissions could again be divided by the production to yield the VOC emissions per unit of production. However, a standard expressed in terms of production would require extensive recordkeeping provisions for production data. This format would not be very flexible in accommodating the range of coating thicknesses that are used by the industry to meet the requirements of the many types of beverage cans produced by the industry, especially in the case of merchant can plants. This format would penalize those coaters that, for reasons of product performance, must use an above-average coating thickness.

Standards expressed in terms of mass of VOC emissions per volume of coating, less water, have the advantage of being compatible with the format used in the CTG and are currently being adopted by most States. Furthermore, they have been accepted by both canmakers and coating suppliers.

Standards expressed in terms of the mass of VOC emissions per volume of coating solids overcome the problems associated with the first two formats. Stack testing would not be required unless add-on controls were used. Furthermore, it is applicable in those cases where a coater may choose to eliminate a coating step, substitute no-varnish inks, or use a radiation-curable coating.

A format requiring an overall percentage reduction is not compatible with compliance by the use of waterborne coatings because it would not directly give credit to those facilities which use coatings with low-solvent content.

For these reasons, the format selected for the proposed standard is expressed in terms of the mass of VOC per volume of coating solids.

Selection of Numerical Emission Limits

The numerical limits selected for the proposed standards are based on the use of waterborne coatings for all surface coating operations. Waterborne coatings are available and in use for all beverage can surface coating operations. In selecting numerical emission limits, the range of VOC contents of currently available coatings either in use or under qualification, the extent of such use, and the applicability to all beverage can surface coating requirements were considered. Numerical emission limits are not based on the lowest VOC-content coating identified but rather on the coating considered to the applicable for all requirements within each coating process. Emission limits and rationale for these selections are presented below.

Lower VOC-content waterborne coatings for the exterior base coat, other than clear base coats, for two-piece steel or aluminum cans range from 0.23 kilogram to 0.36 kilogram per litre of coating solids. One widely used coating has a VOC content of 0.29 kilogram per litre of solids. This coating is considered typical and therefore 0.29 kilograms VOC per litre of solids was selected as the proposed emission limitation for two-piece can exterior base coating operations. Clear base coats for two-piece beverage cans are similar to overvarnish and are therefore subject to the same emission limits as for the overvarnish coating operation.

Lower VOC-content overvarnishes for two-piece cans, three-piece steel sheets and clear base coats for two-piece steel and aluminum cans range from 0.26 to 0.50 kilogram VOC per litre of coating solids. Overvarnishes and clear base coatings must be compatible with a wide range of inks that are used to give beverage cans the distinctive appearance required for product recognition. In order to provide flexibility and compatibility with a wide range of inks, the proposed emission limitation for overvarnish and clear base coat operations was based on a commercially available coating with a VOC content of 0.46 kilograms per litre of solids.

Waterborne inside sprays currently in use or under qualification for two-piece beverage cans contain from 0.83 to 0.95 kilograms of VOC per litre of coating solids. One coating, which has a VOC content of 0.89 kilograms per litre of solids, accounts for 75 percent of the waterborne usage. Therefore this coating was used as the basis of the proposed emission limitation for two-piece inside spray—0.89 kilograms VOC per litre of coating solids.

For three-piece can inside spray, a lower VOC-content material can be used because a lance-type spray device applies the coating to the inside of the body shell before the bottom is attached. One three-piece can inside spray containing 0.64 kilogram VOC per litre of coating solids was identified as under qualification by a major beverage can manufacturer. Two lower VOC-content coatings, 0.58 and 0.61 kilograms per liter of coating solids were also identified as under consideration for qualification, but were not selected as the basis of the standards because of their status.

Materials with low solvent-borne content used for three-piece can sheet interior base coating commercially available or under qualification have a VOC content of 0.50 to 0.53 kilogram per litre of coating solids. The 0.50 coating is commercially available and is being used by at least one beverage can maker. Consequently, 0.50 kilograms VOC per litre of solids was selected as the proposed emission limitation for interior base coating of steel sheets for three-piece cans.

Two materials, both with 0.50 kilograms VOC per litre of coating solids, are commercially available for exterior base coating of steel sheets for three-piece cans. These coatings were selected as the basis for sheet exterior base coating. The proposed emission limitation was established at 0.50 kilograms VOC per litre of coating solids.

For both exterior and interior coating of steel or aluminum end sheets, coatings with VOC content of 0.48 to 0.52 kilograms per litre of coating solids were identified as being in use or under qualification. A coating with a VOC content of 0.50 was identified as being in commercial use for the exterior coating operation. Consequently, the proposed emission limitation for exterior coating of end stock was based on the coating in commercial use and set at 0.50 kilogram VOC per litre of coating solids. The average 0.50 kilogram per litre of coating solid of the coating being qualified for interior coating of end sheet stock was selected as the proposed emission limitation.

Although the majority of end-sealing compounds currently in use throughout the industry is solvent-based, many States have adapted regulations which require beverage can surface coating lines to meet the emission limitations

recommended in the CTG. New higher solids solvent-based compounds that meet the CTG emission limitations are being evaluated by the beverage can surface coating industry for both soft drinks and beer. Water-based end-sealing compounds with even lower emissions are at about the same stage of development. These compounds use water as the carrier, with the only VOC content in the form of pH adjusters or oils. The few problems experienced have been attributed to lack of experience in application of the water-based material and in storage and handling of the ends after application of the end-sealing compound.

The Administrator believes that these end-sealing compounds will be fully tested and applicable for use on beverage cans within two years because the new end-sealing compounds require a qualification period of 12 to 18 months. Consequently, to allow for the completion of these qualification studies, no standard will be proposed for the application of end-sealing compounds at this time. A standard will be proposed after the higher solids solvent-based or the water-based end-sealing compounds have been qualified for use in the beverage can industry. It is anticipated that this will occur by 1982. This action is consistent with the qualification testing schedules currently underway as part of the CTG programs.

Modification/Reconstruction Considerations

The history of steady growth by the beverage can industry has led many owners and operators to look for ways to increase production capacity. Increased production capacity is usually accomplished by increasing line speed, adding a new line, or building a new plant. Many manufacturers have found that the design speed of existing beverage can coating operations could be increased by replacing or modifying the drive motors, electrical controls, or both. All such changes that result in a capital expenditure, as defined in 40 CFR 60.14, would subject the existing facility to the provisions of the proposed standards, if the modification causes increased emissions. However, the control techniques on which the proposed standards are based can be applied to existing beverage can coating operations that undergo a modification. A conversion would require only minor changes in the coating equipment. The use of this control technique as a retrofit on existing coating operations is well documented in the literature.

Existing beverage can surface coating operations undergoing a reconstruction, as defined in 40 CFR 60.15, would also be subject to the proposed standards. As previously discussed, the conversion to waterborne coating could be accomplished with only minor changes in coating equipment.

Selection of Monitoring Requirements

Although there are no monitoring requirements for affected facilities that use waterborne coatings, monthly performance tests are required as specified in the following section. For affected facilities that use a capture system and control device, monitoring requirements are specified in addition to monthly performance testing.

Monitoring requirements are included in standards of performance to provide a means for ensuring proper operation and maintenance of emission control systems and to provide plant and enforcement personnel with sufficient data to determine compliance with the proposed standards. In the case of the beverage can surface coating industry, monitoring is required only when a capture system and incineration are used to comply with the standards. Two types of emission control systems can be used, incineration and carbon adsorption. Monitoring is required only for incineration systems.

The proposed standards would require the plant owner or operator to measure the incinerator operating temperature during each test of incinerator efficiency. Monitoring would then consist of recording the temperature parameters on a continuous basis. For those facilities using catalytic incineration, the plant owner or operator would be required to continuously monitor the gas temperature, both upstream and downstream of the catalyst bed, as a decline in the temperature difference between the inlet and exhaust or a decline in the temperature before the catalyst would be indicative of a reduction in a catalyst activity.

Selection of Performance Test Methods

The selection of a format for the proposed standards in terms of mass of VOC per volume of coating solids limits the choice of performance test methods to a mass balance of all coatings and diluent VOC-solvent used during the test period. Where a capture and emission control system are used, capture and destruction or removal efficiencies are required for the mass balance to determine VOC discharged to the atmosphere. Choice does exist, however, in the manner of obtaining the input data for the mass balance and the frequency of testing.

The performance test may be done on a one time basis upon startup or it can be done on a recurring basis. Requiring only an initial performance test on startup reduces the workload on the owner or operator but is not as effective for ensuring continual compliance as periodic performance testing. On the other hand, periodic performance testing imposes additional recordkeeping requiements. However, the data required for periodic performance testing are collected and maintained by the source as part of production and inventory records. Periodic performance testing provides a better enforcement tool and the additional effort is considered reasonable. Because most can makers maintain the coating data on a calendar month basis, requiring periodic performance testing on a monthly basis is considered reasonable.

The data required for a mass balance performance test include mass or volume and density of each coating and diluent solvent used, volume percent solids in each coating used, and weight percent VOC in each coating used. Mass or volume of each coating and diluent solvent used is obtainable from company records; density and weight percent VOC from analyis using Reference Method 24, or from data provided by the coating supplier. Volume percent solids must be obtained from coating suppliers.

The use of coating supplier data results in the minimum cost to the owner or operator because the data are generally available in the form of a coating specification sheet. However, the procedures used in determining the weight and volume percent composition can vary. Some suppliers base their coating specifications on a theoretical method, e.g., use of ASTM 2369 to determine weight fraction volatile matter and solids and theoretical weight fraction of water to determine weight fraction of VOC. Volume fraction of solids is determined by calculations using the theoretical density of either VOC or solids.

The use of Reference Method 24 to provide data required in determining the VOC content of a coating has the advantage of using the same procedures for all coating suppliers, thereby providing a common basis for comparison. However, volume fraction solids cannot be directly determined using Reference Method 24, coating supplier data being specified for this parameter.

Consequently, the use of data provided by the coating supplier is specified as the source of coating information required for the performance test. However, Reference Method 24 "Determination of Volatile Matter, Water Content, Density, Volume

Solids, and Weight Solids of Surface Coatings" would serve as the primary source of data from which the VOC content of the coatings would be determined for the purposes of enforcement.

Industry data indicate the major can manufacturers would probably achieve compliance with the proposed standards through the use of waterborne coatings. With few exceptions, beverage can coating facilities constructed during the past 5 years were designed for the use of waterborne coatings. In addition, all major manufacturers have converted or are in the process of converting to waterborne coatings. However, a small number of owners or operators may elect to achieve compliance with the proposed emission limits through the use of a capture ststem and emission control device to reduce VOC emissions from solvent-borne coatings. The use of an emission control system necessitates a test method to determine he destruction efficiency and the concentration of VOC in the exhaust gases in and out of the incinerator. Data obtained by Reference Method 25, "Determination of Total Gaseous Nonmethane Organic Emission as Carbon," would be used to calculate the destruction efficiency of incinerators. Reference Method 1 would be used for sample and velocity transverse, Reference Method 2 for velocity and volumetric flow rate, Reference Method 3 for gas analyses, and Reference Method 4 stack gas moisture.

Table 1.—*Distribution of VOC Emissions*

Coating operation	Emission distribution	
	Coater/ flashoff	Curing oven
2-piece aluminum or steel cans:		
Exterior base coat operation	0.75	0.25
Overvarnish coating operation	.75	.25
Inside spray coating operation	.80	.20
3-piece steel cans:		
Exterior base coat operation	.10	.90
Interior base coat operation	.10	.90
Overvarnish coating operation	.10	.90
Inside spray coating operation	.80	.20
Steel ends:		
Exterior coating operation	10	.90
Interior coating operation	.10	.90

No standard method exists to determine the capture efficiency of an emission control system. The owner or operator would be required to use a procedure acceptable to the Administrator, which may include the use of the emission distributions between the coater and oven specified in the standards.

Limited information is available on the distribution of emissions between the cure oven and coater/flashoff. The owner or operator of an affected facility may use the emission distributions shown in Table 1 or may use other values acceptable to the Administrator. The values shown in Table 1 are based on information presented in the CTG, *Control of Volatile Organic Emissions from Existing Stationary Sources, Volume II: Surface Coating of Cans, Coils, Paper, Fabrics, Automobiles, and Light-Duty Trucks;* data from tests conducted by EPA and State agencies; and discussions with industry. Industry representatives agree that the values in Table 1 are representative of the industry. Comments on the emission distributions shown in Table 1 are invited. These values can be used to simplify the determination of control system capture efficiency.

Impacts of Reporting Requirements

A reports impact analysis for the beverage can surface coating industry was prepared in response to the U.S. Environmental Protection Agency (EPA) guidelines for implementing Executive Order 12044 (44 FR 30988, May 29, 1979). The purpose of the analysis is to estimate the economic impact of the reporting and recordkeeping requirements that would be imposed by the proposed standards and by those appearing in the General Provisions of 40 CFR Part 60. Included in the analysis are the rationale for the selection of the proposed requirements, an evaluation of the major alternatives considered prior to the selection of the proposed requirements, and a description of the information required by the General Provisions and by the proposed standards. A copy of the reports impact analysis is included in Subcategory II–I of the beverage can docket (EPA Docket No. OAQPS A–80–4).

Based on the reports impact analysis, a total of 12 industry person-years would be required to comply with the recordkeeping and reporting requirements through the first five years of applicability.

Public Hearing

A public hearing will be held to discuss the proposed standards in accordance with Section 307(d)(5) of the Clean Air Act. Persons wishing to make oral presentations should contact EPA at the address given in the Addresses section of this preamble. Oral presentations will be limited to 15 minutes each. Any member of the public may file a written statement before, during, or within 30 days after the hearing. Written statements should be addressed to the Central Docket Section address given in the Addresses section of this preamble.

A verbatim transcript of the hearing and written statements will be available for public inspection and copying during normal working hours at EPA's Central Docket Section in Washington, D.C. (see Addresses section of this preamble).

Docket

The docket is an organized and complete file of all the information submitted to or otherwise considered in the development of this proposed rulemaking. The principal purposes of the docket are (1) to allow interested parties to readily identify and locate documents so that they can intelligently and effectively participate in the rulemaking process, and (2) to serve as the record in case of judicial review.

Miscellaneous

As prescribed by Section 111, establishment of standards of performance for beverage can surface coating operations was preceded by the Administrator's determination (40 CFR 60.16, 44 FR 49222, dated August 21, 1979) that these sources contribute significantly to air pollution which may reasonably be anticipated to endanger public health or welfare. In accordance with Section 117 of the Act, publication of this proposal was preceded by consultation with appropriate advisory committees, independent experts, and Federal departments and agencies. The Administrator will welcome comments on all aspects of the proposed regulation, including economic and technological issues, and test methods.

Comments are invited on the designation of individual coating operations as the affected facilities. Comments are also invited on the use or development of high-solids or water-based end-sealing compounds and on the emission distribution shown in Table 1. Any comments submitted to the Administrator on these issues, however, should contain specific information and data pertinent to an evaluation of the magnitude and severity of its impact and suggested alternative courses of action that would reduce or eliminate this impact.

It should be noted that standards of performance for new sources established under Section 111 of the Clean Air Act reflect

> * * * application of the best technological system of continuous emission reduction which (taking into consideration the cost of achieving such emission reduction, any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated [Section 111 (a)(1)].

Although there may be emission control technology available that can

reduce emissions below those levels required to comply with standard of performance, this technology might not be selected as the basis of standards of performance due to costs associated with its use. Accordingly, standards of performance should not be viewed as the ultimate in achievable emission control. In fact, the Act required (or has the potential for requiring) the imposition of a more stringent emission standard in several situations.

For example, applicable costs do not necessarily play as prominent a role in determining the "lowest achievable emission rate" for new or modified sources locating in nonattainment areas, i.e., those areas where statutorily-mandated health and welfare standards are being violated. In this respect, Section 173 of the Act requires that new or modified sources constructed in an area where ambient pollutant concentrations exceed the National Ambient Air Quality Standard (NAAQS) must reduce emissions to the level that reflects the "lowest achievable emission rate" (LAER), as defined in Section 171(3) for such category of source. The statute defines LAER as that rate of emissions based on the following, whichever is more stringent:

(A) The most stringent emission limitation which is contained in the implementation plan of any state for such class or category of source, unless the owner or operator of the proposed source demonstrates that such limitations are not achievable, or

(B) The most stringent emission limitation which is achieved in practice by such class or category of source.

In no event can the emission rate exceed any applicable new source performance standard [Section 171(3)].

A similar situation may arise under the prevention of significant deterioration of air quality provisions of the Act (Part C). These provisions require that certain sources [referred to in Section 169(1)] employ "best available control technology" (BACT) as defined in Section 169(3) for all pollutants regulated under the Act. Best available control technology must be determined on a case-by-case basis, taking energy, environmental and economic impacts and other costs into account. In no event may the application of BACT result in emissions of any pollutants which will exceed the emissions allowed by an applicable standard established pursuant to Section 111 (or 112) of the Act.

In all events, State Implementation Plans (SIP's) approved or promulgated under Section 110 of the Act must provide for the attainment and maintenance of NAAQS designed to protect public health and welfare. For this purpose, SIP's must in some cases require greater emission reduction than those required by standards of performance for new sources.

Finally States are free under Section 116 of the Act to establish even more stringent emission limits than those established under Section 111 or those necessary to attain or maintain the NAAQS under Section 110. Accordingly, new sources may in some cases be subject to limitations more stringent than standards of performance under Section 111, and prospective owners and operators of new sources should be aware of this possibility in planning for such facilities.

This regulation will be reviewed four years from the date of promulgation as required by the Clean Air Act. This review will include an assessment of such factors as the need for integration with other programs, the existence of alternative methods, enforceability, improvements in emission control technology, and reporting requirements. The reporting requirements in this regulation will be reviewed as required under EPA's sunset policy for reporting requirements in regulations.

Section 317 of the Clean Air Act requires the Administrator to prepare an economic impact assessment for any new source standard of performance promulgated under Section 111(b) of the Act. An economic impact assessment was prepared for the proposed regulations and for other regulatory alternatives. All aspects of the assessment were considered in the formulation of the proposed standards to insure that the proposed standards would represent the best system of emission reduction considering costs. The economic impact assessment is included in the Background Information Document.

Dated: November 19, 1980.

Douglas M. Costle,
Administrator.

PART 60—STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

It is proposed that 40 CFR Part 60 be amended by adding a new Subpart WW as follows:

Subpart WW—Standards of Performance for the Beverage Can Surface Coating Industry

Sec.
60.490 Applicability and designation of affected facility.
60.491 Definitions.
60.492 Standards for volatile organic compounds.
60.493 Performance test and compliance provisions.
60.494 Monitoring of emissions and operations.
60.495 Reporting and recordkeeping requirements.
60.496 Test methods and procedures.

Authority.—Sections 111 and 301(a) of the Clean Air Act, as amended [42 U.S.C. 7411 and 7601(a)], and additional authority, as noted below.

Subpart WW—Standards of Performance for the Beverage Can Surface Coating Industry

§ 60.490 Applicability and designation of affected facility.

(a) The provisions of this subpart apply to the following affected facilities in beverage can surface coating, beverage can sheet coating, and beverage can end coating lines: each interior base coat operation, over-varnish coating operation, inside spray coating operation, aluminum- or steel-end interior coating operation, and aluminum- or steel-end exterior coating operation.

(b) The provisions of this subpart apply to any affected facility which is identified in paragraph (a) of this section and commences construction, modification, or reconstruction after November 26, 1980.

§ 60.491 Definitions.

(a) All terms which are used in this subpart and are not defined below are given the same meaning as in the Act and in Subpart A of this part.

"Aluminum end" means the aluminum top end for three- and two-piece beverage cans.

"Beverage can" means any two-piece steel or aluminum container or three-piece steel container in which soft drinks or beer, including malt liquor, are packaged. The definition does not include containers in which fruit or vegetable juices are packaged.

"End interior coating operation" means the system on each beverage can surface coating or sheet coating line used to apply a coating, which isolates the contents of the beverage can, to the steel or aluminum sheets from which ends for two-piece and three-piece beverage can are manufactured. The end interior coating operation consists of the coating application station, flashoff area, and curing oven.

"End exterior coating operation" means the system on each beverage can surface coating or sheet coating line used to apply a protective coating to the aluminum or steel sheets from which the ends for two-piece and three-piece beverage cans are manufactured. The end exterior coating operation consists

of the coating application station, flashoff area, and curing oven.

"Exterior base operation" means the system on each beverage can surface coating or sheet coating line used to apply a coating to the exterior of a two-piece beverage can body or to the steel sheets from which three-piece beverage can bodies are made. The exterior base coat provides corrosion resistance and a background for lithography or printing operations. The exterior base coat operation consists of the coating application station, flashoff area, and curing oven. The exterior base coat may be pigmented or clear (unpigmented).

"Interior base coat operation" means the system on each beverage can surface coating or sheet coating line used to apply a coating to the steel sheets from which three-piece beverage can bodies are formed. The interior base coat is the first layer of the protective coating which isolates the contents of a three-piece beverage can from the metal can body. The interior basecoat operation consists of the coating application station, flashoff area, and curing oven.

"Inside spray coating operation" means the system on each beverage can surface coating line used to apply a coating to the interior of a two- or three-piece beverage can body. This coating provides a protective film between the contents of the beverage can and the metal can body. The inside spray coating operation consists of the coating application station, flashoff area, and curing oven. Multiple applications of an inside spray coating are considered to be a single coating operation.

"Overvarnish coating operation" means the system on each beverage can surface coating or sheet coating line used to apply a coating over ink that reduces friction for automated beverage can filling equipment, provides gloss, and protects the finished beverage can body from abrasion and corrosion. The overvarnish coating is applied to the steel sheets from which three-piece beverage can bodies are made and to two-piece beverage can bodies. The coating operation consists of the coating application station, flashoff area, and curing oven.

"Steel end" means the beverage can ends which are formed from surface coated steel sheets for three-piece cans.

"Three-piece can" means any beverage can which consists of a surface coated steel body, a bottom, and a top. The three-piece can is manufactured from a surface coated rectangular sheet that is rolled into a tubular body and soldered, welded, or cement sealed at the seam to form a beverage can body. One end is attached to the can body by roll seaming during the manufacturing process, and the other end is attached during the filling process.

"Two-piece can" means any beverage can that consists of a body manufactured from a single piece of steel or aluminum and a top. Coatings for a two-piece can are usually applied after fabrication of the can body.

"VOC content" means all volatile organic compounds (VOC) that are in a coating. VOC are expressed in terms of kilograms of VOC per litre of coating solids.

(b) Notations used under § 60.493 of this subpart are defined below:

C_a = concentration in gas stream in vents after control device (parts per million as carbon)
C_b = concentration in gas stream in vents before control device (parts per million as carbon)
D_c = coatings density (kilograms per litre)
D_d = diluent VOC-solvents density (kilograms per litre)
D_r = density of VOC solvent recovered by an emission control device (kilograms per litre)
E = emission control device efficiency, inlet versus outlet (fraction)
F = capture efficiency, captured and routed to one control device versus total emissions (fraction)
G = volume-weighted average of VOC content of coatings consumed in a calendar month (kilograms per litre of coating solids)
H_e = fraction of VOC emitted at the coater and flashoff areas captured by a collection system
H_h = fraction of VOC emitted at the cure oven captured by a collection system
L_c = volume of coating, as received (litres)
L_d = volume of diluent VOC-solvent added to coating (litres)
L_r = volume of VOC-solvent recovered by an emission control device (litre)
L_s = volume of coating solids (litres)
M_d = mass of diluent VOC-solvent (kilograms)
M_o = mass of VOC-solvent in coating, as received (kilograms)
M_r = mass of VOC-solvent recovered by emission control device (kilograms)
N = volume-weighted average of VOC emission to atmosphere in a calendar month (kilograms per litre of coating solids)
Q_a = volumetric flow rate in vents after control device (dry standard cubic meters per hour)
Q_b = volumetric flow rate in vents before control device (dry standard cubic meters per hour)
R = overall reduction efficiency from all control systems for an affected facility (fraction)
S_e = fraction of VOC in coating and diluent VOC-solvent emitted at the coater and flashoff area for a coating operation
S_h = fraction of VOC in coating and diluent solvent emitted at the cure oven for a coating operation
V_s = volume fraction of solids in coatings, as received
W_o = weight fraction of VOC-solvent in coatings, as received.

§ 60.492 Standards for volatile organic compounds.

On or after the date on which the initial performance test required by § 60.8(a) is completed, no owner or operator subject to the provisions of this subpart shall discharge or cause the discharge of VOC emissions to the atmosphere that exceed the following volume-weighted calendar-month average emissions:

(a) 0.29 kilogram of VOC per litre of coating solids from each two-piece can exterior base coat operation, except clear base coat;

(b) 0.46 kilogram of VOC per litre of coating solids from each two-piece can clear base coat operation and from each overvarnish coating operation;

(c) 0.50 kilogram of VOC per litre of coating solids from each three-piece can sheet base coating operation and each aluminum- or steel-end sheet coating operation;

(d) 0.89 kilogram of VOC per litre of coating solids from each two-piece can inside spray coating operation; and

(e) 0.64 kilogram of VOC per litre of coating solids from each three-piece can inside spray coating operationn.

§ 60.493 Performance test and compliance provisions.

(a) Sections 60.8 (d) and (f) do not apply to the performance test procedures required by this subpart.

(b) The owner or operator of an affected facility shall conduct an initial performance test as required under Section 60.8(a) and thereafter a performance test each calendar month for each affected facility according to the procedures in this section.

(c) The owner or operator shall use the following procedures for determining monthly volume-weighted average emissions of VOC in kilograms per litre of coating solids.

(1) An owner or operator shall use the following procedures for any affected facility which does not use a capture system and a control device to comply with the emission limit specified under § 60.492.

(i) Calculate the volume-weighted average of the total mass of VOC per volume of coating solids used during each calendar month for each affected facility, except as provided under § 60.493(c)(1)(D). Each monthly calculation is considered a performance test. The owner or operator shall determine the composition of the coatings by formulation data supplied by the manufacturer of the coating or by an analysis of each coating, as received,

using Reference Method 24. The Administrator may require the owner or operator who uses formulation data supplied by the manufacturer of the coating to determine the VOC content of coatings using Reference Method 24 or an equivalent or alternative method. The owner or operator shall determine the volume of coating and the mass of VOC-solvent used for thinning purposes from company records on a monthly basis. If a common coating distribution system serves more than one affected facility or serves both affected and existing facilities, the owner or operator shall estimate the volume of coating used at each facility by using the average dry weight of coating, number of cans, and size of cans being processed by each affected and existing facility or by other procedures acceptable to the Administrator. The weighted average of the total mass of VOC per volume of coating solids used each calendar month will be determined by the following procedures.

(A) Calculate the mass of VOC used ($M_o + M_d$) during each calendar month for each affected facility by the following equation:

$$M_o + M_d = \sum_{i=1}^{n} L_{ci} D_{ci} W_{oi} + \sum_{j=1}^{m} L_{dj} D_{dj}$$

[$\Sigma L_{dj} D_{dj}$ will be 0 if no VOC solvent is added to the coatings, as received.]

Where: n is the number of different coatings used during the calendar month and m is the number of different diluent VOC-solvents used during the calendar month.

(B) Calculate the total volume of coating solids used (L_s) in each calendar month for each affected facility by the following equation:

$$L_s = \sum_{i=1}^{n} L_{ci} V_{si}$$

where: n is the number of different coatings used during the calendar month.

(C) Calculate the volume-weighted average mass of VOC per volume of solids used (G) during the calendar month for each affected facility by the following equation:

$$G = \frac{M_o + M_d}{L_s}$$

(ii) Calculate the volume-weighted average of VOC emissions discharged to the atmosphere (N) during the calendar month for each affected facility by the following equation:

$$N = G$$

(iii) Where the value of the volume-weighted average of mass of VOC per volume of solids discharged to the atmosphere (N) is less than or equal to the applicable emission limit specified under § 60.492, the affected facility is in compliance.

(iv) For each affected facility that uses only coatings, as received, which individually have a VOC content equal to or less than the limit specified under § 60.492 and does not add VOC to the coating during the distribution or application process, the owner or operator may demonstrate compliance by determining the formulation of the coatings from data determined using Reference Method 24 or data provided by the manufacturer of the coating. If required by the Administrator, the owner or operator shall determine the composition of any coating, as applied, by using Reference Method 24 or an equivalent or alternative method. Where the value of the VOC content of each coating used is equal to or less than the applicable emission limit specified under § 60.492, the affected facility is in compliance.

(2) An owner or operator shall use the following procedures for any affected facility that uses a capture system and a control device that destroys VOC (e.g., incinerator) to comply with the emission limit specified under § 60.492.

(i) Calculate the volume-weighted average of the total mass of VOC per volumn of coating solids (G) used during each calendar month for each affected facility as described under § 60.493(c)(1)(i).

(ii) Calculate the volume-weighted average of VOC emissions discharged to the atmosphere (N) during each calendar month by the following equation:

$$N = G \times [1-R]$$

For the initial performance test the overall reduction efficiency (R) shall be determined as prescribed in A, B, and C below. In subsequent months, the owner or operator may use the most recently determined overall reduction efficiency (R) for the performance test providing control device, and capture system operating conditions have not changed. The procedure in A, B, and C, below, shall be repeated when directed by the Administrator or when the owner or operator elects to operate the control device or capture system at conditions different from the initial performance test.

(A) Determine the fraction (F) of total VOC emitted by an affected facility that enters the control device using the following equation:

$$F = S_e H_e + S_h H_h$$

where H_e and H_h shall be determined by a method that has been previously approved by the Administrator. The owner or operator may use the values of S_e and S_h specified in Table 1 or other values determined by a method that has been previously approved by the Administrator.

(B) Determine the destruction efficiency of the control device (E) using values of the volumetric flow rate of each of the gas streams and the VOC content (as carbon) of each of the gas streams in and out of the device by the following equation.

$$E = \frac{\sum_{i=1}^{n} Q_{bi} C_{bi} - \sum_{j=1}^{m} Q_{aj} C_{aj}}{\sum_{i=1}^{n} Q_{bi} C_{bi}}$$

Where: n is the number vents before the control device, and m is the number of vents after the control device.

(C) Determine overall reduction efficiency (R) using the following equation:

$$R = EF$$

(iii) If the volume-weighted average of mass of VOC emitted to the atmosphere for each calendar month (N) is less than or equal to the applicable emission limit

specified under § 60.492, the affected facility is in compliance. Each monthly calculation is a performance test.

Table I.—*Distribution of VOC Emissions*

Coating operation	Emission distribution	
	Coater/ flashoff (S_r)	Curing oven (S_o)
2-piece aluminum or steel cans:		
Exterior base coat operation	0.75	0.25
Overvarnish coating operation	.75	.25
Inside spray coating operation	.80	.20
3-piece steel cans:		
Exterior base coat operation	.10	.90
Interior base coat operation	.10	.90
Overvarnish coating operation	.10	.90
Inside spray coating operation	.80	.20
Steel ends:		
Exterior coating operation	.10	.90
Interior coating operation	.10	.90

(3) An owner or operator shall use the following procedure for any affected facility which uses a capture system and a control device that recovers the VOC (e.g., carbon adsorber) to comply with the applicable emission limit specified under § 60.492.

(i) Calculate the volume-weighted average of the total mass of VOC per volume of coating solids (G) used during each calendar month for each affected facility as described under § 60.493(c)(1)(i).

(ii) Calculate the total mass of VOC recovered (M_r) during each calendar month using the following equation:

$$M_r = L_r D_r$$

(iii) Calculate overall reduction efficiency of the control device (R) for each calendar month for each affected facility using the following equation:

$$R = \frac{M_r}{M_a + M_d}$$

(iv) Calculate the volume-weighted average mass of VOC emitted to the atmosphere (N) for each calendar month for each affected facility using the following equation:

$$N = G\,(1 - R)$$

(v) If the weighted average of VOC emitted to the atmosphere for each calendar month (N) is less than or equal to the applicable emission limit specified under § 60.492, the affected facility is in compliance. Each monthly calculation is a performance test.

§ 60.494 Monitoring of emission and operations.

The owner or operator of an affected facility that uses a capture system and an incinerator to comply with the emission limits specified under § 60.492 shall install, calibrate, maintain, and operate temperature measurement devices as prescribed below:

(a) Where thermal incineration is used, a temperature measurement device shall be installed in the firebox. Where catalytic incineration is used, a temperature measurement device shall be installed in the gas stream immediately before and after the catalyst bed.

(b) Each temperature measurement device shall be installed, calibrated, and maintained according to the manufacturer's specifications. The device shall have an accuracy the greater of ±0.75 percent of the temperature being measured expressed in °C or ±2.5° C.

(c) Each temperature measurement device shall be equipped with a recording device so that a permanent continuous record is produced.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414))

§ 60.495 Reporting and recordkeeping requirements.

(a) Each owner or operator of an affected facility shall include the following data in the initial compliance report required under § 60.8(a):

(1) Where only coatings which individually have a VOC content equal to or less than the limits specified under § 60.492 are used, and no VOC is added to the coating during the application or distribution process, the owner or operator shall provide a list of the coatings used for each affected facility and the VOC content of each coating calculated from formulation data determined using Reference Method 24 or supplied by the manufacturers of the coatings.

(2) Where one or more coatings which individually have a VOC content greater than the limits specified under § 60.492 are used or where VOC are added or used in the coating process, the owner or operator shall report for each affected facility the volume-weighted average of the total mass of VOC per volume of coating solids.

(3) Where compliance is achieved through the use of incineration, the owner or operator shall include in the initial performance test required under § 60.8(a) or subsequent performance tests at which destruction efficiency is determined the combustion temperature (or the gas temperature upstream and downstream of the catalyst bed), the total mass of VOC per volume of coating solids before and after the incinerator, capture efficiency, and the destruction efficiency of the incinerator used to attain compliance with the applicable emission limit specified under § 60.492. The owner or operator shall also include a description of the method used to establish the amount of VOC captured by the capture system and sent to the control device.

(b) Following the initial compliance report, each owner or operator of an affected facility shall report, within ten calendar days, each instance in which the volume-weighted average of the total mass of VOC per volume of coating solids, after the control device if a capture device and control system are used, is greater than the limit specified under § 60.492.

(c) Where compliance with § 60.492 is achieved through the use of incineration, the owner or operator shall continuously record the incinerator combustion temperature during coating operations for theremal incineration or the gas temperature upstream and downstream of the incinerator catalyst bed during coating operations for catalytic incineration. For thermal incinerators the owner or operator shall report quarterly all 3-hour periods during which the average temperature (when cans are being processed) of the device was more than 28° C below the average temperature of the device during the most recent performance test at which destruction efficiency was determined as specified under § 60.493. For catalytic incinerators, the owner or operator shall report quarterly all 3-hour periods during which the average temperature of the device immediately before the catalyst bed, when cans are being processed, is more than 28° C below the average temperature of the device during the most recent performance test at which destruction efficiency was determined as specified under § 60.493, and all 3-hour periods during which the average temperature difference across the catalyst bed, when cans are being processed, is less than 80 percent of the average temperature difference of the device during the most recent performance test at which destruction efficiency was determined as specified under § 60.493. Negative reports are required. The owner or operator shall submit negative reports, quarterly, if there were no periods of reportable temperature differences.

(d) Each owner or operator subject to the provisions of this subpart shall

maintain at the source, for a period of at least 2 years, records of all data and calculations used to determine VOC emissions from each affected facility. Where compliance is achieved through the use of thermal incineration, each owner or operator shall maintain, at the source, daily records of the incinerator combustion chamber temperature. If catalytic incineration is used, the owner or operator shall maintain at the source daily records of the gas temperature, both upstream and downstream of the incinerator catalyst bed. Where compliance is achieved through the use of a solvent recovery system, the owner or operator shall maintain at the source daily records of the amount of solvent recovered by the system for each affected facility.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414))

§ 60.496 Reference methods and procedures.

(a) The reference methods in Appendix A to this part, except as provided in § 60.8, shall be used to conduct performance tests.

(1) Reference Method 24 or an equivalent or alternative method approved by the Administrator for the determination of formulation data from which the VOC content of the coatings used for each affected facility can be calculated. In the event of dispute, Reference Method 24 shall be the reference method.

(2) Reference Method 25 or an equivalent or alternative method for the determination of the VOC concentration in the effluent gas entering and leaving the incinerator for each stack equipped with an emission control device. The owner or operator shall notify the Administrator 30 days in advance of any State test using Reference Method 25. The following reference methods are to be used in conjunction with Reference Method 25:

(i) Method 1 for sample and velocity traverses,

(ii) Method 2 for velocity and volumetric flow rate,

(iii) Method 3 for gas analysis, and

(iv) Method for stack gas moisture.

(b) For Reference Method 24, the coating sample must be a 1-litre sample collected in a 1-litre container at a point where the sample will be representative of the coating material.

(c) For Reference Method 25, the sampling time for each of three runs must be at least 1 hour. The minimum sample volume must be 0.003 dscm except that shorter sampling times or smaller volumes, when necessitated by process variables or other factors, may be approved by the Administrator. The Administrator will approve the sampling of representative stacks on a case-by-case basis if the owner or operator can demonstrate to the satisfaction of the Administrator that the testing of representative stacks would yield results comparable to those that would be obtained by testing all stacks.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414))

[FR Doc. 80-36885 Filed 11-25-80; 8:45 am]
BILLING CODE 6560-26-M

Federal Register / Vol. 46, No. 39 / Friday, February 27, 1981

Proposed Rules

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 60

[AD-FRL-1762-5]

Standards of Performance for New Stationary Sources; Beverage Can Surface Coating Industry; Reopening of Comment Period

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule; reopening comment period.

SUMMARY: This action provides for a reopening of the comment period for the proposed standards of performance for the beverage can surface coating industry for a 30-day period beginning February 27, 1981. These standards were proposed in the Federal Register on November 26, 1980 (45 FR 78980). This action responds to requests from the Can Manufacturers Institute and the Adolph Coors Company for an extension of the comment period. This extension will allow additional time for the industry to further evaluate the proposed standards and submit additional information and data.

DATES: Comments must be postmarked no later than March 30, 1981. Also, written comments responding to, supplementing, or rebutting written or oral comments received at the public hearing on January 6, 1981, must be postmarked no later than March 30, 1981.

ADDRESS: Comments should be submitted (in duplicate if possible) to: Central Docket Section (A-130), Attention: Docket Number A-80-4, U.S. Environmental Protection Agency, 401 M Street, SW., Washington, D.C. 20460.

FOR FURTHER INFORMATION CONTACT: Mr. Gene W. Smith, Standards Development Branch, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5421.

Dated: February 20, 1981.

Edward F. Tuerk,

Acting Assistant Administrator for Air, Noise, and Radiation.

[FR Doc. 81-3771 Filed 2-26-81; 8:45 am]
BILLING CODE 6560-26-M

ENVIRONMENTAL PROTECTION AGENCY

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STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

BULK GASOLINE TERMINALS

SUBPART XX

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 60

[AD-FRL-1634-4]

Standards of Performance for New Stationary Sources; Bulk Gasoline Terminals

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed Rule and Notice of Public Hearing.

SUMMARY: The proposed standards would limit emissions of volatile organic compounds (VOC) from new, modified, and reconstructed gasoline tank truck loading racks at bulk gasoline terminals.

The proposed standards implement Secion 111 of the Clean Air Act and are based on the Administrator's determination that bulk gasoline terminals contribute significantly to air pollution that may reasonably be anticipated to endanger public health or welfare. The intent is to require new, modified, and reconstructed bulk gasoline terminals to use the best technological system of continuous emission reduction, considering costs, non-air quality health, and environmental and energy impacts which has been adequately demonstrated.

A public hearing will be held to provide interested persons an opportunity for oral presentation of data, views, or arguments concerning the proposed standards.

DATES: *Comments.* Comments must be received on or before February 17, 1981.

Public Hearing. A public hearing will be held on January 21, 1981 (about 30 days after proposal) beginning at 9 a.m.

Request to Speak at Hearing. Persons wishing to present oral testimony must contact EPA by January 14, 1981 (1 week before hearing).

ADDRESSES: *Comments.* Comments should be submitted (in duplicate if possible) to: Central Docket Section (A-130), Attention: Docket Number A-79-52, U.S. Environmental Protection Agency, 401 M Street, SW, Washington, D.C. 20460.

Public Hearing. The public hearing will be held at E.R.C. Auditorium, R.T.P., North Carolina 27711. Persons wishing to present oral testimony should notify Mrs. Naomi Dur Kee, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5271.

Background Information Document. The Background Information Document (BID) for the proposed standards may be obtained from the U.S. EPA Library (MD-35), Research Triangle Park, North Carolina 27711, telephone (919) 541-2777. Please refer to "Bulk Gasoline Terminals—Background Information for Proposed Standards," EPA-450/3-80-038a.

Docket. Docket No. A-79-52, containing supporting information used in developing the proposed standards, is available for public inspection and copying between 8:00 a.m. and 4:00 p.m., Monday through Friday, at EPA's Central Docket Section, West Tower Lobby, Gallery 1, Waterside Mall, 401 M Street, SW, Washington, D.C. 20460. A reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: Ms. Susan R. Wyatt, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5477.

SUPPLEMENTARY INFORMATION: A Background Information Document has been prepared that contains information on tank truck loading operations at bulk gasoline terminals; the available control technologies for VOC emissions; and analysis of the environmental, energy, economic, and inflationary impacts of regulatory alternatives. The information contained in this document is summarized in this preamble. All references used for the information contained in the preamble can be found in this document.

Proposed Standards

The proposed standards would limit volatile organic compound (VOC) emissions from new, modified, and reconstructed gasoline tank truck loading racks at bulk gasoline terminals. Specifically, the proposed standards would require the installation of vapor collection equipment at the terminal for the purpose of collecting the VOC emissions displaced during loading of liquid product into gasoline trank trucks, and would limit these emissions from the collection system to 35 milligrams of VOCs per liter of gasoline loaded.

Additionally, a terminal owner or operator would be required to restrict gasoline tank truck loadings to those tank trucks which had passed an annual vapor-tight test. Written documentation in the form of tank truck test results would be kept on file at the bulk gasoline terminal in a permanent form available for inspection.

Five new Reference Methods are proposed with these standards to measure vapor processor outlet VOC mass emissions, and to test gasoline delivery tanks for vapor tightness. Methods 2A and 2B measure gas flow rates in pipes and small ducts, and in vapor incinerator exhausts, respectively. Methods 25A and 25B measure VOC concentration by two detection methods. Method 27 is a pressure/vacuum (vapor-tight) test for gasoline delivery tanks. Terminal vapor handling equipment would be monitored for leaks prior to each performance test using Method 21, which has been proposed with Standards of Performance for VOC Fugitive Emission Sources in the Synthetic Organic Chemicals Manufacturing Industry.

Summary of Environmental, Energy, and Economic Impacts

The proposed standards would reduce the projected nationwide 1985 VOC emissions from affected facilities by about 6,600 megagrams per year, or 70 percent.

Emissions of carbon monoxide and oxides of nitrogen from thermal oxidation systems would total up to 10 Mg/yr and 4 Mg/yr, respectively, in the fifth year of the standards. This represents a relatively small air pollution impact.

Water is not used as a direct control medium by any of the available control techniques. Existing separation and handling systems could accommodate the small amount of wastewater discharged by some types of control processors. The proposed standards would have a negligible impact on water quality.

Because all of the VOC emissions are incinerated or returned to storage as liquid product, there would be no direct solid waste impacts under the proposed standards. Some solid waste would be generated indirectly due to disposal of activated carbon from carbon adsorption units after the useful life of the carbon had expired. Even the worst case situation would produce minimal impacts on solid waste.

The proposed standards would have negligible impacts on noise, space requirements, and availability of resources.

Because all of the available vapor processors, except the thermal oxidizer, recover energy in the form of gasoline, the proposed standards would result in a net energy savings equivalent to approximately 9 million liters (2.4 million gallons) of gasoline per year in the fifth year of the standards.

The proposed standards would result in a total nationwide capital cost for VOC control during the first five years after the effective date of the standards

of about $25.3 million. The proposed standards would also result in a total nationwide annualized cost in the fifth year of about $4.3 million.

Under the worst case situation, the maximum increase in the retail price of gasoline resulting from the proposed standards would be less than 0.6 percent due to bulk terminals and less than 0.7 percent due to the independent tank truck industry.

Rationale

Selection of Source

The EPA Priority List (40 CFR 60.16, 44 FR 49222, August 21, 1979) lists, in order of priority for standards development, various source categories in terms of quantities of nationwide pollutant emissions, the mobility and competitive nature of each source category, and the extent to which each pollutant endangers health and welfare. The Priority List reflects the Administrator's determination that emissions from the listed source categories contribute significantly to air pollution that may reasonably be anticipated to endanger public health or welfare, and is intended to identify major source categories for which standards of performance are to be promulgated. Petroleum Transportation and Marketing is included as Number 23 on the Priority List.

Bulk gasoline terminals are an important part of the gasoline delivery chain and are usually the first link between the refinery and the ultimate end-user. There are presently an estimated 1,511 bulk terminals handling gasoline in the U.S. terminals typically receive gasoline from the refinery by pipeline, ship, or barge, store the gasoline in large aboveground tanks, and redistribute the gasoline to smaller facilities in the marketing chain (i.e., bulk plants and service stations). Gasoline is loaded into delivery tank trucks at the terminal loading racks and is transported to the next link in the delivery chain. A typical bulk gasoline terminal has a gasoline throughput of 950,000 liters (250,000 gallons) per day, three loading rack positions for gasoline, and four aboveground tanks for gasoline with a combined storage capacity of 24,000 m^3 (150,000 bbl). Bulk gasoline terminals are normally found in or around urban areas since the demand for gasoline is higher in these locations.

It is estimated that ten new terminals will be built in the next ten years. This relatively small growth rate is a reflection of the small increase in gasoline consumption projected for the next ten years. Current industry trends are toward consolidation of existing terminals rather than the construction of new terminals. Estimates, based upon an industry survey, indicate that there may be as many as 100 modified and reconstructed sources in the next ten years.

Gasoline loading racks at terminals currently contribute approximately 300,000 megagrams per year (Mg/year) of VOC emissions, which is approximately 2 percent of the total nationwide VOC emissions. After full implementation of proposed State regulations on bulk gasoline terminals, expected by 1982, total VOC emissions from loading racks are expected to be reduced to about 140,000 Mg/year.

Selection of Pollutants and Affected Facilities

VOC is the only pollutant which is emitted during the loading of liquid product into tank trucks at bulk gasoline terminals. Consequently, the proposed standards would regulate only VOC emissions from the loading operations at terminals.

Volatile organic compounds are any of the organic compounds that participate in atmospheric photochemcial reactions. Ozone, produced in these reactions, results in a variety of adverse impacts on health and welfare, including impaired respiratory function, eye irritation, necrosis of plant tissue, and deterioration of certain materials, such as rubber. Further information on these effects can be found in the U.S. Environmental Protection Agency (EPA) document entitled "Air Quality Criteria for Ozone and Other Photochemical Oxidants" (EPA-600/8-78-004).

The two major sources of VOC emissions at terminals are the storage tanks and the tank truck loading racks. Storage tanks are currently regulated under Federal standards (40 CFR 60, Subpart Ka—Standards of Performance for Storage Vessels for Petroleum Liquids). Those standards cover storage tank emissions caused by atmospheric changes (breathing losses) and emissions due to filling and emptying the storage tank (working losses). Therefore, storage tanks would not be regulated by these proposed standards.

Loading racks consist of the piping, pumps, meters, and loading arms that are necessary to transfer liquid petroleum products from storage tanks to delivery tank trucks. Emissions from the loading racks are generated during the loading of liquid product into delivery tank trucks when the liquid product being loaded displaces VOC vapors contained in the delivery tanks. These vapors consist of evaporated gasoline components which fill the air space above the liquid product. VOC emissions from the loading operation can vary due to the loading method (splash loading causes more emissions than submerged loading) and due to the VOC concentration of the vapors in the delivery tank truck prior to loading. This VOC concentration can vary significantly depending upon the type of product carried, temperature, pressure, vapor tightness of the delivery tank, and whether vapors were transferred back to the delivery tank when the last load of liquid product was unloaded (vapor balanced).

Loading rack facilities in the bulk terminal industry can vary widely in the types and quantities of products handled. In addition to gasoline, large quantities of fuel oil, diesel, and jet fuel may be handled by a gasoline terminal. The amount of each product handled is due to the different demands for each product in the vicinity of the terminal. VOC emisisons from fuel oil, diesel, and jet fuel are very small compared to those from gasoline. Consequently, only VOC emissions from gasoline would be covered by the proposed standards.

At many terminals, "switch loading" of delivery tank trucks is practiced. Switch loading involves the transport, in a single tank compartment on successive deliveries, of various products in addition to gasoline. Gasoline vapors can be displaced either by incoming gasoline or by any other liquid product when a previous load of gasoline left vapors in the delivery tank. As an example, fuel oil loaded into a tank compartment which had carried gasoline on the previous load would displace gasoline vapors, and thus produce VOC emissions. For the purposes of the proposed standards, the delivery vehicle in both cases is referred to as a "gasoline tank truck."

Because gasoline vapors can be emitted from a tank truck loading a product other than gasoline, switch loading was taken into account in designating the affected facility to be regulated under the proposed standards. Consequently, the proposed standards would affect both the loading of gasoline into delivery tanks and the loading of any liquid product into delivery tanks which contain gasoline vapors. Any delivery tank carrying gasoline on the immediately previous load is assumed to contain gasoline vapors. The costs of controlling switch loading facilities (loading racks) are not significantly greater than the costs to control only gasoline loading racks. Since the same vapor processor is used to control all of the loading racks, the primary additional cost would be for the vapor piping

connecting each loading rack to the main vapor line to the processor. In some cases, a larger, more expensive processor might be specified in order to handle increased vapor flow, but the additional cost would amount to a small percentage of the total cost. Many bulk terminals are already controlling all loading racks which have the potential to displace gasoline vapors.

Since only small quantities of gasoline (less than 2 percent) are delivered by rail cars, vapor controls on these loadings were not investigated, and the proposed standards would apply only to the loading of liquid product into gasoline tank trucks.

For the purposes of the proposed standards, gasoline is defined as any petroleum distillate or petroleum distillate/alcohol blend with a Reid vapor pressure of 27.6 kilopascals (4 pounds per square inch) or greater which is used as a fuel for internal combustion engines. The addition of the distinction for petroleum distillate/alcohol blend in the definition is to include gasohol fuels which have experienced increased consumption in recent months.

Because vapor leakage from the tank trucks being loaded can represent a significant proportion of the total bulk terminal VOC emissions occurring during liquid product loading, the proposed standard has been written to control such vapor leakage as well as emissions from the loading racks. EPS believes that Section 111 would authorize this regulation to take any one of the three alternative forms described below; the Agency solicits comments on all issues associated with each approach.

Under the first approach, the standards would apply only to the bulk terminal. The terminal owner or operator would be required to use vapor collection equipment on loading racks servicing gasoline tank trucks, and to restrict loadings to vapor-tight tank trucks. The affected facility under this approach would include only the loading racks servicing gasoline tank trucks. Operators of gasoline tank trucks wishing to load at the teminal would need compatible loading and vapor recovery equipment, and vapor-tight delivery tanks. This approach would consolidate responsibility for controlling emissions without resulting in an excessive burden for the terminal owner or operator.

Under the second approach, standards would apply directly to both the terminal and the tank trucks. The standards would require the terminal owner or operator to install vapor collection equipment and the tank truck operator to have compatible equipment and vapor-tight tank trucks. Under this appproach, the affected facility would consist of the combination of the loading rack and the truck-mounted tank, with a single standard covering the hybrid loading rack/tank facility. The second approach could result in several owners or operators (of the terminal and of the tank trucks) at the same terminal being regulated under a single standard. This could create enforcement difficulties and problems in determining liability.

The third approach would involve designating two affected facilities, one consisting of the loading racks servicing gasoline tank trucks and the other consisting of the truck-mounted tanks, and applying a separate standard to each facility. It would not be practical to directly regulate gasoline tank trucks under a separate standard because the VOC emissions being regulated occur only during product loading at the terminal, and a situation of two standards regulating the same source of emissions would result. Furthermore, in the case of new tank trucks loading at an existing uncontrolled bulk terminal, only the tank trucks would be regulated, and VOC emissions would be displaced to the atmosphere uncontrolled since the terminal would have no vapor collection or control equipment to process the vapors. Thus, separate standards would not be effective in these circumstances.

After considering the issues involved with each of these approaches to designating the affected facility, the Administrator selected the first approach as the most practical designation. This places direct responsibility under the proposed standards on the owner or operator of the bulk terminal only, eliminates the potential for enforcement problems associated with an impermanent affected facility under the second approach, and eliminates the situation of regulating the same operation with two standards under the third approach.

The selected approach, which considers only the bulk terminal loading racks as the affected facility designation, presents several possibilities. Two potential affected facility designations considered under this approach were (1) each individual loading rack, and (2) the combination of all the loading racks at the terminal which service gasoline tank trucks.

In choosing the affected facility, EPA must decide which piece or group of equipment is the appropriate unit (the "source") for separate emission standards in the particular industrial context involved. The Agency must do this by examining the situation in light of the terms and purpose of Section 111. One major consideration in this examination is that the use of a narrower designation results in bringing replacement equipment under the NSPS sooner. If, for example, an entire plant is designated as the affected facility, no part of the plant would be covered by the standard unless the plant as a whole is "modified" or "reconstructed." If, on the other hand, each piece of equipment is designated as the affected facility, then as each piece is replaced, the replacement piece will be a new source subject to the standard. Since the purpose of Section 111 is to minimize emissions by application of the best demonstrated control technology at all new and modified sources (considering cost, other health and evnironmental effects, and energy requirements), there is a presumption that a narrower designation of the affected facility is proper. This ensures that new emission sources within plants will be brought under the coverage of the standards as they are installed. This presumption can be overcome, however, if the Agency concludes either that a) a broader designation of the affected facility would result in greater emissions reduction than would a narrow designation; or b) the other relevant statutory factors (technical feasibility, cost, energy, and other environmental impacts) point to a broader designation. The application of these factors is discussed below.

While selection of a narrower designation of affected facility generally results in greater emissions reduction by earlier coverage of replacement equipment, it appears that a broader designation would result in greater emissions reduction in the bulk gasoline terminal industry. Replacement of existing racks in not expected to occur to any great extent, because properly maintained racks do not generally require replacement. In other words, the isolated replacement of a single rack due to deterioration of that rack is expected to occur rarely. Rather, EPA projects that terminals will concentrate on additions of new racks to sets of existing racks rather than replacement of existing racks. EPA further projects that if replacement does occur, it will involve a major change in the rack system (such as conversion from top to bottom loading) and will involve most or all of the racks at the terminal rather than just one rack. The reasons that a total racks affected facility designation is expected to result in greater emission reduction than a single rack affected facility designation, in the situations described above, are explained in the following paragraphs.

A modification, under 40 CFR 60.14, is any physical or operational change to an existing facility which produces a net increase in the emission rate from that facility. If a new rack were added to a terminal it would be an affected facility under a single rack designation, and only that rack would be covered. Under a total racks designation, the addition of a single new rack could result in a modification, in which case all of the racks would become an affected facility, resulting in greater emission reduction under this designation. Even if the addition of the new rack did not result in a modification because there was no increase in emissions (due to partial control, for example), the total racks designation would still result in less emissions. This is because the single rack designation would still result in a small incremental emissions increase even if the rack were controlled.

In addition to modification, an existing facility could become reconstructed, under 40 CFR 60.15, if the fixed capital cost of replacing components at that facility exceeded 50 percent of the cost of a comparable entirely new facility. Under a single rack designation, this cost figure could be attained sooner for a given rack than it would under a total racks designation, since total replacement cost for parts for a single rack would be less than for all the racks, and 50 percent of the cost for a single new rack would be less than 50 percent of the total cost for all new racks. However, under a total racks designation, all the racks at a terminal could become affected facilities if the conversion cost exceeded 50 percent of the cost needed to build all new racks; although more racks would have to be converted to attain this cost, more racks could eventually be covered sooner than they would be under a single rack designation. Multiplerack conversion projects of this type are the most likely type of replacement at bulk terminals.

Whether the total racks designation would actually result in more emission reduction than the single rack designation is somewhat uncertain. The designation which would result in the most emission reduction depends on decisions made by a terminal owner or operator when replacing racks or adding new racks to the terminal. It is difficult to accurately forecast what these decisions will be. For example, under the single rack designation, even if only one rack had to be controlled, the terminal owner or operator may elect to control all racks instead of one rack, since it is common industry practice to control all racks with one control device. If this occurred, the single rack designation could result in control of all racks just as would the total racks designation.

In summary, considering that the addition of new racks and the multiple replacement of racks are expected to be more likely occurrences in this industry than single rack replacement, and the fact that more racks would come under the standards under the total racks designation than under the single rack designation in these cases, it is projected that the total racks designation would result in the greatest emission reduction. However, as stated previously, this depends on decisions made by a terminal owner or operator at the time of construction.

After projecting that the total racks designation would result in the greatest emission reduction, the reasonableness of the cost of this designation was then evaluated. For terminals which do not already have control devices (most new and existing terminals in attainment areas), examination of the cost data has indicated that the affected facility designation of each individual rack would generally result in lower capital costs than the designation of all the loading racks. However, the net annualized cost would be lower for the total racks approach, assuming that the terminal elected to use a control system other than thermal oxidation, because of the greater liquid recovery cost credits associated with controlling all of the loading racks. For example, at an affected terminal the capital cost to install controls on one loading rack (assuming 380,000 liters/day throughput) would be about $295,000. This cost includes the vapor processing system, installation, and piping. Under a total racks designation, the capital cost to install controls on all loading racks (assuming 1,900,000 liters/day throughput) would be about $345,000. Annualized costs, which include capital charges, labor, maintenance, utilities, and liquid recovery credits, indicate as much as an $80,000 per year difference in favor of the total racks controls (a net annualized cost of about $40,000 for a single rack designation, and a net annualized cost savings of $40,000 for a total racks designation). The major reason for this favorable annualized cost, as stated earlier, is the greater recovery cost credits associated with the controls on all of the racks. Based on this analysis, it was concluded that for terminals in attainment areas the costs which would result from a total racks designation would be reasonable, and would in fact be less expensive on an annualized basis provided that the control system used recovered gasoline from the collected vapors. Systems which recover gasoline are expected to comprise the majority of the systems which would be installed under the NSPS.

Another consideration regarding costs for terminals in attainment areas is that most tank trucks serving bulk terminals in attainment areas would not be equipped for vapor recovery under State regulations. In order to load at a controlled loading rack, a tank truck would have to be equipped with a vapor collection system to route gasoline vapors to the terminal's control system. Besides having to retrofit vapor recovery equipment, some tank trucks would also have to convert to bottom loading from top loading, if the terminal switched to bottom loading in the course of installing vapor control equipment. In addition, a vapor tightness requirement could be in effect for tank trucks loading at such a rack. However, under a single rack designation, a terminal could end up with a mix of controlled racks and uncontrolled racks. In this case, tank trucks would probably load at the uncontrolled racks so that the cost of retrofitting could be avoided. Thus, a terminal owner or operator considering a conversion of one or more racks, which would result in those racks becoming affected facilities, likely would either be deterred from making any changes or would convert all of the racks and all of his tank trucks in order to prevent this situation from occurring. The result of this conversion would be the same as under a total racks designation.

For terminals which already have control devices (the majority being existing terminals in non-attainment areas), capital and annualized costs could both be lower for a total racks designation of the affected facility. For example, the case of an existing terminal which is modified by adding a loading rack and increasing emissions was analyzed. If the limits of the standard were more stringent than those under which the existing control device was operating, then depending on whether the device could meet the more stringent limit, the terminal owner or operator might have to make an expenditure in order to comply with the new limits. Under a one rack designation for the affected facility, only the new rack would be required to meet the limits of the standard. If a separate control system was installed for the new rack, capital costs could be about $295,000 and annualized costs could be about $70,000 per year. Under the total racks designation of the affected facility, both the existing racks and the new rack

might be required to meet the limits of the standard under the modification provisions. One option would be to install an add-on system to the existing control device if that control device could not meet the limits of the standard. The capital cost for this approach could be about $100,000 and the net annualized cost could be about $20,000 per year more than the annualized cost of operating the original system. Another option would be to replace the existing control device with a new device which could meet the limits of the standard. The capital cost for this could be about $200,000 and the incremental net annualized cost could amount to $50,000 per year. A third option for terminal operators whose control device could be altered to achieve a lower emission limit would be to upgrade the existing device through design or operational changes. While the cost for this approach would vary in individual cases, it would be considerably less than the cost for either of the first two options. Finally, any presently installed control device which was capable of complying with the limits of a more stringent standard would not have to be altered. The operator's decision to select any of these options would depend on such factors as the terminal's financial position and the type, age, condition, and control efficiency of the existing control device. Based on this analysis, it was concluded that for terminals in non-attainment areas, regardless of which option the terminal operator selected, the costs incurred under a total racks designation would be reasonable, and in fact any of the options discussed would be less expensive than the costs under a one rack designation.

In addition to the emission reduction and cost considerations discussed above, the single rack designation has technical complications. Performance testing of this affected facility would be difficult at terminals which already have some means of vapor control installed (estimated to include about 70 percent of the existing terminals). If one rack were newly installed or altered in such a way as to become an affected facility under modification or reconstruction provisions (40 CFR 60.14 and 60.15) and were required to meet a more stringent emission limit, the new rack could require controls different from the remainder of the loading equipment. Since the emissions from all of the racks are typically routed to the single vapor processor, it would be impossible to distinguish the vapor processor outlet emissions originating from only the new loading rack. If an existing control device were unable to meet a more stringent emission limit, a bulk terminal operator could either install a separate vapor collection system and processor for the new rack, or replace or upgrade the existing control device. The latter approach is identical to what a total racks designation of the affected facility would accomplish.

The foregoing discussion indicates that, based on the assumptions made, the total racks designation would result in the greatest emission reduction. Furthermore, the total racks designation would be the most consistent with the industry practice of using one control device for all racks at a terminal. The total racks designation, by causing all collected vapors to be routed to a single vapor processor, would result in the less expensive approach to achieving the requirements of the proposed standards, and the costs would be reasonable. Performance testing of this type of affected facility would be straightforward because all loading racks would be subject to the same standards. Consequently, after considering the emission reduction, technical, and cost impacts associated with each possible designation, the Administrator selected the combination of all the loading racks as the affected facility.

Comments are specifically invited concerning the selection of the affected facility. In particular, comments are requested on the question of whether selection of the total racks designation would in fact result in greater emissions reduction than would selection of the one rack designation, and the economic impact of this selection on existing terminals. Comments are requested on the factors considered and also on any additional factors which should be considered. Any comments submitted to the Administrator on this issue should contain specific information and data pertinent to an evaluation of the magnitude and severity of its impact and suggested alternative courses of action that would avoid this impact.

Selection of Basis of Proposed Standards

Control Technology. Control systems currently being used at terminals consist of two main elements, the vapor collection system and the vapor processing system (or vapor processor). All of the vapor collection systems used at terminals are somewhat similar. The air-vapor mixture displaced during the loading of the delivery tank is contained and routed through vapor piping on the tank truck to the terminal vapor collection piping. The terminal vapor collection system, in turn, routes the air-vapor mixture through piping to the vapor processing equipment. Knock-out tanks are commonly utilized between the loading racks and the vapor processor to remove liquid from the transfer lines before it reaches the vapor processor. Liquid can enter the line due to overfilling the delivery tank, entrainment of liquid droplets from the loading operation, or condensation of vapor into liquid. Vapor holding tanks are also used in some vapor collection systems. Vapor holding tanks are used to store a designated volume of air-vapor mixture and then release it to the processor to process the vapors on a batch basis. Fluctuations in VOC concentration and air-vapor mixture flow rate are minimized by using vapor holders.

Several vapor processing techniques were evaluated by EPA. These control techniques included carbon absorption (CA), thermal oxidation, (TO), refrigeration (REF), compression-refrigeration-adsorption (CRA), compression-refrigeration-condensation (CRC), and lean oil absorption (LOA). These six techniques represent all of the control methodologies commonly employed at bulk terminals. At least one system utilizing each of these control technologies was tested in an EPA-sponsored test program conducted between 1973 and 1978. The test procedure used was the procedure outlined in the draft bulk gasoline terminal Control Techniques Guideline (CTG) document, "Control of Hydrocarbons from Tank Truck Gasoline Loading Terminals," dated May 15, 1977. This test procedure is similar to the procedures in the proposed standards and in Reference Methods 2A, 2B, 25A, and 25B. Although the emission measurement methods were the same as the proposed Reference Methods 2A, 2B, 25A, and 25B, the test procedure varied slightly, in that the test period was longer than the period required in the proposed standards. This difference is discussed in Appendix D of the Background Information Document, and would not affect the achievability of the standard.

The test data considered in evaluating the six control technologies mentioned earlier represent terminals ranging in gasoline throughput from 190,000 liters per day (50,000 gal/day) to 5,700,000 liters per day (1,500,000 gal/day). Twenty-two tests were performed, totaling 61 days of testing. In addition, several tests performed by others using the same procedures were considered in evaluating the control technologies. Thus, these data are considered representative of the conditions at a

wide range of terminal sizes and are an adequate basis for an evaluation of the best systems of continuous emission reduction.

Tank trucks have been demonstrated to be major sources of vapor leakage during product loading operations at bulk terminals. Vapor leakage can vary significantly from one tank to another. The larger the tank truck leakage, the smaller the volume of air-vapor mixture that enters the vapor collection system. To evaluate the results of the vapor control system tests, the results from all of the tests were calculated on a comparable no-leak basis. Mass emissions, in the form of milligrams of VOC per liter of gasoline loaded, were used to compare the test results on a common basis. These units were used to be consistent with the units utilized in the test reports.

Carbon adsorption systems use beds of activated carbon to adsorb gasoline vapors from the air-vapor mixture. CA systems at terminals typically consist of two carbon beds. One bed actively adsorbs the vapors while the other bed is being regenerated. After a set period of time, the active bed is regenerated, with the air-vapor flow re-routed to the opposite bed.

Three EPA tests, consisting of nine days of testing, were performed on two carbon adsorption systems which incorporated vacuum regeneration assisted by warm air purge. The daily average emissions from these systems ranged from 1.8 milligrams of VOC per liter of gasoline loaded (mg/liter) to 11.0 mg/liter. Two days of testing were not included in evaluating the system because of unit maladjustment and testing irregularities. On one test day, the bed switching timer was set incorrectly, leading to excessive loading on one carbon bed. On one day of another test, two tank trucks were purposely loaded simultaneously, causing vapor loading to exceed the design capacity of the CA system. This was done in order to determine the performance limit of the system. Further details are contained in Appendix C of the Background Information Document. Control unit efficiencies on the remaining seven days ranged from 98.6 percent to 99.6 percent. One of the systems tested included a vapor holder in its design.

One test was performed in 1979 by the California Air Resources Board on a carbon adsorption system using vacuum regeneration. Mass emissions measured at the system exhaust were not specified exactly, but were reported to be less than 12 mg/liter.

Thermal oxidizer systems do not recover any product. Instead, the gasoline vapors are oxidized in a burner chamber. Many TO systems use vapor holders to store air-vapor mixture from the loading racks so that the system can process VOC vapors at a relatively constant concentration and flow.

Tests were performed on four thermal oxidizer control systems. Two of the control systems incorporated vapor holders, while two systems operated on an on-demand basis. Emissions from the thermal oxidizer systems ranged from 1.4 mg/liter to 107 mg/liter over the four systems tested. Control efficiencies varied from 86.6 percent to 99.8 percent. Even though there was a wide variability in the test results, all systems tested appeared to be operating properly. The two thermal oxidizer systems incorporating a vapor holder achieved an average VOC emission rate of 13.3 mg/liter, while the two systems without vapor holders averaged 46.4 mg/liter.

Refrigeration systems, as with the remainder of the systems to be discussed, recover gasoline vapors from the loading operation in the form of a liquid product. In the REF system, air-vapor mixture from the loading racks is routed to a condensation chamber and passed over a series of cooling coils. Temperatures in the condensation section can be as low as −115°F. The gasoline vapors condense, with some water vapor in the air, and are separated in a gasoline/water separator.

Six refrigeration type vapor processing systems were tested in the EPA program, totaling 17 days of testing. The emissions in one test were unusually high compared to those from other REF tests. Problems with the test equipment and with the refrigeration system itself led to the high emissions in this test. Since these test results were not considered representative of the system's performance, data from this test were not included in the analysis of the REF system. In another test, serious leakage in the vapor collection system prevented almost half of the air-vapor mixture displaced from tank trucks from reaching the refrigeration system. Data from this test were also not included in the REF system performance evaluation. Appendix C of the Background Information Document contains further details on these tests. The daily average results from the four remaining tests ranged from 31.1 mg/liter to 103 mg/liter, and indicated a control efficiency ranging from 77.1 percent to 94.6 percent. During two of these four tests, the refrigeration system was not cooling the vapors to the temperature for which the sytem was designed. Cooling section temperatures were approximately 40°F warmer than the design temperature — 60°F instead of −100°F). Emission rates adjusted for system leakage from these two tests averaged approximately 52 mg/liter. It is not known how much lower the emission rate would have been if the design temperature of the cooling sections had been maintained, but improved emission rates are expected for these systems if design temperatures are maintained. Most of the EPA testing performed since 1974 on REF systems involved systems which use chilled methylene chloride "brine" to cool the condenser section. Many newer systems use direct expansion of refrigerant for cooling, and recent tests indicate that the new systems may be capable of improved performance and reliability when compared to the older systems. Three tests performed in 1978 and 1979 by the California Air Resources Board on the latest model refrigeration systems measured outlet VOC mass emission rates of 48 mg/liter, 36 mg/liter, and 5 mg/liter.

In compression-refrigeration-absorption systems, the air-vapor mixture from the loading racks is first saturated to bring the concentration of the gasoline vapors above the explosive range and is then stored in a vapor holding tank. When the volume limit is achieved, the air-vapor mixture is routed to the CRA processing unit. The air-vapor mixture is first compressed and then passed to a cooler-condenser section where some liquid is condensed and recovered. The remaining mixture is sent to an absorption section where the gasoline vapors are absorbed in chilled gasoline.

Six CRA-type vapor processing systems were tested by EPA, totaling 16 days of testing. All of the systems tested incorporated vapor holders in the system design. Average daily processor outlet emission rates ranged from 41.5 mg/liter to 91.0 mg/liter. Processor efficiences ranged from 61.4 percent to 94.8 percent.

Compression-refrigeration-condensation systems are similar in operation to the CRC systems. The air-vapor mixture is saturated and then stored in a vapor holding tank. The air-vapor mixture is compressed and any condensed liquid is collected. The remaining mixture then passes through a series of refrigerated condenser sections before exiting to the atmosphere.

Two CRC vapor processing systems were tested, totaling five days of testing. One system tested had serious leakage problems from the vapor holder. No method was available to estimate the leakage so the outlet emissions could not be adjusted for comparison to the other tests. Processor efficiency was

also not calculated because the vapor leakage took place after the inlet sampling location. The two test days with complete results indicated emission rates of 48.4 mg/liter and 55.9 mg/liter, and processor efficiencies of 89.0 percent and 91.5 percent.

The final system evaluated was the lean oil absorption system. The LOA system is basically an absorption system where the gasoline vapors, which are predominantly lighter molecular weight hydrocarbons, are absorbed in a "lean oil," which is lean in light ends. The air-vapor mixture is introduced into the bottom of the absorption column and passes countercurrent to lean oil, generated on site, which is sprayed from the top of the tower. The recovered liquid is returned to storage.

One lean oil absorber processing system was tested, consisting of three days of testing. The daily average emission rate ranged from 73.0 mg/liter to 130.0 mg/liter with processing efficiency ranging from 74.1 percent to 85.9 percent.

Most of the systems evaluated were designed and installed to meet an 80 mg/liter (or about 90 percent efficiency) standard as required in many SIPs. The test data, however, reflect the potential of most of the systems to achieve a higher control efficiency.

As mentioned earlier, vapor leakage from tank trucks can be a major source of VOC emissions during terminal loading operations. As the gasoline or other liquid product is being loaded, most of the displaced vapors are collected and contained in the vapor collection system. However, some vapors may leak out of the hatch covers, pressure-vacuum (P–V) vents, and other vapor containment components on the tank truck to the atmosphere uncontrolled. Since, in this case, only part of the displaced vapor volume is collected and controlled, the overall efficiency of the vapor control system is reduced. Vapor tightness requirements on the delivery tank would reduce the fugitive emissions problem at the loading racks. No vapor tightness requirements were in effect at any of the terminals tested in the EPA control system test program. Vapor leakage for individual loadings varied from 0 to 100 percent. The average vapor leakage was approximately 30 percent.

To control these emissions, a maintenance program would be necessary. Such a program would consist of inspecting gaskets and seals for wear or crackiing, hatch covers for warpage, and P–V vents to ensure that they seat properly. The maintenance program would involve repairing or replacing any items in the tank truck vapor containment equipment that might allow vapors to escape. The ability of the delivery tank to maintain vapor tightness is dependent upon the loading method, maintenance program, and the type of service to which the tank is exposed. In separate EPA-sponsored program (EPA Report No. EPA–450/3–79–018), delivery tank trucks were tested in an area where a vapor tightness program was implemented. in this area, delivery tank trucks were required to pass an annual certification test which verified the vapor tightness of the tank. In this program, the annual average vapor leakage from the tested delivery tank trucks was reduced to about 10 percent.

Emissions through leaking tank trucks can be increased by improperly designed loading rack vapor collection systems. For example, if two trucks are loading simultaneously, vapor collected from one truck may pass through the vapor piping to another rack and escape through a non-vapor-tight truck. The leaking tank represents the path of least resistance to the atmosphere for the vapors in the loading rack collection system. This has been observed in several terminal tests. This problem can be eliminated by the installation of check valves or similar devices in the vapor collection system which would not allow vapors to pass from one loading rack to another. This design has been used at several terminals.

Regulatory Alternatives. Regulatory alternatives were developed which represent technically feasible levels of control for reducing VOC emissions from bulk gasoline terminals. The units of milligrams per liter (mg/liter) were used to compare the vapor processing systems tested and were, therefore, used to distinguish between emission reductions achiveable by each of the alternatives.

Based on review of the technical support data, four regulatory alternatives were selected. Under Alternative I no standards would be developed. Instead, the State Implementation Plans (SIP's) would be relied upon to control VOC emissions from bulk gasoline terminals. SIP regulations for VOC generally require controls only in the areas which do not meet National Ambient Air Quality Standards for ozone (non-attainment areas). However, 17 States are expected to require SIP controls statewide by 1982. A typical SIP regulation for gasoline loading at bulk terminals would require the routing of vapors to a vapor processing system and would limit the emission rate from the processor outlet to 80 mg/liter. The emission rate of 80 mg/liter is roughly equivalent to 90 percent control efficiency. The typical SIP would also contain a requirement for gasoline delivery tanks to pass an annual vapor-tight test to minimize fugitive vapor losses at the loading terminal. It was estimated that SIP regulations on tank truck loadings and vapor tightness would affect approximately 70 percent of new and existing terminals by 1982.

The remaining three alternatives reflect two basic levels of control for vapor processing equipment installed at terminals, but represent three levels of overall emission reduction. Each of these three alternatives would require that affected facilities be equipped with vapor collection equipment. Emission limits would be met using vapor processing equipment similar to the systems tested by EPA. Emission test results indicate that most of the vapor processing systems which are now being installed to meet existing emission limits could, in fact, meet a more stringent standard.

Alternative II would require the SIP emission limit of 80 mg/liter and would also require that liquid product loadings into gasoline tank trucks be restricted to trucks which were vapor-tight. Emission reductions from the baseline would be experienced under Alternative II since all new, modified, or reconstructed terminals not covered by the SIPs would be regulated by Alternative II. These terminals would include those in attainment areas not regulated by SIPs. The test data indicate that the carbon absorption, thermal oxidation, refrigeration, CRA, and CRC vapor processing systems could meet the emission limits of Alternative II.

Alternative III would set a VOC emission limit based on 35 mg/liter as determined from the available test data. This alternative would have no specific tank truck vapor-tight requirements and would rely on the SIPs to control tank truck fugitive emissions in non-attainment areas. Tank truck fugitive emissions in attainment areas would remain uncontrolled under Alternative III. Inspection of the test data revealed that the carbon adsorption system and thermal oxidation system with vapor holder were roughly equivalent, giving the most consistent results in reducing VOC emissions. Emission rates from carbon adsorption systems ranged from 1.8 to 11.0 mg/liter, averaging 5.9 mg/liter. Thermal oxidizer systems using a vapor holder produced emissions ranging from 1.4 to 29.4 mg/liter, for an average of 13.3 mg/liter. Although average emissions from carbon

adsorption systems were slightly lower, the cost analysis indicated that the thermal oxidation system using a vapor holder is the most cost-effective system for small terminals.

This is important since about half of the affected facilities are expected to be in the smallest model plant size.

The highest adjusted daily emission rate from the applicable tests on carbon adsorption and thermal oxidizer with vapor holder systems was approximately 29 mg/liter. This adjusted emission rate represents the calculated rate which would have occurred in a vapor-tight collection system, based on actual measured emissions and an adjustment factor based on measurements of tank truck vapor leakage during testing. In order to allow a small margin above the highest adjusted emission rate from the tested systems, a level of 35 mg/liter was selected as the emission limit for the regulatory alternative. It appears that refrigeration, as well as carbon adsorption and thermal oxidation, has the capability to achieve this limit, although some operational or design modifications might be required for specific systems.

Alternative IV is similar to Alternative III in that it would limit the vapor collection system emissions to 35 mg/liter. This emission limit is based on the same control technologies as in Alternative III. In addition, Alternative IV would require that liquid product loadings into gasoline tank trucks be restricted to vapor-tight trucks.

Model plants were developed for new, modified, and reconstructed terminals in order to analyze and compare the environmental, energy, and economic impacts of each regulatory alternative. Four model plants were selected to represent the cross-section of daily gasoline throughputs found in the bulk gasoline terminal industry. Gasoline throughputs selected for comparison and analysis were 380,000 liters/day (100,000 gallons/day), 950,000 liters/day (250,000 gallons/day), 1,900,000 liters/day (500,000 gallons/day), and 3,800,000 liters/day (1,000,000 gallons/day). New terminals are best represented by the three larger model plant sizes while existing terminals are best represented by the three smaller model plant sizes.

Impacts of Regulatory Alternatives. Under Alternative I, in the absence of additional standards of performance, there would be no VOC emission reduction beyond the reductions due to the SIPs, which will result in a 1982 baseline VOC emission level of 140,000 megagrams per year (Mg/year).

Under Alternative II, the 1982 baseline level would be reduced by 5,750 Mg/year by 1985. This represents a reduction of about 60 percent, from 9,150 Mg/year to 3,410 Mg/year, in the VOC emissions from all new, modified, and reconstructed terminals.

Under Alternative III, nationwide VOC emissions would be reduced by 4,510 Mg/year by 1985. Emissions from affected terminals would be reduced by about 50 percent, from 9,150 Mg/year to 4,650 Mg/year by 1985. The lower emission reduction of Alternative III when compared to Alternative II illustrates the significance of tank truck vapor leakage. Even though processor outlet emissions under Alternative III would be reduced from 80 mg/liter to 35 mg/liter, the absence of a requirement that terminals restrict loadings of gasoline tank trucks to vapor-tight trucks more than offsets the additional VOC reduction.

Under Alternative IV, nationwide VOC emissions by 1985 would decrease by 6,620 Mg/year. The reduction in VOC emissions from affected terminals during this period would be about 70 percent, from 9,150 Mg/year to 2,540 Mg/year.

The regulatory alternatives would apply to all new, modified, or reconstructed terminals but would affect terminals in non-attainment areas differently than terminals in attainment areas. New and existing terminals in non-attainment areas would be regulated by SIP requirements and would therefore have some type of vapor control system already installed. Most terminals in attainment areas would not be controlled by SIPs and would experience the greatest effects of the regulatory alternatives. Terminals in attainment areas would experience different effects depending upon the type of loading currently used at existing terminals or that which would have been used by a new terminal in the absence of additional standards. There are two basic methods by which delivery tanks can be loaded at bulk terminals, top loaded through the hatchways on top of the tanks, or bottom loaded through adapters at the bottom of the tanks. Top splash loading involves inserting a nozzle into the hatchway and splashing the incoming product onto the surface of the product in the tank. Attaching a fixed or extensible downspout to the loading arm allows product to be introduced below the liquid surface (submerged loading). Bottom loading can also be considered a form of submerged loading. Generally, top splash loading results in greater VOC emissions than submerged loading. Thus, greater emission reductions would be achieved under any of the regulatory alternatives when controlling top splash loading terminals compared to terminals using submerged loading.

VOC emissions for model plants would vary for each alternative. Under Alternative II, new, modified, or reconstructed terminals in non-attainment areas would experience no VOC emissions reduction. The emission limits for existing terminals in non-attainment areas under SIP regulations are identical to the limits under Alternative II. In an attainment area, under Alternative II, a terminal with a gasoline throughput of 950,000 liters per day which previously used submerged loading would experience a VOC emission reduction of 137 Mg/year (from 194 Mg/yr to 57 Mg/yr). For the same throughput terminal which previously used top splash loading, a VOC emission reduction of 408 Mg/yr (from 465 Mg/yr to 57 Mg/yr) would be experienced under Alternative II.

Under Alternative III, a 950,000 liter/day terminal in a non-attainment area would experience an VOC emission reduction of 19 Mg/yr (from 57 Mg/yr to 38 Mg/yr). For a submerged loading terminal in an attainment area, a VOC emission reduction of 87 Mg/yr (from 194 Mg/yr to 107 Mg/yr) would be experienced. If splash loading were used prior to control, this same terminal would experience a VOC emission reduction of 358 Mg/yr (from 465 Mg/yr to 107 Mg/yr) under Alternative III.

For a 950,000 liter/day terminal in a non-attainment area, emission reductions under Alternative IV would be the same as the emission reduction achieved under Alternative III, 19 Mg/yr (from 57 Mg/yr to 38 Mg/yr). For a 950,000 liter/day terminal in an attainment area, emission reductions achieved under Alternative IV would be 156 Mg/yr (from 194 Mg/yr to 38 Mg/yr) for a terminal which used submerged loading and 427 Mg/yr (from 465 Mg/yr to 38 Mg/yr) for a terminal which previously used splash loading.

Thermal oxidation systems emit carbon monoxide (CO) and oxides of nitrogen (NO_x) during the combustion of VOC vapors. A thermal oxidation system at a 950,000 liter/day terminal would emit approximately 0.8 Mg/yr of CO and 0.3 Mg/yr of NO_x. A worst case situation would be one in which 25 percent of the 50 modified or reconstructed terminals by 1985 were to install thermal oxidation systems, and all of these facilities had gasoline throughputs of about 950,000 liters per day. In this case, nationwide CO emissions would increase by 10 Mg/yr and nationwide NO_x emissions would increase by 4 Mg/yr. For both of these pollutants, the emission increases

represent a small adverse nationwide air pollution impact.

Impacts on water pollution from any of the alternatives considered would be negligible, since none of the control systems considered uses water as a collection medium. Carbon adsorption systems using steam in the regeneration mode would have the greatest impact on water pollution. All of the steam would be condensed and any gasoline present in the condensed liquid would be separated in the terminal's gasoline/water separator. However, there are no steam-regenerated carbon adsorption systems currently installed at bulk terminals, and the vacuum-regenerated systems currently in use will represent the primary carbon adsorption technology at bulk terminals into the foreseeable future. All other systems which chill or condense the air-vapor mixture use a gasoline/water separator integrated into their design, and discharge a small amount of condensed water vapor. The impacts on water pollution are the same for each of the regulatory alternatives because essentially the same control equipment is being assumed for each alternative.

Because all of the VOC emissions are incinerated or returned to storage as liquid product, there would be no direct solid waste impacts under the regulatory alternatives. Some solid waste could be generated indirectly due to disposal of activated carbon from carbon adsorption units after the useful life of the carbon had expired. The worst case for solid waste impact would occur if all affected facilities were to use carbon adsorption units for control and had to dispose of the activated carbon every 10 years. This would result in only about 50,000 kilograms (55 tons) of solid waste annually. Even in this worst case, the impact of the alternatives on solid waste would be negligible. In practice, not all affected facilities are expected to choose carbon adsorption for control, and in many cases the carbon may last longer than 10 years or may be transported off-site for regeneration and reuse.

The energy impacts were derived by assuming that all VOC emissions reduction was recovered as liquid product, and that one liter of this liquid product was equivalent to one liter of gasoline. It is assumed for a vapor-tight vapor collection system, that no part of the recovered product is lost to the atmosphere on the way to the storage tank. In addition, although the VOC liquid may not have the exact composition of gasoline, the liquid is returned to the storage tank where each liter becomes absorbed and is available for loading into tank trucks as gasoline. The energy required to operate the vapor processing equipment was subtracted to determine the net energy impact of each alternative.

A net energy savings would result from each of the regulatory alternatives. A net energy savings for each alternative is projected even though it is assumed that as many as half of the small new, modified, or reconstructed terminals may install thermal oxidizer systems, which do not recover energy and have a small net energy loss. Alternative II would accomplish a net fuel savings of 8 million liters (2.1 million gallons) of gasoline per year in the fifth year of the standard. Alternative III would recover 6 million liters (1.6 million gallons) of gasoline per year in the fifth year.

Because it results in the greatest recovery of VOC, Alternative IV would result in the greatest net energy savings. Alternative IV would recover 9 million liters (2.4 million gallons) of gasoline per year in the fifth year of the standard.

A net energy savings would result from each of the model plant sizes for any of the vapor control systems except thermal oxidizer systems. Energy savings would range from an average of 144,000 liters per year (38,000 gallons per year) of gasoline for the smallest model plant (gasoline throughput 380,000 liters/day) to an average of 1,540,000 liters per year (407,000 gallons per year) of gasoline for the largest model plant (gasoline throughput 3,800,000 liters/day). A net energy loss ranging from 2,600 liters of gasoline per year for the small model plants to 22,000 liters of gasoline per year for the largest model plants would result through the use of thermal oxidizer systems.

The total capital and annualized costs to the bulk gasoline terminal industry were determined for each regulatory alternative. Capital costs include the purchase and installation of vapor collection and processing systems, retrofit of tank trucks to bottom loading and vapor recovery configurations, and conversion of top loading racks to bottom loading. Annualized costs include capital charges, utilities, maintenance and repairs, and routine operating labor. Alternatives II and IV would require an additional cost to perform an annual vapor-tight test and subsequent repairs on tank trucks.

In addition to the incremental costs incurred by bulk terminals under the regulatory alternatives, there would be a cost impact on owners of the "for-hire" tank trucks operating at terminals. For-hire tank trucks are those trucks owned by independent companies, which transport products from bulk terminals to other distribution points. For-hire trucks are estimated to constitute about 70 percent of the tank trucks at bulk terminals. Companies operating for-hire tank trucks would have to install compatible loading and vapor recovery equipment on their tank trucks which serve affected bulk terminals. Since several configurations of adapters are possible, the regulation would require compatible equipment to ensure that tank truck and terminal vapor collection systems could be connected during product loading. All trucks not already having bottom loading and vapor recovery provisions would be retrofitted with this equipment, and thus there would be a cost impact on these companies as a result of the proposed standards. It is estimated that 390, or 2 percent, of the estimated 18,000 for-hire tank trucks would be affected in the first five years. Approximately 85 of these would have to convert to botton loading and incorporate vapor recovery provisions, at $8,400 per tank truck, and 305 would have to add vapor recovery provisions only, at $2,400 per tank truck. Annualized costs to the for-hire tank truck industry would include the cost of maintaining the vapor recovery equipment and, under Alternatives II and IV, the cost of performing an annual vapor-tight test on each gasoline tank truck.

The total capital cost to the bulk gasoline terminal industry for the installed vapor control equipment necessary to meet Alternative II on the 55 new, modified, or reconstructed terminals expected through the first five years of the standard would be approximately $23.0 million. The terminal industry annualized cost in 1985 would be $3.3 million. The total capital cost to the for-hire tank truck industry through the first five years would be approximately $1.3 million. Annualized cost to the tank truck industry in 1985 would total approximately $0.7 million, due to incremental maintenance and testing requirements. The overall annualized cost-effectiveness in 1985 expected under Alternative II would be $696/Mg ($632/ton) of VOC controlled.

Under Alternative III, the total capital cost for vapor control equipment necessary through the first five years would be approximately $24.0 million. The industry annualized cost in 1985 would be $4.1 million. The total capital cost to the for-hire tank truck industry through 1985 would be about $1.3 million, and the annualized cost in 1985 would total about $0.6 million. The industry annualized cost-effectiveness in 1985 expected under Alternative III

would be $1.042/Mg ($946/ton) of VOC controlled.

Under Alternative IV, the total capital cost to the terminal industry for vapor control equipment necessary through the first five years of the standard would be approximately $24.0 million. The terminal industry annualized cost in 1985 would be $3.6 million. As in Alternative II, the total capital cost to the for-hire tank truck industry through 1985 would be about $1.3 million, and the annualized cost in 1985 would total about $0.7 million. The overall annualized cost-effectiveness in 1985 expected under Alternative IV would be $650/Mg (590/ton) of VOC controlled.

A mix of current control technologies being installed to achieve 80 mg/liter was used to establish the capital cost figures for Alternative II. Three of the four technologies used could, in fact, meet an emission limit of 35 mg/liter. These three technologies were then used to establish the capital costs for Alternatives III and IV. Because the costs of all the control technologies considered are similar and because much the same equipment was used to establish the capital costs for each alternative, the resultant capital costs for Alternatives II, III, and IV are similar To meet the emission limits of any of the alternatives, the vapors from tank trucks would have to be collected and routed to the terminal collection system. Therefore, the costs for tank truck retrofitting would be the same for each alternative. The differences in net annualized cost among the alternatives result from differing product recovery cost credits at affected terminals, and the inclusion of tank truck vapor-tight requirements under Alternatives II and IV.

For Alternative II, cost assessments were performed on the carbon adsorption, thermal oxidizer, refrigeration and compression-refrigeration-absorption vapor processing systems for each model plant size. Operating costs for the compression-refrigeration-condensation system are considered comparable to the CRA system. The lean oil absorption system was not included in the analysis because the test data indicated that the system tested would not be able to meet the requirements of Alternative II. For Alternatives III and IV, cost assessments were performed on the carbon adsorption, thermal oxidation, and refrigeration vapor processing systems only. The test data indicated the inability of the CRA or CRC systems to meet a 35 mg/liter limit. For all of the alternatives, the thermal oxidizer system would be competitive with the other units only at the smaller model plant sizes. All other systems evaluated are comparable when considering annualized costs.

A secondary, or add-on, vapor processor could be chosen by the owner or operator of an existing SIP-controlled facility which became an affected facility under the proposed standards. Add-on systems, primarily carbon adsorption and thermal oxidation, have been used at bulk terminals to increase the control efficiency of existing processing systems. Selecting an add-on system to process part of the vapors would be an option to replacing the existing system with a more efficient system designed to handle the entire load. The add-on option would require operating and maintaining two processors, whereas the option of replacing the system entirely means that expenses would be incurred for just one processor. The incremental net annualized cost for the add-on option is virtually independent of terminal size, amounting to approximately $20,000 per year for an add-on carbon adsorption system, and $45,000 per year for an add-on thermal oxidizer system. The incremental net annualized cost of a replacement carbon adsorption system would average approximately $37,400 for any terminal size. Due to the loss of gasoline recovery cost credits, a thermal oxidizer system replacing a vapor recovery system would cost from $43,000 per year to $300,000 per year more than the costs incurred due to the original system. As a result, add-on or replacement thermal oxidizer systems are likely to be selected for use only at the smallest bulk terminals.

An economic analysis performed on each of the regulatory alternatives investigated impacts for new terminals and for modified or reconstructed terminals. New terminals constructed in previously regulated (non-attainment) areas will incur no additional costs as a result of any of the regulatory alternatives because the collection and processing systems being installed to meet SIP requirements are essentially identical to those systems which would be considered under the regulatory alternatives. New terminals in attainment areas would incur varying control costs depending on their size and type of loading. Control costs would not vary significantly among the regulatory alternatives, although the improved product recovery cost credits under Alternative IV lead to the lowest net annualized cost of any alternative. Industry information indicates that no new 380,000 liter/day bulk terminals are planned in the first five years of the proposed standards, because the potential rate of return on smaller terminals is not sufficient to encourage their growth. Terminals in the 950,000 liter/day size category are considered marginally profitable, even without additional control costs. Therefore, only one new terminal of this size is expected to be constructed in an attainment area in the first five years of standards. The two largest model plant sizes, 1,900,000 and 3,800,000 liters/day, are considered attractive investment possibilities, and one new 1,900,000 liter/day terminal is expected to be constructed in an attainment area in the first five years. The construction of these two terminals should not be hindered under any of the alternatives. The 950,000 liter/day terminal would have to pass through most of the control costs to remain a reasonable investment. The necessary degree of cost pass-through appears possible.

Approximately 50 existing bulk terminals are expected to be modified or reconstructed in the five year period covered by this assessment, with 30 of these being in attainment areas. The affected terminals in attainment areas would be likely to experience the impact of installing a complete new vapor collection and processing system where none existed previously. The remaining 30 affected terminals in non-attainment areas would experience a lesser impact because a system to satisfy SIP requirements would probably already be in place. Such a system would satisfy the requirements of Alternative II, but may require upgrading or partial replacement under Alternative III or IV.

Existing terminals of the smallest model plant size (380,000 liters/day) would have to pass through essentially all of the control costs in order to maintain an acceptable rate of return under any regulatory alternative. Existing top loaded 950,000 liter/day terminals in attainment areas would be in a similar situation because they would experience the full impact of converting the loading racks to bottom loading and installing vapor collection and processing systems. It is estimated that 25 of the former case and two of the latter case will occur in the first five years of the proposed standards. In general, full cost pass-through would be unlikely due to competition from other existing terminals and from consumer pressure as indicated by current conservation patterns. However, it is likely that most of the control costs will be able to be passed through, allowing most of the 50 modified or reconstructed terminals to experience acceptable post-control returns on investment. Capital

availability would not be adversely affected by any of the regulatory alternatives. The larger terminals should not encounter any difficulty in meeting the control costs resulting from modifications or reconstructions under any alternative. Terminals in non-attainment areas which replace, upgrade, or add onto an existing control system should also be able to maintain an acceptable return on investment. It should be noted that the control costs under any regulatory alternative are similar to those being borne by a large number of terminals as a result of State VOC regulations.

The current trend toward the consolidation of existing facilities of marginal profitability can be expected to continue under the proposed standards, but the analysis does not indicate any additional closures. The cost pass-through analyses for both new and existing terminals indicate that maximum price increases of less than 0.6 percent would result from any regulatory alternative. It should be noted that this increase would not affect nationwide gasoline prices, but represents a worst case situation within the bulk terminal industry due to complete cost pass-through.

The regulatory alternatives would affect the independent tank truck industry with minor impacts. The profitability of the firms in the industry would not be impacted significantly since regulatory cost absorption would be minimal. Most of the regulatory costs would be passed through to the consumer, causing a maximum increase in retail gasoline prices of less than 0.07 percent for any of the alternatives. It should be noted that this increase would not affect nationwide gasoline prices, but represents a worst case situation within the independent tank truck industry due to complete cost pass-through. Additionally, no closures or dislocations of tank truck firms are expected to result from any of the regulatory alternatives.

Section 111 of the Clean Air Act requires that standards of performance be based on the degree of emission reduction which the Administrator judges to be achievable through application of the best technological system of continuous emission reduction, considering costs, non-air quality health and environmental impacts, and energy requirements, which has been adequately demonstrated. Therefore, in selecting the basis of the proposed standards, the Administrator first examined Alternative IV, which would achieve the greatest reduction in VOC emissions. This alternative would result in a net energy savings of approximately 9 million liters (2.4 million gallons) of gasoline in the fifth year of the standard, which is more than any other alternative. Water and solid waste impacts are essentially negligible under this alternative. Both total capital and net annualized costs to the bulk terminal and for-hire tank truck industries are not excessive under Alternative IV. Small bulk terminals, which would bear the greatest economic impact, would be likely to be able to pass through most of the control costs in order to remain viable. Even the product price increases on the order of 1 percent which could occur if full cost pass-through were possible for terminals are considered reasonable. The price increases due to costs incurred by for-hire tank truck firms would be the same for any alternative. Finally, test data indicate that systems have been demonstrated that can achieve the emission limitation required by this alternative. After consideration of these factors, the Administrator selected Alternative IV as the basis for the proposed standards. It is noted that Alternative IV would achieve a greater VOC emission reduction at less annualized cost than Alternative III.

Selection of Format of Proposed Standards

Section 111 of the Clean Air Act requires the promulgation of standards of performance, establishing allowable emission limitations for a category of stationary sources, whenever it is feasible to promulgate and enforce standards in such terms. Standards of performance are considered not feasible to promulgate or enforce when either (1) a pollutant or pollutants cannot be emitted through a conveyance designed and constructed to emit or capture such pollutant, or (2) the application of measurement methodology to a particular class of sources is not practicable due to technological or economic limitations. If the Administrator judges that it is not feasible to prescribe or enforce a standard of performance, Section 111(h) allows the promulgation of a design, equipment, work practice, or operational standard, or combination of these, which reflects the best technological system of continuous emission reduction (taking into consideration the cost of achieving such emission reduction, and any non-air quality health and environmental impact and energy requirements) which has been adequately demonstrated.

As discussed earlier, VOC emissions at tank truck loading racks are generated when the incoming product displaces air-vapor mixture from the truck-mounted tanks. At an uncontrolled loading rack, the entire quantity of mixture is emitted directly to the atmosphere through open hatch covers or vents. The vapor control systems currently being used at bulk gasoline terminals collect the air-vapor mixture displaced from tank trucks and route the mixture to a vapor processing system. The mixture is conveyed to the processor through vapor collection systems installed on the tank trucks and on the bulk terminal's loading rack system. Even in controlled systems, VOC emissions may occur from the loading operation due to vapor leakage from closed gasoline tank trucks during product loading. These VOC leakage emissions originate at various points on the tank, such as leaking pressure-vacuum vents and defective hatch covers and seals. Due to the fugitive nature of these emissions, it is not feasible to collect the escaping vapors and route them through a conveyance. Since tank leakage measurements at the loading racks do not provide a quantitative measurement of total VOC concentration, flow rate, or mass emissions, an enclosure around a loading tank truck would be necessary in order to trap emissions for measurement. An enclosure and conveyance to accomplish this is not technologically or economically practicable. Due to these considerations, the Administrator determined that a standard of performance, in the form of a numerical emission limit, could not be set, and that a work practice standard would be appropriate for controlling tank truck vapor leakage emissions.

Two methods of defining tank truck vapor tightness and regulating leakage emissions under a work practice standard were considered. The first method would require the use of a portable combustible gas detector during product loading to detect leaks. Any measurement in excess of a specified limit would define a leaking tank. However, the terminal owner or operator may not have control over the maintenance of all trucks loading at his terminal. Also, many terminals use automated billing equipment which allows the tank truck driver to load the tank without any interaction with terminal personnel. At these terminals, a requirement that each loading be monitored would represent an excessive burden. For these reasons, the regulatory format requiring leak monitoring of each gasoline tank truck during product loading was not selected by the Administrator.

The second method would require the terminal owner or operator to restrict loadings of gasoline tank trucks to those which had passed an annual vapor-tight test. This test would be a pressure test of the delivery tank itself and would yield a quantitative measure of tank leakage. Test data show that annual testing and subsequent leakage repair can reduce the average annual tank truck emissions from 30 percent before repair to 10 percent of the vapors displaced during product loading. This work practice standard format would consist of a requirement that the owner or operator of an affected facility restrict product loadings of gasoline tank trucks to those for which he possessed documentation that the tank had passed the vapor-tight test within the 12 preceding months. This format would provide some control over leakage emissions and would not impose an excessive burden on bulk terminal owners or operators. No direct requirements would be placed on operators of for-hire tank trucks which load at affected loading racks. Because this format is the most practical means of controlling emissions from tank trucks, it was selected by the Administrator as the format for the work practice standard.

As discussed previously, in order to set a numerical emission limit for the loading operation at regulated loading racks, the total VOC emissions would have to be measurable, so that a comparison with this emission limit could be made. Since the small portion of the displaced vapors which may leak from the tank trucks cannot be quantitatively measured, accurate measurements of total VOC emissions from tank truck loading are not possible. However, the major portion of the displaced vapors can be measured after the vapors are collected at the loading rack. Vapor collection systems typically include the equipment at the loading rack used to contain and route emissions, and generally consist of hoses or arms, manifolding, piping, and check valves. This type of system is consistent with the current state-of-the-art collection systems in use at many existing bulk terminals. Because of its demonstrated control effectiveness, and because it is not possible to set a standard of performance for the total emissions from the loading operation, an equipment standard requiring a vapor collection system at each loading rack was selected by the Administrator as the format for controlling VOC emissions at the loading racks.

If there were leaks in the terminal's vapor collection system, some or all of the displaced vapors would not reach the vapor processor and would escape to the atmosphere uncontrolled. Leak sources can include flanges and other connections, valves, and pressure relief devices (such as those used in vapor holders). Leakage in excess of 80 percent of the displaced vapors has been found in some EPA tests at bulk terminals. In order for control measures to be effective, leakage from the vapor collection and processing equipment must be minimized. Section 111(h)(1) of the Clean Air Act directs the Administrator to include as part of any equipment standards promulgated under § 111(h) "such requirements as will assure the proper maintenance of any such . . . equipment." Periodic visual monitoring of the equipment required by these proposed standards and repair of observed leaks would minimize VOC leakage without imposing an unreasonable burden on terminal owners and operators. Therefore, the proposed standards include such an inspection-and-repair requirement aimed at enhancing the effectiveness of the proposed standards.

Because emissions from the vapor collection system can be measured, standards of performance in the form of a numerical emission limit can be applied to the vapor collection system. Several formats for these standards of performance are possible. Three formats considered for limiting emissions from the vapor collection system include a concentration standard, a control efficiency standard, and a mass emissions standard. It is assumed that a vapor processing system would be used under any of these formats to achieve the required emission limit.

A format expressed in terms of concentration would limit the VOC concentration in the exhaust from the vapor processing system. The advantage of the concentration format is that a test method to determine VOC concentration does not require flow measurements. These data are required to convert concentration measurements to mass emission measurements. There are, however, several disadvantages to a concentration format. The test data indicate a variation in exhaust gas flow rates and concentrations among the various systems. Flow rates are high through the thermal oxidizer system, which uses large amounts of combustion air, and are low through the refrigeration and CRA systems, which use no outside air in their operation. In addition, the vacuum regenerated carbon adsorption system uses warm purge air to enhance the desorption. These variations in amount of dilution air would require adjustments to compare the systems on an equal basis. The outlet concentrations also vary from system to system and between similar systems manufactured by different companies. Separate concentration limits might be required for each type of control sytstem at each affected terminal if a concentration format were selected.

Information from the manufacturers and results from the testing program indicate that the control efficiencies of the processing systems are dependent on the inlet concentration to the processor. The test data further indicate that concentrations at the inlet of the processor vary considerably from terminal to terminal. This variation is caused by many factors which can include temperature, pressure, vapor tightness of tank trucks, loading method, and whether vapor balancing of tank trucks is used. Vapor balancing consists of routing the vapors, displaced during loading of the customer tank, back to the delivery tank truck. Because of the many factors which may affect the vapor processor inlet concentration, adjustment calculations to compare all terminals on an equal inlet concentration would be very difficult.

Two forms of a mass standard format were considered. The first of these mass formats was an adjusted mass emission limit. An adjusted limit method estimates the volume of vapor loss due to tank truck leakage and assumes that this vapor loss is controlled by the vapor processor at the same efficiency as that measured during the source test. These estimated "processed" truck leakage emissions are then added to the emissions actually measured at the vapor processor outlet to arrive at the adjusted emission rate. This adjustment method, therefore, calculates the emissions from the tank truck loading operation assuming there is no vapor leakage in the vapor collection system. The adjusted emissions method was used to normalize the test results from all the terminals tested so that all control systems could be compared on an equivalent leak-free basis.

The disadvantages of the adjusted mass emission format include: (1) a complex and expensive test procedure, and (2) the mathematical adjustment of an accurately measured value (actual VOC mass emissions from the processor outlet) to obtain the emission limit. The test procedure required to determine the adjusted limits would be identical to the procedure used in the EPA emission testing program. The test procedure requires three days of testing and requires measurements to be taken at the processor outlet, at the vapor

collection system inlet at the loading rack, and at the tank truck hatches for detection of leaks. This test would typically cost $15,000 to conduct.

The second of the mass formats, a mass standard based upon the vapor processor outlet emissions, would involve a simpler, less expensive, and more straightforward test procedure. The vapor processor outlet test would require measurement of the VOC mass emissions at the processor outley only. The emission test procedure, therefore, would not require any mathematical adjustments of the measured VOC mass emissions. The test procedure would be further simplified by requiring only one day of testing. It is estimated that this type of test would cost from $5,000 to $10,000, depending on the type of processor being tested.

The difference between the processor outlet mass emission format and the adjusted mass emission format is that the variable of fugitive tank truck emissions due to leakage is not taken into account under the outlet mass emissions format. However, since neither approach would actually control the fugitive emissions, additional testing complexity and cost are considered to be unwarranted. Due to these considerations, a mass emission format, based on measurements at the outlet of the vapor processor only, was selected.

Selection of Numerical Emission Limits

As discussed previously in the section entitled "Regulatory Alternatives," the numerical limit for Regulatory Alternative IV, which was selected to represent the performance of the best systems tested by EPA at bulk terminals. Although measured emissions from all types of processing systems are highly variable, two of the control technologies achieved consistently low emissions. Three tests on carbon adsorption systems, and two tests on thermal oxidation systems using a vapor holder to release accumulated vapors to the processor on a batch basis, indicated that these two types of systems represented the best control technology for this application. These two types of control systems were selected to represent the best technological system of continuous emission reduction, as required by Section 111 of the Clean Air Act.

The highest adjusted daily emission rate of 29 mg/liter for these two types of systems led to the selection of 35 mg/liter as the emission limit for the proposed standards. It should be noted that any system capable of achieving this limit would be acceptable. Some of the test data and comments from manufacturers of vapor processors indicate that several types of systems could be designed to achieve an emission limit of 35 mg/liter. Design variables could include equipment sizing, increased utilities consumption, and improved system reliability.

The vapor processors designed for VOC control at bulk gasoline terminals require regular maintenance attention in order to consistently achieve the emission limit for which they are designed. Proper maintenance for these units generally includes frequent (at least daily) visual inspections in order to monitor competent operation, fluid levels, warning lights, pressures, temperatures, presence of leaks, and other miscellaneous items. Manufacturers frequently supply inspection checklists to facilitate these routine checks, and some terminals have developed individual lists for their own use. Most terminals incorporate such inspections into the normal duties of their maintenance personnel, which include routine checks of loading racks, storage tanks, pumps, and other terminal equipment. Of course, the inspections themselves do not maintain the proper operation of vapor processors, but any necessary repairs indicated through atypical readings, sounds, etc., can be implemented rapidly to minimize downtime.

Each type of vapor processor has different maintenance requirements due to varying system size and complexity, types of components, and operating time and sequencing. Refrigeration systems require daily checks of several subsystems and components. Defrost system pump pressure, as well as fluid levels and temperatures, should be checked regularly. Oil levels, pressures, and temperatures in the precooler and refrigeration systems require regular inspection. Liquid recovery meters and condenser coil temperature records on some units indicate the level of performance of the units. Maintenance on carbon adsorption systems includes checks of cycle timing and bed vacuum and temperatures. Elapsed system operation time meters on some systems provide an indication of proper system operation and can indicate maintenance intervals. Maintenance of thermal oxidation systems may include daily observation of the activation sequence and inspection of pilots and burners. Sight ports are generally provided so that the condition of the flame can be observed. Vapor holders in these systems should be frequently inspected for leaks, and the high and low level switches checked for proper operation. All vapor processors are provided with indicator panels to warn of malfunctions, and most have automatic shutdown or interlock systems. These systems provide automatic indication that maintenance attention may be required. The annual costs to maintain vapor processing systems, including routine inspections and the expected typical repair costs, have been considered in determining the cost impact on affected terminals.

The vapor-tight test for gasoline tank trucks, Reference Method 27, would require applying a pressure of 4,500 pascals (450 millimeters of water) to the delivery tank and require that the tank sustain a pressure loss of not more than 750 pascals (75 millimeters of water) in 5 minutes from the initial pressure level. The applied pressure value of 4,500 pascals represents the pressure at which tank P–V vents begin to open to relieve tank pressure. Thus, this value was selected for the test limit used to determine tank vapor tightness. This test has been used successfully in California since 1977. Note that only the pressure test, and not the vacuum test, of Reference Method 27 would be applicable under the proposed standards. Only the pressure test is required because tank truck vapor leakage during product loading occurs only when the delivery tank is under positive pressure (product displacing vapors out of the tank). These limits for the tank truck vapor-tight test represent a vapor containment efficiency of 99 percent after testing. However, the tanks do not remain vapor-tight all year. Leaks can occur in the vapor containment equipment due to wear and tear during loading, lodging of foreign material on valve seats, or equipment shock during over-the-road travel. Tests show that the average annual containment efficiency of leak-tested tanks decreases to about 90 percent.

Back pressure from the vapor collection and processing equipment should not exceed the pressure limit of the tank truck vapor-tight test. If the back pressure exceeds this pressure limit, leaks may occur even from tanks which have passed the vapor-tight test.

Therefore, to eliminate the problem of system back pressure causing leaks in the delivery tanks during loading, the vapor collection and processing systems must be designed so that the system back pressure, measured at the loading rack, will always be less than the pressure limit of the tank truck pressure test. This is accomplished in practice by specifying the proper piping diameter and length, minimizing the number of flow control components such as check valves, and selecting a vapor processor which is properly sized to match the

loading activities at the terminal. Therefore, the proposed standards would require that the terminal's collection and loading systems be designed so that the test pressure limit of 4,500 pascals (450 mm of water) will not be exceeded in the delivery tank during product loading.

The pressure-vacuum (P-V) vents commonly used in bulk terminal vapor collection systems are designed to open to relieve any system pressure which exceeds a predetermined value. These vents should not open at any pressure value which may occur in a normally operating system. Since system back pressure may reach the pressure limit of the tank truck pressure test, the P-V vents must not begin to open at any pressure less than this pressure limit. Vents opening at a lower pressure could unnecessarily allow uncontrolled VOC emissions to escape to the atmosphere. Therefore, the proposed regulation would require that these vents have the capacity to contain the vapors in the system under the operating pressure range of the system.

Modification/Reconstruction Considerations

Modification, as defined in § 60.14 of Chapter I, Title 40, of the Code of Federal Regulations (CFR), occurs when any physical or operational change to an existing facility results in an increase in the emission rate to the atmosphere of any pollutant to which a standard applies.

Investigation of the bulk gasoline terminal industry indicated that there are several changes at a bulk terminal which could constitute a modification under § 60.14. The criteria for determination of modification would be applied to the entire affected facility, which is designated as the total of all the loading racks which service gasoline tank trucks. For example, any loading rack conversion resulting in a net increase in the emission rate to the atmosphere from an existing facility could be considered a modification, and the existing facility would become an affected facility. A second example would be a physical change to an existing facility which resulted in increased product throughput. However, according to § 60.14(e)(2), such a change would not be considered a modification unless it required a capital expenditure, as defined in § 60.2. For example, the addition of a new loading position, which would require a capital expenditure, to an existing facility with a resulting increase in throughput and in net emission rate would be considered a modification.

Reconstruction, as defined in § 60.15 of Chapter I, Title 40 of the CFR, occurs when the fixed capital cost of replacement components of an existing facility exceeds 50 percent of the fixed capital cost that would be required to construct a comparable entirely new facility, and it is shown that it is technically and economically feasible to meet the applicable standards. The 50 percent capital cost figure for reconstruction is a cumulative value of the replacement components for the existing facility. Upon replacement of components, the Administrator would determine, on a case-by-case basis, whether a reconstruction had taken place and whether the existing facility would become an affected facility under the standards.

As in the case of modification, the determination as to whether reconstruction had taken place would be made by applying the criteria to the entire affected facility, which is designated as the total of all the loading racks which service gasoline tank trucks. Again, investigation of the bulk gasoline terminal industry has indicated certain component repairs and replacements which would be considered under the reconstruction provisions. Top to bottom loading conversions of the loading racks, for example, usually exceed the 50 percent fixed capital cost criterion. If so, these conversions would be reviewed under the reconstruction provisions. The Administrator reviews these conversions on a case-by-case basis and, as specified in § 60.15(f), his decision is based upon the following: (1) the fixed capital costs of the replacement components, (2) the estimated life of the facility, (3) the extent to which the components being replaced cause or contribute to the emissions from the facility, and (4) any economic or technical limitations on compliance with applicable standards of performance which are inherent in the proposed replacements. Considering the above items, the Administrator would then determine if the top to bottom loading conversion would constitute a reconstruction.

Replacement or unscheduled major repairs of such items as loading arms, pumps, or meters may not by themselves exceed the 50 percent replacement cost of a new facility. However, since the 50 percent replacement cost is a cumulative figure, these unscheduled major repairs and replacements would be included in reaching the 50 percent criterion.

Normal maintenance items are not included in this determination of the 50 percent replacement cost. Normal scheduled maintenance items include pump seals, meter calibrations, gaskets and swivels in loading arms, coupler gaskets, and overfill sensor repairs. Items which typically require replacement under a normal maintenance program include vapor hoses and grounding cables at the loading rack.

Selection of Performance Test Methods

The VOC concentrations in the vapor processor exhaust would be determined using either EPA Reference Method 25A or 25B. Method 25A, "Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer," applies to the measurement of total gaseous organic concentration of vapors consisting of alkanes, alkenes, and/or arenes (aromatic hydrocarbons). The concentration is expressed in terms of propane (or other appropriate organic compound) or in terms of organic carbon.

A sample is extracted from the source through a heated sample line and glass fiber filter and routed to a flame ionization analyzer (FIA). Results are reported as concentration equivalents of the calibration gas organic constituent, carbon, or other organic compound.

Method 25B, "Determination of Total Gaseous Organic Concentration Using a Nondispersive Infrared Analyzer," is similar to Method 25A and applies to the measurement of total gaseous organic concentration of vapor consisting primarily of alkanes. The concentration is expressed in terms of propane or in terms of organic carbon. The sample is extracted as described in Method 25A and is analyzed with a nondispersive infrared analyzer (NDIR). Results are reported as propane equivalents or as carbon equivalents.

Volumetric flow rate of the exit gases from the vapor processor outlet would be measured using EPA Reference Method 2A or 2B. Method 2A, "Direct Measurement of Gas Volume Through Pipes and Small Ducts," applies to the measurement of gas flow rates in pipes and small ducts, either in-line or at exhaust positions, within the temperature range of 0 to 50°C. A gas volume meter is used to directly measure gas flow. Temperature and pressure measurements are made to correct the volume to standard conditions.

Method 2B, "Determination of Exhaust Gas Volume Flow Rate from Gasoline Vapor Incinerators," applies to the measurement of exhaust volume flow rate from incinerators that process gasoline vapors consisting generally of alkanes, alkenes, and/or arenes (aromatic hydrocarbons). It is assumed

that the amount of auxiliary fuel is negligible. The incinerator exhause flow rate is determined by carbon balance. Organic carbon concentration and volume flow rate are measured at the incinerator inlet. Organic carbon, carbon dioxide, and carbon monoxide concentrations are measured at the outlet. The ratio of total carbon at the incinerator inlet and outlet is multiplied by the inlet volume flow rate to determine the exhaust flow rate.

Methods 2A, 2B, 25A, and 25B are essentially the same methods used on existing bulk gasoline terminals to establish the majority of the data base used in the development of the proposed standards. The tests conducted to establish the data base used three 8-hour test repetitions to average out environmental effects on the vapor-to-liquid volume (V/L) measurements, because temperature and pressure variations in the vapor collection system can affect the vapor volume measured at the inlet to the processor. These V/L values were used to adjust the measured mass emissions to account for leakage. The proposed test procedures would measure the processor outlet only and do not require any adjustments. However, the owner or operator may adjust the emission results to exclude methane and ethane, which are considered negligibly photochemically reactive and do not appreciably contribute to the formation of ozone, a policy announced in EPA's "Recommended Policy on the Control of Volatile Organic Compounds," 42 FR 35314 (July 8, 1977). No reference methods have been promulgated by EPA for specific measurement of methane and ethane. However, these compounds can be measured by gas chromatographic analysis, or any other method approved by the administrator. Since no V/L measurements are require for adjustment, the proposed test procedures incorporate one 6-hour averaging period. The test period is considered to represent the performance of the vapor processing systems. A minimum of 300,000 liters of gasoline would have to be loaded in order for the test period to be valid. This volume of gasoline represents 7 to 10 truck loadings, which is considered to be the minimum number required to allow system performance to be adequately evaluated. Conducting a performance test using these procedures would cost a facility between $5,000 and $10,000, depending on the type of processor being tested.

At many terminals, switch loading is practiced, as discussed in the section entitled "Selection of Pollutants and Affected Facilities." There are two major types of switch loading of concern with regard to the testing of VOC emissions generated during tank truck loading. First, gasoline may be loaded into a tank which has carred a non-volatile product, such as diesel fuel, on the previous load. This tank would contain essentially no VOC vapors, so the VOC emissions during loading would be negligible. Second, a product such as diesel fuel may be loaded into a tank which has carried gasoline on the previous load. The VOC vapors from the previous load of gasoline would be displaced by the incoming product.

At a particular terminal the tank truck population is static over the short term, and each tank truck operates at just that one terminal. Therefore, the frequency of each of the two types of switch loading discussed above would be about equal, and the quantity of VOC emissions could be accounted for by considering only the volume of gasoline dispensed during a given time period. This approach to determining emissions at a terminal would simplify the test procedure. If the liquid volume of all products dispensed into gasoline tank trucks during the performance test were considered, then the liquid volume not displacing gasoline vapors would have to be subtracted form the total volume loaded in order to correlate the VOC mass emitted with the corresponding liquid volume. This procedure would require that each driver be asked which product was carried on the previous load. Based on the information obtained, only the loadings displacing gasoline vapors would be added to obtain the total volume to be used in the calculations. However, since the accuracy of this information would depend on the knowledge of several individuals who may not know the facts, and because it may require extra test personnel to question the drivers, this procedure is not considered to be the most practical method of conducting the performance test.

The procedure which considers only the volume of gasoline loaded during the test relies on a known quantity which can be obtained directly from dispensing meters, instead of relying on uncertain data. The two cases of switch loading essentially cancel each other in terms of their effects on the test results. Therefore, the proposed standards would require emissions to be calculated in terms of the total volume of gasoline dispensed during the performance test. Since excessive practice of switch loading has the potential to affect the test results by increasing the apparent emission level, especially if there were extra unbalanced instances of nonvolatile product loadings into tanks containing gasoline vapors, it is recommended that switch loading be minimized during the performance test.

If there are leaks in the vapor collection system, part of the displaced vapors will escape to the atmosphere and not be controlled by the vapor processor. In order for the emission limitation from the collection system to be effective, any leakage in the system should be repaired as soon as possible. For this reason, the proposed standards would require that the vapor collection and processing systems, as well as the affected loading racks, be visually inspected for liquid or vapor leaks on a monthly basis. The costs presented for the proposed standards include costs for inspection of the control equipment to ensure proper operation and maintenance. Visual inspections for leaks would be part of these inspections and would impose no costs in addition to those already reported. Such inspections would require perhaps one hour to accomplish, and would not impose an unreasonable burden on a terminal owner or operator. In fact such inspections are already a routine practice at many bulk terminals. Under the proposed regulation, a summary of the findings during the inspections would be required as part of the quarterly written report of excess emissions required by the General Provisions, § 60.7(c). The repair interval, i.e., the length of time allowed between the detection of a leak and repair of the leak, selected for the leak inspection requirement is 15 days. This repair interval would allow effective VOC emission reduction to be maintained, while not being burdensome to the terminal operator.

In addition to the monthly inspection, potential sources of vapor leaks would be monitored immediately prior to a system performance test using EPA Reference Method 21, which applies to determination of VOC leaks from organic liquid and vapor processing equipment. A portable instrument is used to detect VOC leaks from individual sources. All leaks would have to be repaired before the test was conducted. This ensures that the vapor processing system is processing the total flow of air-vapor mixture while the performance of the system is being evaluated.

The terminal operator should accept vapor tightness test documentation only for gasoline delivery tank truck testing conducted according to EPA Reference Method 27, "Determination of Vapor

Tightness of Gasoline Delivery Tanks Using Pressure-Vacuum Test." This method is applicable for the determination of vapor tightness of a gasoline delivery tank which is equipped with vapor collection equipment. The cost to perform this annual test would be about $100, plus an average additional repair cost of $50. Variations on this test method are acceptable only with the approval of the Administrator.

Selection of Monitoring Requirements

There are presently no demonstrated continuous monitoring systems commercially available which monitor vapor processor exhaust VOC emissions in the units of the proposed standard (mg/liter). This monitoring would require measuring not only VOC exhaust concentration, but also exhaust gas volume flow rate, volume of product dispensed, temperature, and pressure. Therefore, continuous monitoring in units of the standard would not be required at this time.

Monitoring equipment is available to monitor the operational variables associated with vapor processing system operation. Monitoring of operations indicates whether the vapor processing system is being properly operated and maintained, and whether the processor is continuously reducing VOC emissions to an acceptable level. The variable which would yield the best indication of system operation is VOC concentration at the processor outlet. Extremely accurate measurements would not be required since the purpose of the monitoring would not be to determine the exact outlet emissions but rather to indicate operational and maintenance practices regarding the vapor processor. Monitors for this type of continuous VOC measurement typically cost about $6,000. To achieve representative VOC concentration measurements at the processor outlet, the concentration monitoring device should be installed in the exhaust vent at least two equivalent stack diameters from the exit point, and protected from any interferences due to wind, weather, or other processes.

For some vapor processing systems, monitoring of a process parameter may yield as accurate an indication of system operation as the exhaust VOC concentration. For example, temperature monitoring in the case of thermal oxidation or refrigeration systems may indicate proper operation and maintenance of these systems. Parameter monitoring equipment would typically cost about $3,000. Because control system design is constantly changing and being upgraded in this industry, all acceptable process parameters for all systems cannot be specified. In general, the regulation allows for substituting the monitoring of vapor processing system process parameters for monitoring of exhaust VOC concentration if it can be demonstrated to the Administator's satisfaction that the value of the process parameter is indicative of proper operation of the processing system and is related to the exhaust VOC content. Monitoring of these parameters would be approved by the Administrator on a case-by-case basis. Continuous monitoring systems which are a part of a vapor processor's design may substitute for the requirement to install a separate system, with the approval of the Administrator.

For any system installed to monitor operations, a recording device must also be installed so that a permanent time record of the measured parameter is produced.

EPA has not yet developed performance specifications for these monitors, but a program is underway to develop these specifications. Consequently, until EPA proposed and promulgated monitor performance specifications, owners and operators subject to the requirement to install a vapor processor continuous monitoring system will not be required to do so.

For purposes of excess emissions reports required under § 60.7(c), the period of time selected as the averaging time is a 6-hour clock period. This time interval was selected to coincide with the time interval specified in the performance test. The VOC concentration or parameter limit for the excess emissions report would be determined during the performance test. After EPA establishes and promulgates monitor performance specifications, the monitoring equipment must be operating during the performance test to establish the average VOC concentration or process parameter value. This average value from the monitoring device becomes the limit for the excess emissions report. The quarterly excess emissions report would indicate the amount of time during periods of vapor processing system operation that the average value of the VOC concentration or process parameter value exceeded the average value of the parameter established during the performance test. *It is possible that each installation may* have a different monitoring limit.

Impacts of Reporting Requirements

The proposed standards for bulk gasoline terminals would require the terminal operator to keep on file documentation that all gasoline delivery tank trucks loading at the terminal had passed an annual vapor-tight test performed according to Method 27. The documentation would include the name of the tester, the test location and date, and the test results. These records would be kept on file at the terminal in a permanent form available for inspection, and would be updated at least once per year to reflect current information. The other type of report required under the proposed standards would be a summary report reflecting the findings on the monthly leak inspection. The preparation and filing of this report would represent only a modest increase in a bulk terminal's reporting requirements. These reports would be submitted quarterly with each report of excess emissions required under the General Provisions.

The General Provisions require three additional types of reports. First, there are notification requirements which would enable the Agency to keep abreast of facilities subject to the standards of performance. Second, there would be reporting of performance test results which would show that a facility is meeting the standards initially. Third, there would be quarterly reports of excess emissions which would be quarterly reports of excess emissions which would permit the Agency to determine whether the emission control system installed to comply with the standards is being properly operated and maintained.

The resources needed by the industry to maintain records and to collect, prepare, and use the reporting through the first five years after proposal of the standard would be about 26 man-years.

Public Hearing

A public hearing will be held to discuss the proposed standards in accordance with Section 307(d)(5) of the Clean Air Act. Persons wishing to make oral presentations should contact EPA at the address given in the ADDRESSES section of this preamble. Oral presentations will be limited to 15 minutes each. Any member of the public may file a written statement before, during, or within 30 days after the hearing. Written statements should be addressed to the Central Docket Section address given in the ADDRESSES section of this preamble.

A verbatim transcript of the hearing and written statements will be available for public inspection and copying during normal working hours at EPA's Central Docket Section in Washington, D.C. (see ADDRESSES section of this preamble).

Docket

The docket is an organized and complete file of all the information submitted to or otherwise considered in the development of this proposed rulemaking. The principal purposes of the docket are (1) to allow interested parties to readily identify and locate documents so that they can intelligently and effectively participate in the rulemaking process, and (2) to serve as the record in case of judicial review.

Miscellaneous

As prescribed by Section 111, establishment of standards of performance for bulk gasoline terminals was preceded by the Administrator's determination (40 CFR 60.16, 44 FR 49222, dated August 21, 1979) that these sources contribute significantly to air pollution which may reasonably be anticipated to endanger public health or welfare. In accordance with Section 117 of the Act, publication of this proposal was preceded by consultation with appropriate advisory committees, independent experts, and Federal departments and agencies. The Administrator will welcome comments on all aspects of the proposed regulation, including economic and technological issues, monitoring requirements, and proposed test methods.

It should be noted that standards of performance for new sources established under Section 111 of the Clean Air Act reflect:

> " " " application of the best technological system of continuous emission reduction which (taking into consideration the cost of achieving such emission reduction, and any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated [Section 111(a)(1)].

Although there may be emission control technology available that can reduce emissions below those levels required to comply with standards of performance, this technology might not be selected as the basis of standards or performance due to costs associated with its use. Accordingly, standards of performance should not be viewed as the ultimate in achievable emission control. In fact, the Act requires (or has the potential for acquiring) the imposition of a more stringent emission standard in several situations.

For example, applicable costs do not necessarily play as prominent a role in determining the "lowest achievable emission rate" for new or modified sources locating in non-attainment areas; i.e., those areas where statutorily-mandated health and welfare standards are being violated. In this respect, Section 173 of the Act requires that new or modified sources constructed in an area where ambient pollutant concentrations exceed the National Ambient Air Quality Standards (NAAQS) must reduce emissions to the level that reflects the "lowest achievable emission rate" (LAER), as defined in Section 171(3), for such category of source. The statute defines LAER as that rate of emissions based on whichever of the following is more stringent:

(A) the most stringent emission limitation which is contained in the implementation plan of any State for such class of category of source, unless the owner or operator of the proposed source deomonstates that such limitations are not achievable, or

(B) the most stringent emission limitation which is achieved in practice by such class or category of source.

In no event may the emission rate exceed any applicable new source performance standard [Section 171(3)].

A similar situation may arise under the prevention of significant deterioration of air quality provisions of the Act (Part C). These provisions require that certain sources [referred to in Section 169(1)] employ "best available control technology" (BACT) as defined in Section 169(3) for all pollutants regulated under the Act. Best available control technology must be determined on a case-by-case basis, taking energy, environmental, and economic impacts and other costs into account. In no event may the application of BACT result in emissions of any pollutants which exceed the emissions allowed by any applicable standard established pursuant to Section 111 (or 112) of the Act.

In all events, State Implementation Plans (SIPs) approved or promulgated under Section 110 of the Act must provide for the attainment and maintenance of NAAQS designed to protect public health and welfare. For this purpose, SIPs may in some cases require greater emission reductions than those required by standards of performance for new sources.

Finally, States are free under Section 116 of the Act to establish even more stringent emission limits than those established under Section 111 or those necessary to attain or maintain the NAAQS under Section 110. Accordingly, new sources may in some cases be subject to limitations more stringent than standards of performance under Section 111, and prospective owners and operators of new sources should be aware of this possibility in planning for such facilities.

This regulation will be reviewed four years from the date of promulgation as required by the Clean Air Act. This review will include an assessment of such factors as the need for integration with other programs, the existence of alternative methods, enforceability, improvements in emission control technology, and reporting requirements. The reporting requirements in this regulation will be reviewed as required under EPA's sunset policy for reporting requirements in regulations.

Section 317 of the Clean Air Act requires the Administrator to prepare an economic impact assessment for any new source standard of performance promulgated under Section 111(b) of the Act. An economic impact assessment was prepared for the proposed regulations and for other regulatory alternatives. All aspects of the assessment were considered in the formulation of the proposed standards to ensure that the proposed standards would represent the best system of emission reduction considering costs. The economic impact assessment is included in the Background Information Document.

Dated: December 8, 1980.

Douglas M. Costle,

Administrator.

It is proposed that 40 CFR Part 60 be amended as follows:

1. By adding a new subpart as follows:

Subpart XX—Standards of Performance for Bulk Gasoline Terminals

Sec.

60.500 Applicability and designation of affected facility.
60.501 Defintions.
60.502 Standards for volatile organic compound emissions from bulk gasoline terminals.
60.503 Test methods and procedures.
60.504 Monitoring of operations.
60.505 Recordkeeping.

Authority: Sections 111 and 301(a) of the Clean Air Act, as amended, (42 U.S.C. 7411, 7601(a)), and additional authority as noted below.

Subpart XX—Standards of Performance for Bulk Gasoline Terminals

§ 60.500 Applicability and designation of affected facility.

(a) The affected facility to which the provisions of this subpart apply is the total of all the loading racks at a bulk gasoline terminal which deliver liquid product into gasoline tank trucks.

(b) Each facility under paragraph (a) of this section that commences construction or modification after —— (date of publication in **Federal Register**

is subject to the provisions of this subpart.

(c) The provisions of § 60.504 will not apply until EPA has established and promulgated performance specifications for the monitoring devices. After the promulgation of performance specifications, these provisions will apply to each affected facility under paragraph (b) of this section.

§ 60.501 Definitions.

The terms used in this subpart are defined in the Clean Air Act, in § 60.2 of this part, or in this section as follows:

"Bulk gasoline terminal" means any wholesale gasoline outlet which receives gasoline by pipeline, ship, or barge.

"Continuous vapor processing system" means a VOC vapor processing system that treats VOC vapors collected from gasoline tank trucks on a demand basis without intermediate accumulation in a vapor holder.

"Gasoline" means any petroleum distillate or petroleum distillate/alcohol blend having a Reid vapor pressure of 27.6 kilopascals or greater which is used as a fuel for internal combustion engines.

"Gasoline tank truck" means a delivery tank truck used at bulk gasoline terminals which is loading gasoline or which has loaded gasoline on the immediately previous load.

"Intermittent vapor processing system" means a VOC vapor processing system that employs an intermediate vapor holder to accumulate the collected vapors from gasoline tank trucks, and treats the accumulated vapors only during automatically controlled cycles.

"Loading rack" means the loading arms, pumps, meters, shutoff valves, relief valves, check valves, electrical grounding, and lighting necessary to fill delivery tank trucks.

"Vapor collection system" means any equipment used for containing VOC vapors displaced during the loading of gasoline tank trucks.

"Vapor processing system" means any equipment used for recovering or oxidizing VOC vapors.

"Vapor-tight gasoline tank truck" means a gasoline tank truck which has demonstrated within the 12 preceding months that its product delivery tank will sustain a pressure change of not more than 750 pascals (75 mm of water) within 5 minutes after it is pressurized to 4,500 pascals (450 mm of water). This capability is to be demonstrated using the pressure test procedure specified in Reference Method 27.

"Volatile organic compound (VOC)" means any organic compound which participates in atmospheric photochemical reactions; or which is measured by Reference Methods 25A, 25B, and 21.

§ 60.502 Standard for Volatile Organic Compound (VOC) emissions from bulk gasoline terminals.

On and after the date on which the performance test required under by § 60.8 is completed, the owner or operator of a bulk gasoline terminal containing an affected facility shall comply with the requirements of this section.

(a) Each loading rack which loads gasoline tank trucks shall be equipped with a vapor collection system designed to collect the VOC vapors displaced from tank truck vapor collection systems during loading.

(b) The bulk gasoline terminal's vapor collection system shall be designed to prevent any VOC vapors collected at one loading rack from passing to another loading rack.

(c) The emissions to the atmosphere from the bulk gasoline terminal's vapor collection system due to the loading of liquid product into gasoline tank trucks are not to exceed 35 milligrams of VOC per liter of gasoline loaded.

(d) Loadings of liquid product into gasoline tank trucks shall be restricted to vapor-tight gasoline tank trucks only.

(e) Loadings of liquid product into gasoline tank trucks shall be restricted to those equipped with vapor recovery equipment that is compatible with the bulk gasoline terminal's vapor collection system.

(f) The bulk gasoline terminal's and the tank truck's vapor collection systems shall be connected during each loading of a gasoline tank truck.

(g) The vapor collection and liquid loading equipment shall be designed and operated to prevent gauge pressure in the delivery tank from exceeding 4,500 pascals (450 mm of water). This level is not to be exceeded when measured by the procedures specified in § 60.503(b).

(h) No pressure-vacuum vent in the bulk gasoline terminal's vapor collection system shall begin to open at a system pressure less than 4,500 pascals (450 mm of water).

(i) Each calendar month, the vapor collection system, the vapor processing system, and each loading rack handling gasoline shall be visually inspected during the loading of gasoline tank trucks for liquid or vapor VOC leaks. Each detection of a leak shall be recorded and the source of the leak repaired within 15 calendar days after it is detected. A summary of each set of three consecutive inspection records shall be submitted with the next quarterly report required under § 60.7(c).

§ 60.503 Test methods and procedures.

(a) For the performance tests, § 60.8(f) does not apply.

(b) For the purpose of determining compliance with the pressure regulation of § 60.502(g), the following procedures shall be used:

(1) Calibrate and install a liquid manometer, or equivalent, capable of measuring up to 500 mm of water gauge pressure with ±2.5 mm of water precision.

(2) Connect the manometer to a pressure tap in the terminal's vapor collection system, located as close as possible to the connection with the delivery tank.

(3) During the performance test, read and record the pressure every 5 minutes while a delivery tank is being loaded.

(c) For the purpose of determining compliance with the VOC mass emission limitation of § 60.502(c), the following reference methods shall be used:

(1) For the determination of volume at the exhaust vent:

(i) Method 2B for combustion vapor processing systems.

(ii) Method 2A for all other vapor processing systems.

(2) For the determination of VOC concentration at the exhaust vent, Method 25A or 25B. The calibration gas shall be either propane or butane.

(d) Immediately prior to a performance test required for determination of compliance with § 60.502(c) and (g), all potential sources of vapor leakage in the terminal's vapor collection system equipment shall be monitored for leaks using Method 21. A reading of greater than or equal to 10,000 ppmv as methane shall be considered a leak. All leaks shall be repaired prior to conducting the performance test.

(e) The test procedure for determining compliance with § 60.502(c) and (g) is as follows:

(1) The time period for a performance test shall be as follows:

(i) For continuous vapor processing systems, not less than 6 hours, during which at least 300,000 liters of gasoline are loaded.

(ii) For intermittent vapor processing systems, not less than 6 hours, during which at least 300,000 liters of gasoline are loaded and at least two full cycles of operation of the vapor processing system occur. The end of the performance test shall coincide with the end of a cycle of operation.

(2) All testing equipment shall be prepared and installed as specified in the appropriate test methods.

(3) For intermittent vapor processing systems, the system shall be manually started and allowed to process vapors

already in the vapor holder until the lower automatic cutoff is reached. This should be done immediately prior to the beginning of testing.

(4) An emission testing interval during the performance test shall consist of each 5 minute period or increment thereof, while the vapor processing system is operating; and each 15 minute period or increment thereof, while the vapor processing system is not operating.

(5) For each testing interval:

(i) The reading from each measurement instrument shall be recorded, and

(ii) The volume exhausted and the average VOC concentration in the exhaust vent, as specified in the appropriate test method, shall be determined.

(6) The volume of gasoline dispensed during the performance test period at all loading racks whose vapor emissions are controlled by the processing system being tested shall be determined. This may be determined from terminal records or from gasoline dispensing meters at each loading rack.

(7) The mass emitted for each testing interval shall be calculated as follows:

$M_e = 10^{-6} K V_{es} C_e$

where:

M_e = mass of VOC emitted at the exhaust vent, mg.

V_{es} = volume of air-vapor mixture exhausted, m^3 at standard conditions.

C_e = VOC concentration (as measured) at the exhaust vent, ppmv.

K = density of calibration gas, mg/m^3, at standard conditions
= 1.83×10^6 for propane
= 2.41×10^6 for butane.

s = standard conditions, 20°C and 760 mm Hg.

(8) The VOC emissions shall be calculated as follows:

$$E = \frac{\sum_{i}^{n} M_{ei}}{L}$$

where:

E = mass of VOC emitted per volume of gasoline loaded, mg/l.

L = total volume of gasoline loaded, l.

M_{ei} = mass of VOC emitted for each testing interval i, mg.

n = number of testing intervals.

(f) The owner or operator may adjust the emission results to exclude the methane and ethane content in the exhaust vent by any method approved by the Administrator.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414))

§ 60.504 Monitoring of operations.

(a) The owner or operator of each affected facility shall install, calibrate, operate, and maintain a monitoring system to continuously measure the VOC concentration of the exhaust vent stream of the vapor processing system to determine the proper operation of each system.

(b) Upon application to the Administrator, monitoring of a vapor processing system process parameter may be substituted for the measurement of the exhaust vent VOC content, if it can be demonstrated to the Administrator's satisfaction that the value of the process parameter is indicative of proper operation of the system and is related to the exhaust vent VOC content. Monitoring of process parameters must be approved on a case-by-case basis by the Administrator.

(c) Each monitoring device shall be installed, calibrated, operated, and maintained according to accepted practices and the manufacturer's specifications.

(d) The VOC concentration monitoring device shall be installed in a location that is representative of the VOC concentration in the exhaust vent, at least two equivalent stack diameters from the exhaust point, and protected from any interferences due to wind, weather, or other processes.

(e) Each monitoring device shall be equipped with a recording device so that a permanent time record of the measured process parameter is produced.

(f) The exhaust vent VOC concentration or approved process parameter shall be continuously measured and recorded during the performance test required under § 60.8.

(g) For the purposes of reports required under § 60.7(c), periods of excess emissions are defined as any 6-hour clock periods during which the average value of the exhaust vent VOC concentration or measured process parameter, during periods of vapor processing system operation, differs from the average value measured during the performance test required under § 60.8.

(h) The owner or operator of each affected facility shall install and operate all monitoring equipment before conducting the performance test required under § 60.8.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414))

§ 60.505 Recordkeeping.

(a) The owner or operator of each bulk gasoline terminal containing an affected facility shall keep on file documentation that each gasoline tank truck loading at that terminal is a vapor-tight gasoline tank truck. This documentation shall be kept on file at the terminal in a permanent form available for inspection.

(b) The documentation file for each gasoline tank truck shall be updated at least once per year to reflect current test results as determined by Method 27. This documentation shall include, as a minimum, the following information:

(1) Test Short Title: Gasoline Delivery Tank Pressure Test—EPA Test Method 27.

(2) Tank Owner and Address.

(3) Tank ID Number.

(4) Testing Location.

(5) Date of Test.

(6) Tester Name and Signature.

(7) Witnessing Inspector, if any: Name, Signature, and Affiliation.

(8) Test Results: Actual Pressure Change in 5 minutes, mm of water (average for 2 runs).

(c) The owner or operator of each bulk gasoline terminal containing an affected facility shall keep on file at the terminal a record of each monthly leak inspection required under § 60.502(i). Inspection records shall include, as a minimum, the following information:

(1) Date of Inspection.

(2) Findings (may indicate no leaks discovered; or location, nature, and severity of each leak).

(3) Corrective Action (date each leak repaired; reasons for any repair interval in excess of 15 days).

(4) Inspector Name and Signature.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414))

2. By adding five new Reference Methods (Method 2A, Method 2B, Method 25A, Method 25B, and Method 27) to Appendix A as follows:

Appendix A—Reference Methods

. . . . .

Method 2A. Direct Measurement of Gas Volume Through Pipes and Small Ducts

1. *Applicability and Principle*

1.1 Applicability. This method applies to the measurement of gas flow rates in pipes and small ducts, either in-line or at exhaust positions, within the temperature range of 0 to 50°C.

1.2 Principle. A gas volume meter is used to directly measure gas volume. Temperature

and pressure measurements are made to correct the volume to standard conditions.

2. *Apparatus*

Specifications for the apparatus are given below. Any other apparatus that has been demonstrated (subject to approval of the Administrator) to be capable of meeting the specifications will be considered acceptable.

2.1 Gas Volume Meter. A positive displacement meter, turbine meter, or other direct volume measuring device capable of measuring volume to within 2 percent, the meter shall be equipped with a temperature gauge (±2 percent of the minimum absolute temperature) and a pressure gauge (±2.5 mm Hg). The manufacturer's recommended capacity of the meter shall be sufficient for the expected maximum and minimum flow rates at the sampling conditions. Temperature, pressure, corrosive characteristics, and pipe size are factors necessary to consider in choosing a suitable gas meter.

2.2 Barometer. A mercury, aneroid, or other barometer capable of measuring atmospheric pressure to within 2.5 mm Hg. In many cases, the barometric reading may be obtained from a nearby national weather service station, in which case the station value (which is the absolute barometric pressure) shall be requested, and an adjustment for elevation differences between the weather station and the sampling point shall be applied at a rate of minus 2.5 mm Hg per 30-meter elevation increase, or vice-versa for elevation decrease.

2.3 Stopwatch. Capable of measurement to within 1 second.

3. *Procedure*

3.1 Installation. As there are numerous types of pipes and small ducts that may be subject to volume measurement, it would be difficult to describe all possible installation schemes. In general, flange fittings should be used for all connections wherever possible. Gaskets or other seal materials should be used to assure leak-tight connections. The volume meter should be located so as to avoid severe vibrations and other factors that may affect the meter calibration.

3.2 Leak Test. A volume meter installed at a location under positive pressure may be leak-checked at the meter connections by using a liquid leak detector solution containing a surfactant. Apply a small amount of the solution to the connections. If a leak exists, bubbles will form, and the leak must be corrected.

A volume meter installed at a location under negative pressure is very difficult to test for leaks without blocking flow at the inlet of the line and watching for meter movement. If this procedure is not possible, visually check all connections and assure tight seals.

3.3 Volume Measurement.

3.3.1 For sources with continuous, steady emission flow rates, record the initial meter volume reading, meter temperature(s), meter pressure, and start the stopwatch. Throughout the test period, record the meter temperature(s) and pressure so that average values can be determined. At the end of the test, stop the timer and record the elapsed time, the final volume reading, meter temperature(s), and pressure. Record the barometric pressure at the beginning and end of the test run. Record the data on a table similar to Figure 2A-1.

3.3.2 For sources with noncontinuous, non-steady emission flow rates, use the procedure in 3.3.1 with the addition of the following. Record all the meter parameters and the start and stop times corresponding to each process cyclical or noncontinuous event.

4. *Calibration*

4.1 Volume Meter. The volume meter is calibrated against a standard reference meter prior to its initial use in the field. The reference meter is a spirometer or liquid displacement meter with a capacity consistent with that of the test meter. Alternative references may be used upon approval of the Administrator.

Set up the test meter in a configuration similar to that used in the field installation (i.e., in relation to the flow moving device). Connect the temperature and pressure gauges as they are to be used in the field. Connect the reference meter at the inlet of the flow line, if appropriate for the meter, and begin gas flow through the system to condition the meters. During this conditioning operation, check the system for leaks.

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Plant _____

Date _____ Run Number _____

Sample Location _____

Barometric Pressure mm Hg Start _____ Finish _____

Operators _____

Meter Number _____ Meter Calibration Coefficient _____

Last Date Calibrated _____

Time	Volume	Static pressure	Temperature		
Run/clock	Meter reading	mm Hg	°C	°K	
Average					

Figure 2A-1. Volume flow rate measurement data.

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The calibration shall be run over at least three different flow rates. The calibration flow rates shall be about 0.3, 0.6, and 0.9 times the meter's rated maximum flow rate.

For each calibration run, the data to be collected include: reference meter initial and final volume readings, the test meter initial and final volume reading, meter average temperature and pressure, barometric pressure, and run time. Repeat the runs at each flow rate at least three times.

Calculate the test meter calibration coefficient, Y_m, for each run as follows:

$$Y_m = \frac{(V_{rf} - V_{ri})(t_r + 273)}{(V_{mf} - V_{mi})(t_m + 273)} \frac{P_b}{(P_b + P_g)} \qquad \text{Eq. 2A-1}$$

Where:

Y_m = Test volume meter calibration coefficient, dimensionless.
V_r = Reference meter volume reading, m^3.
V_m = Test meter volume reading, m^3.
t_r = Reference meter average temperature, °C.
t_m = Test meter average temperature, °C.
P_b = Barometric pressure, mm Hg.
P_g = Test meter average static pressure, mm Hg.
f = Final reading for run.
i = Initial reading for run.

Compare the three Y_m values at each of the flow rates tested and determine the maximum and minimum values. The difference between the maximum and minimum values at each flow rate should be no greater than 0.030. Extra runs may be required to complete this requirement. If this specification cannot be met in six successive runs, the test meter is not suitable for use. In addition, the meter coefficients should be between 0.95 and 1.05. If these specifications are met at all the flow rates, average all the Y_m values for an average meter calibration coefficient, $\overline{Y}_m$.

The procedure above shall be performed at least once for each volume meter. Therefore, an abbreviated calibration check shall be completed after each field test. The calibration of the volume meter shall be checked by performing three calibration runs at a single, intermediate flow rate (based on the previous field test) with the meter pressure set at the average value encountered in the field test. Calculate the average value of the calibration factor. If the calibration has changed by more than 5 percent, recalibrate the meter over the full range of flow as described above. Note: If the volume meter calibration coefficient values obtained before and after a test series differ by more than 5 percent, the test series shall either be voided, or calculations for the test series shall be performed using whichever meter coefficient value (i.e., before or after) gives the greater value of pollutant emission rate.

4.2 Temperature Gauge. After each test series, check the temperature gauge at ambient temperature. Use an ASTM mercury-in-glass reference thermometer, or equivalent, as a reference. If the gauge being checked agrees within 2 percent (absolute temperature) of the reference, the temperature data collected in the field shall be considered valid. Otherwise, the test data shall be considered invalid or adjustments of the test results shall be made, subject to the approval of the Administrator.

4.3 Barometer. Calibrate the barometer used against a mercury barometer prior to the field test.

5. *Calculations*

Carry out the calculations, retaining at least one extra decimal figure beyond that of the acquired data. Round off figures after the final calculation.

5.1 Nomenclature.

P_b = Barometric pressure, mm Hg.
P_g = Average static pressure in volume meter, mm Hg.
Q_s = Gas flow rate, m^3/min, standard conditions.
T_m = Average absolute meter temperature, °K.
V_m = Meter volume reading, m^3.
$\overline{Y}_m$ = Meter calibration coefficient, dimensionless.
f = Final reading for run.
i = Initial reading for run.
s = Standard conditions, 20° C and 760 mm Hg.
θ = Elapsed run time, min.

5.2 Volume.

$$V_{ms} = 0.3853\, \overline{Y}_m\, (V_{mf} - V_{mi}) \left(\frac{P_b + P_g}{T_m}\right) \qquad \text{Eq. 2A-2}$$

5.3 Gas Flow Rate.

$$Q_s = \frac{V_{ms}}{\theta} \qquad \text{Eq. 2A-3}$$

6. *References*

6.1 United States Environmental Protection Agency. Standards of Performance for New Stationary Sources, Revisions to Methods 1–8. Title 40, part 60. Washington, D.C. **Federal Register** Vol. 42, No. 160. August 18, 1977.

6.2 Rom, Jerome J. Maintenance, Calibration, and Operation of Isokinetic Source Sampling Equipment. U.S. Environmental Protection Agency. Research Triangle Park, N.C. Publication No. APTD-0576. March 1972.

6.3 Wortman, Martin, R. Vollaro, and P. R. Westlin. Dry Gas Volume Meter Calibrations. Source Evaluation Society Newsletter. Vol. 2, No. 2. May 1977.

6.4 Westlin, P. R. and R. T. Shigehara. Procedure for Calibrating and Using Dry Gas Volume Meters as Calibration Standards. Source Evaluation Society Newsletter. Vol. 3, No. 1. February 1978.

Method 2B—Determination of Exhaust Gas Volume Flow Rate From Gasoline Vapor Incinerators

1. *Applicability and Principle*

1.1 Applicability. This method applies to the measurement of exhaust volume flow rate from incinerators that process gasoline vapors consisting of generally non-methane alkanes, alkenes, and/or arenes (aromatic hydrocarbons). It is assumed that the amount of auxiliary fuel is negligible.

1.2 Principle. The incinerator exhaust flow rate is determined by carbon balance. Organic carbon concentration and volume flow rate are measured at the incinerator inlet. Organic carbon, carbon dioxide (CO_2), and carbon monoxide (CO) concentrations are measured at the outlet. Then the ratio of total carbon at the incenerator inlet and outlet is multiplied by the inlet volume to determine the exhaust volume and volume flow rate.

2. *Apparatus*

2.1 Volume Meter. Equipment described in Method 2A.

2.2 Organic Analyzers (2). Equipment described in Method 25A or 25B.

2.3 CO Analyzer. Equipment described in Method 10.

2.4 CO_2 Analyzer. A nondispersive infrared (NDIR) CO_2 analyzer and supporting equipment described in Method 10.

3. *Procedure*

3.1 Inlet Installation. Install a volume meter in the vapor line to incinerator inlet according to the procedure in Method 2A. At the volume meter inlet, install a sample probe as described in Method 25A. Alternatively, a single opening probe may be used so that a gas sample is collected from the centrally located 10 percent area of the vapor line cross-section. Connect to the probe a leak-tight, heated (if necessary to prevent condensation) sample line (stainless steel or equivalent) and an organic analyzer system as described in Method 25A or 25B.

3.2 Exhaust Installation. Three analyzers are required for the incinerator exhaust—CO_2, CO, and organic. A sample manifold with a single sample probe may be used. Install a sample probe as described Method 25A or, alternatively, a single opening probe positioned so that a gas sample is collected from the centrally located 10 percent area of the stack cross-section. Connect a leak-tight heated sample line to the sample probe. Heat the sample line sufficiently to prevent any condensation.

3.3 Recording Requirements. The output of each analyzer must be permanently recorded on an analog strip chart, digital recorder, or other recording device. The chart speed or number of readings per time unit must be similar for all analyzers so that data can be correlated. The minimum data recording requirement for each analyzer is one measurement value per minute during the incinerator test period.

3.4 Preparation. Prepare and calibrate all equipment and analyzers according to the procedures in the respective methods. All calibration gases must be introduced at the connection between the probe and the sample line. If a manifold system is used for the exhaust analyzers, all the analyzers and sample pumps must be operating when the calibrations are done. Note: For the purposes of this test, methane should not be used as an organic calibration gas.

3.5 Sampling. At the beginning of the test period, record the initial parameters for the inlet volume meter according to the procedures in Method 2A and mark all of the recorder strip charts to indicate the start of the test. Continue recording inlet organic and exhaust CO_2, CO, and organic concentrations throughout the test. During periods of process interruption and halting of gas flow, stop the timer and mark the recorder strip charts so that data from this interruption are not included in the calculations. At the end of the test period, record the final parameters for the inlet volume meter and mark the end on all of the recorder strip charts.

3.6 Post Test Calibrations. At the conclusion of the sampling period, introduce the calibration gases as specified in the respective reference methods. If analyzer output does not meet the specifications of the method, invalidate the test data for that period. Alternatively, calculate the volume results using initial calibration data and using final calibration data and report both resulting volumes. Then, for emissions calculations, use the volume measurement resulting in the greatest emission rate concentration.

4. *Calculations*

Carry out the calculations, retaining at least one extra decimal figure beyond that of the acquired data. Round off figures after the final calculation.

4.1 Nomenclature

CO_e—Mean carbon monoxide concentration in system exhaust, ppmv.

CO_{2e}—Mean carbon dioxide concentration in system exhaust, ppmv.

HC_e—Mean organic concentration in system exhaust as defined by the calibration gas, ppmv.

HC_i—Mean organic concentration in system inlet as defined by the calibration gas, ppmv.

K—Calibration gas factor=2 for ethane calibration gas.
=3 for propane calibration gas.
=4 for butane calibration gas.

V_{es}—Exhaust gas volume, m^3.

V_{is}—Inlet gas volume, m^3.

Q_{es}—Exhaust gas volume flow rate, m^3/min.

Q_{is}—Inlet gas volume flow rate, m^3/min.

θ—Sample run time, min.

s—Standard Conditions: 20°C, 760 mm Hg.

300—Estimated concentration of ambient CO_2, ppmv. (CO_2 concentration in the ambient air may be measured during the test period using an NDIR and the mean value substituted into the equation.)

4.2 Concentrations. Determine mean concentrations of inlet organics, outlet CO_2, CO, and outlet organics according to the procedures in the respective methods and the analyzers' calibration curves, and for the time intervals specified in the applicable regulations. Concentrations should be determined on a parts per million by volume (ppmv) basis.

4.3 Exhaust Gas Volume. Calculate the exhaust gas volume as follows:

$$V_{es} = V_{is}\frac{K(HC_i)}{K(HC_e) + CO_{2e} + CO_e - 300} \qquad \text{Eq. 2B-1}$$

4.4 Exhaust Gas Volume Flow Rate. Calculate the exhaust gas volume flow rate as follows:

$$Q_{es} = \frac{V_{es}}{\theta} \qquad \text{Eq. 2B-2}$$

5. *References*

5.1 Measurement of Volatile Organic Compounds. U.S. Environmental Protection Agency. Office of Air Quality Planning and Standards. Research Triangle Park, N.C. 27711. Publication No. EPA-450/2-78-041. October 1978. p. 55.

5.2 Method 10—Determination of Carbon Monoxide Emissions from Stationary Sources. U.S. Environmental Protection Agency. Code of Federal Regulations. Title 40, Chapter 1, part 60, Appendix A. Washington, D.C. Office of the Federal Register. March 8 1974.

5.3 Method 2A—Determination of Gas Flow Rate in Pipes and Small Ducts. Tentative Method. U.S. Environmental Protection Agency. Office of Air Quality Planning and Standards. Research Triangle Park, N.C. 27711. March 1980.

5.4 25A—Determination of Total Gaseous Organic Compounds Using a Flame Ionization Analyzer. Tentative Method. U.S. Environmental Protection Agency. Office of Air Quality Planning and Standards. Research Triangle Park, N.C. 27711. March 1980.

5.5 Method 25B—Determination of Total Gaseous Organic Compounds Using a Nondispersive Infrared Analyzer. Tentative Method. U.S. Environmental Protection Agency. Office of Air Quality Planning and Standards. Research Triangle Park, N.C. 27711. March 1980.

Method 25A—Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer

1. *Applicability and Principle*

1.1 Applicability. This method applies to the measurement of total gaseous organic concentration of vapors consisting of nonmethane alkanes, alkenes, and/or arenes (aromatic hydrocarbons). The concentration is expressed in terms of propane (or other appropriate organic compound) or in terms of organic carbon.

1.2 Principle. A gas sample is extracted from the source, through a heated sample line, if necessary, and glass fiber filter to a flame ionization analyzer (FIA). Results are reported as concentration equivalents of the calibration gas organic constituent, carbon, or other organic compound.

2. *Definitions*

2.1 Measurement System. The total equipment required for the determination of the gas concentration. The system consists of the following major subystems:

2.1.1 Sample Interface. That portion of the system that is used for one or more of the following: sample acquisition, sample transportation, sample conditioning, or protection of the analyzer from the effects of the stack effluent.

2.1.2 Organic Analyzer. That portion of the system that senses organic concentration and generates an output proportional to the gas concentration.

2.2 Span Value. The upper limit of a gas concentration measurement range that is specified for affected source categories in the applicable part of the regulations. For convenience, the span value should correspond to 100 percent of the recorder scale.

2.3 Calibration Gas. A known concentration of a gas in an appropriate diluent gas.

2.4 Zero Drift. The difference in the measurement system output readings before and after a stated period of operation during which no unscheduled maintenance, repair, or adjustment took place and the input concentration at the time of the measurements were zero.

2.5 Calibration Drift. The difference in the measurement system output readings before and after a stated period of operation during which no unscheduled maintenance, repair, or adjustment took place and the input concentration at the time of the measurements was a mid-level value.

3. *Apparatus*

A schematic of an acceptable measurement system is known in Figure 25A-1. The essential components of the measurement system are described below:

3.1 Organic Concentration Analyzer. A flame ionization analyzer (FIA) capable of meeting or exceeding the specifications in this method.

3.2 Sample Probe. Stainless steel, or equivalent, three-hole rake type. Sample holes shall be 4 mm in diameter or smaller and located at 16.7, 50, and 83.3 percent of the equivalent stack diameter.

3.3 Sample Line. Stainless steel or Teflon [1] tubing to transport the sample gas to the analyzers. The sample line should be heated, if necessary, to prevent condensation in the line.

3.4 Calibration Valve Assembly. A three-way valve assembly to direct the zero and calibration gases to the analyzers is recommended. Other methods, such as quick-connect lines, to route calibration gas to the analyzers are applicable.

3.5 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 should be heated to prevent any condensation.

3.6 Recorder. A strip-chart recorder, analog computer, or digital recorder for recording measurement data. The minimum data recording requirement is one measurement value per minute. Note: This method is often applied in highly explosive areas. Caution and care should be exercised in choice of equipment and installation.

4. *Calibration and Other Gases*

Gases used for calibrations, fuel, and combustion air (if required) are contained in compressed gas cylinders of stainless steel or aluminum. Preparation of calibration gases shall be done according to the procedure in Protocol No. 1, listed in Reference 9.2. The pressure in the gas cylinders is limited by the critical pressure of the subject organic component. As a safety factor, the maximum pressure in the cylinder should be no more than half the critical pressure. 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.

Calibration gas usually consists of propane in air or nitrogen and is determined in terms of the span value. The span value is established in the applicable regulation and is usually 1.5 to 2.5 times the applicable emission limit. If no span value is provided, use a span value equivalent to 1.5 to 2.5 times the highest expected concentration. Organic compounds other than propane can be used following the above guidelines and making the appropriate corrections for carbon number.

4.1 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.

4.2 Zero Gas. High purity air with less than 0.1 parts per million by volume of organic material (propane or carbon equivalent).

4.3 Low-level Calibration Gas. An organic calibration gas with a concentration equivalent to 25 to 35 percent of the applicable span value.

4.4 Mid-level Calibration Gas. An organic calibration gas with a concentration equivalent to 45 to 55 percent of the applicable span value.

4.5 High-level Calibration Gas. An organic calibration gas with a concentration equivalent to 80 to 90 percent of the applicable span value.

5. *Measurement System Performance Specifications*

5.1 Zero Drift. Less than ± 1 percent of the span value.

5.2 Calibration Drift. Less than ± 1 percent of the span value.

6. *Pretest Preparations*

6.1 Selection of Sampling Site. The location of the sampling site is generally specified by the applicable regulation or purpose of the test; i.e., exhaust stack, inlet line, etc. The sample port shall not be located within 1.5 meters or 2 equivalent diameters (whichever is less) of the gas discharge to the atmosphere.

6.2 Location of Sample Probe. 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.

6.3 Measurement System Preparation. Prior to the emission test, assemble the measurement system following the manufacturer's written instructions in preparing the sample interface and the organic analyzer. Make the system operable.

FIA equipment can be calibrated for almost any range of total organics concentrations. For high concentrations of organics (>1.0 percent by volume as propane) modifications to most commonly available analyzers are necessary. One accepted method of equipment modification is to decrease the size of the sample to the analyzer through the use of a smaller diameter sample capillary. Direct and continuous measurement of organic concentration is a necessary consideration when determining any modification design.

6.4 Calibration. Immediately prior to the test series, introduce zero gas and high-level calibration gas at the calibration valve assembly. Adjust the analyzer output to the appropriate levels, if necessary. Then introduce low-level and mid-level calibration gases successively to the measurement system. Record the analyzer responses for all four gases and develop a permanent record of the calibration curve. This curve shall be used in performing the post-test drift checks and in reducing all measurement data during the test series. No adjustments to the measurement system shall be conducted after the calibration and before the drift check (Section 7.3). If adjustments are necessary before the completion of the test series, perform the drift checks prior to the required adjustments and repeat the calibration following the adjustments. 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. *Emission Measurement Test Procedure*

7.1 Organic Measurement. Begin sampling at the start of the test period, recording time notations and any required process information as appropriate. In particular, note on the recording chart periods of process interruption or cyclic operation.

7.2 Drift Determination. Immediately following the completion of the test period, or

[1] Mention of trade names on specific products does not constitute endorsement by the Environmental Protection Agency.

if adjustments are necessary for the measurement system during the test, reintroduce the zero and mid-level calibration gases, one at a time, to the measurement system at the calibration valve assembly. (Make no adjustments to the measurement system until after the drift checks are made.) Record the analyzer response. If the drift values exceed the specified limits, invalidate the test run preceding the check and repeat the test run following corrections to the measurement system. Alternatively, recalibrate the test measurement system as in Section 6.4 and report the results using the calibration data that yield the highest corrected emission concentration.

8. *Organic Concentration Calculations*

Determine the average organic concentration in terms of ppmv as propane or other calibration gas. The average shall be determined by the integration of the output recording over the period specified in the applicable regulation.

If results are required in terms of ppmv as carbon, adjust measured concentrations using Equation 25A-1.

$C_c = K C_{meas}$ Eq. 25A-1

Where:

C_c = Organic concentration as carbon, ppmv.
C_{meas} = Organic concentration as measured, ppmv.
K = Carbon equivalent correction factor.
K = 2 for ethane.
K = 3 for propane.
K = 4 for butane.

9. *References*

9.1 Measurement of Volatile Organic Compounds—Guideline Series. U.S. Environmental Protection Agency, Research Triangle Park, N.C. Publication No. EPA-450/2-78-041, June 1978, p. 46-54.

9.2 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, N.C. June 1978. 10 pgs.

9.3 Gasoline Vapor Emission Laboratory Evaluation—Part 2. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, N.C. Report No. 75-GAS-6. August 1975. 32 pgs.

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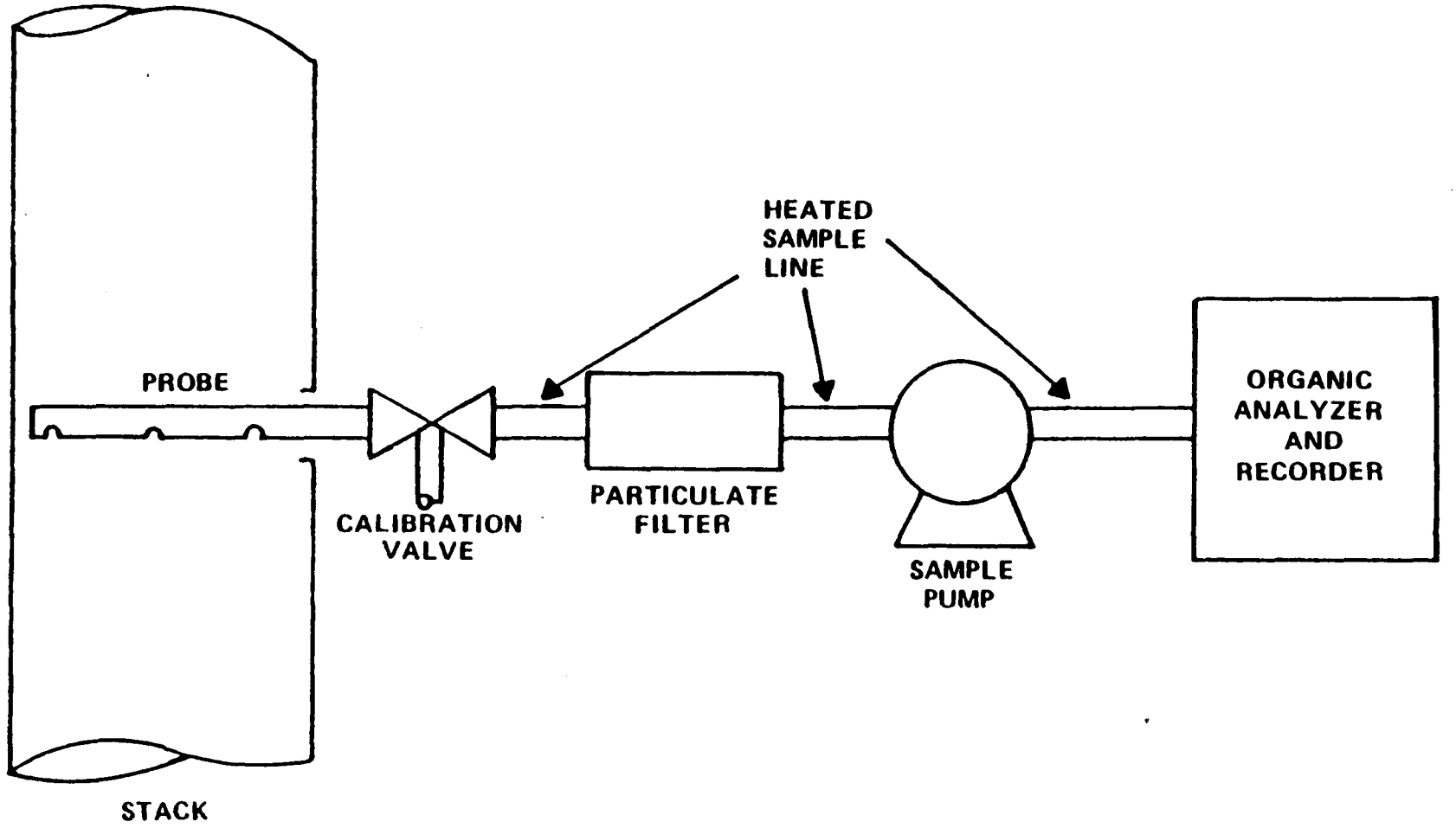

Figure 25A-1. Organic Concentration Measurement System.

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Method 25B—Determination of Total Gaseous Organic Concentration Using a Nondispersive Infrared Analyzer

1. *Applicability and Principle*

1.1 Applicability. This method applies to the measurement of Total gaseous organic concentration of vapors consisting primarily of nonmethane alkanes. (Other organic materials may be measured using the general procedure in this method, the appropriate calibration gas, and an analyzer set to the appropriate absorption band.) The concentration is expressed in terms of propane (or other calibration gas) or in terms of organic carbon.

1.2 Principle. A gas sample is extracted from the source, through a heated sample line and glass fiber filter to a nondispersive infrared analyzer (NDIR). Results are reported as equivalents of the calibration gas or as carbon equivalents.

2. *Definitions*

The terms and definitions are the same as for Method 25A.

3. *Apparatus*

The apparatus are the same as for Method 25A with the exception of the following:

3.1 Organic Concentration Analyzer. A nondispersive infrared analyzer designed to measure alkane organics and capable of meeting or exceeding the specifications in this method.

4. *Calibration Gases*

The calibration gases are the same as are required for Method 25A, Section 4. No fuel gas is required for an NDIR.

5. *Measurement System Performance Specifications*

5.1 Zero Drift. Less than ± 2 percent of the span value.

5.2 Calibration Drift. Less than ± 2 percent of the span value.

6. *Pretest Preparations*

6.1 Selection of Sampling Site. Same as in Method 25A, Section 6.1.

6.2 Location of Sample Probe. Same as in Method 25A, Section 6.2.

6.3 Measurement System Preparation. Prior to the emission test, assemble the measurement system following the manufacturer's written instructions in preparing the sample interface and the organic analyzer. Make the system operable.

6.4 Calibration. Same as in Method 25A, Section 6.4.

7. *Emission Measurement Test Procedure*

Proceed with the emission measurement immediately upon satisfactory completion of the calibration.

7.1 Organic Measurement. Same as in Method 25A, Section 7.1.

7.2 Drift Determination. Same as in Method 25A, Section 7.2.

8. *Organic Concentration Calculations*

The calculations are the same as in Method 25A, Section 8.

9. *References*

The references are the same as in Method 25A, Section 9.

Method 27—Determination of Vapor Tightness of Gasoline Delivery Tank Using Pressure-Vacuum Test

1. *Applicability and Principle*

1.1 Applicability. This method is applicable for the determination of vapor tightness of a gasoline delivery tank which is equipped with vapor collection equipment.

1.2 Principle. Pressure and vacuum are applied alternately to the compartments of a gasoline delivery tank and the change in pressure or vacuum is recorded after a specified period of time.

2. *Definitions and Nomenclature*

2.1 Gasoline. Any petroleum distillate or petroleum distillate/alcohol blend having a Reid Vapor pressure of 27.6 kilopascals or greater which is used as a fuel for internal combustion engines.

2.2 Delivery tank. Any container, including associated pipes and fittings, that is attached to or forms a part of any truck or railcar used for the transport of gasoline.

2.3 Compartment. A liquid-tight division of a delivery tank.

2.4 Delivery tank vapor collection equipment. Any piping, hoses, and devices on the delivery tank used to collect and route gasoline vapors either from the tank to a bulk terminal vapor control system or from a bulk plant or service station into the tank.

2.5 Time period of the pressure or vacuum test (t). The time period of the test, as specified in the appropriate regulation, during which the change in pressure of vacuum is monitored, in minutes.

2.6 Initial pressure (P_i). The pressure applied to the delivery tank at the beginning of the static pressure test, as specified in the appropriate regulation, in mm H_2O.

2.7 Initial vacuum (V_i). The vacuum applied to the delivery tank at the beginning of the static vacuum test, as specified in the appropriate regulation, in mm H_2O.

2.8 Allowable pressure change (Δp). The allowable amount of decrease in pressure during the static pressure test, within the time period t, as specified in the appropriate regulation, in mm H_2O.

2.9 Allowable vacuum change (Δv). The allowable amount of increase in vacuum during the static vacuum test, within the time period t, as specified in the appropriate regulation, in mm H_2O.

3. *Apparatus*

3.1 Pressure source. Pump or compressed gas cylinder of air or inert gas sufficient to pressurize the delivery tank to 500 mm H_2O above atmospheric pressure.

3.2 Regulator. Low pressure regulator for controlling pressurization of the delivery tank.

3.3 Vacuum source. Vacuum pump capable of evacuating the delivery tank to 250 mm H_2O below atmospheric pressure.

3.4 Pressure-vacuum supply hose.

3.5 Manometer. Liquid manometer, or equivalent instrument, capable of measuring up to 500 mm H_2O gauge pressure with ±2.5 mm H_2O precision.

3.6 Pressure-vacuum relief valves. The test apparatus shall be equipped with an in-line pressure-vacuum relief valve set to activate at 675 mm H_2O above atmospheric pressure or 250 mm H_2O below atmospheric pressure, with a capacity equal to the pressurizing or evacuating pumps.

3.7 Test cap for vapor recovery hose. This cap shall have a tap for manometer connection and a fitting with shut-off valve for connection to the pressure-vacuum supply hose.

3.8 Caps for liquid delivery hoses.

4. *Pretest Preparations*

4.1 Emptying of tank. The delivery tank shall be emptied of all liquid.

4.2 Purging of vapor. The delivery tank shall be purged of all volatile vapors by any safe, acceptable method. One method is to carry a load of non-volatile liquid fuel, such as diesel or heating oil, immediately prior to the test, thus flushing out all the volatile gasoline vapors. A second method is to remove the volatile vapors by blowing ambient air into each tank compartment for at least 20 minutes. This second method is usually not as effective and often causes stabilization problems, requiring a much longer time for stabilization during the testing.

4.3 Location of test site. The delivery tank shall be tested where it will be protected from direct sunlight.

5. *Test Procedure*

5.1 Preparations.

5.1.1 Open and close each dome cover.

5.1.2 Connect static electrical ground connections to tank. Attach the liquid delivery and vapor return hoses, remove the liquid delivery elbows, and plug the liquid delivery fittings.

5.1.3 Attach the test cap to the end of the vapor recovery hose.

5.1.4 Connect the pressure-vacuum supply hose and the pressure-vacuum relief valve to the shut-off valve. Attach a manometer to the pressure tap.

5.1.5 Connect compartments of the tank internally to each other if possible. If not possible, each compartment must be tested separately, as if it were an individual delivery tank.

5.2 Pressure Test.

5.21 Connect the pressure source to the pressure-vacuum supply hose.

5.2.2 Open the shut-off valve in the vapor recovery hose cap. Applying air pressure slowly, pressurize the tank to P_i, the initial pressure specified in the regulation.

5.23 Close the shut-off valve and allow the pressure in the tank to stabilize, adjusting the pressure if necessary to maintain pressure of P_i. When the pressure stabilizes, record the time and initial pressure.

5.24 At the end of t minutes, record the time and final pressure.

5.25 Repeat steps 5.2.2 through 5.2.4 until the change in pressure for two consecutive runs agrees with ±10mm H_2O. Calculate the arithmetic average of the two results.

5.2.6 Compare the average measured change in pressure to the allowable pressure change, Δp, as specified in the regulation. If the delivery tank does not satisfy the vapor tightness criterion specified in the regulation, repair the sources of leakage, and repeat the pressure test until the criterion is met.

5.2.7 Disconnect the pressure source from the pressure-vacuum supply hose, and slowly

open the shut-off valve to bring the tank to atmospheric pressure.

5.3 Vacuum Test.

5.3.1 Connect the vacuum source to the pressure-vacuum supply hose.

5.3.2 Open the shut-off valve in the vapor recovery hose cap. Slowly evacuate the tank to V_i, the initial vacuum specified in the regulation.

5.3.3 Close the shut-off valve and allow the pressure in the tank to stabilize, adjusting the pressure if necessary to maintain a vacuum of V_i. When the pressure stabilizes, record the time and initial vacuum.

5.3.4 At the end of t minutes, record the time and final vacuum.

5.3.5 Repeat steps 5.3.2 through 5.3.4 until the change in vacuum for two consecutive runs agrees within ± 10 mm H_2O. Calculate the arithmetic average of the two results.

5.3.6 Compare the average measured change in vacuum to the allowable vacuum change, Δv, as specified in the regulation. If the delivery tank does not satisfy the vapor tightness criterion specified in the regulation, repair the sources of leakage, and repeat the vacuum test until the criterion is met.

5.3.7 Disconnect the vacuum source from the pressure-vacuum supply hose, and slowly open the shut-off valve to bring the tank to atmospheric pressure.

5.4 Post-test clean-up. Disconnect all test equipment and return the delivery tank to its pretest condition.

6. *Alternative Procedures*

Techniques other than specified above may be used for purging and pressurizing a delivery tank, if prior approval is obtained from the Administrator. Such approval will be based upon demonstrated equivalency with the above method.

[FR Doc. 80-38932 Filed 12-16-80; 8:45 am]

BILLING CODE 6560-26-M

Proposed Rules

40 CFR Part 60

[AD-FRL 1738-8 Docket No. OAQPS A-79-52]

Standards of Performance for New Stationary Sources; Bulk Gasoline Terminals; Extension of Public Hearing and End of Comment Period

AGENCY: Environmental Protection Agency (EPA).

ACTION: Additional public hearing and extension of comment period.

SUMMARY: This notice announces that the public hearing which will be held on January 21, 1981, on the proposed new source performance standards for bulk gasoline terminals will be continued on January 28, 1981. This second public hearing day has been scheduled to provide interested persons who are unable to attend the January 21, 1981, hearing an opportunity for oral presentaiton of data, views and arguments concerning the proposed standard. The end of the comment period on the proposed standard has been extended until March 20, 1981.

DATES: The second public hearing will be held on January 28, 1981, beginning at 1:00 P.M. Written comments to be included in the record on the proposed standard and written comments responding to, supplementing, or rebutting written or oral comments received at the public hearing must be postmarked no later than March 20, 1981.

ADDRESSES: Comments on the proposed standards should be submitted (in duplicate if possible) to Central Docket Section (A-130), Attention: Docket Number A-79-52, U.S. Environmental Protection Agency, 401 M Street, SW., Washington, D.C. 20460.

Public Hearing. The January 21 public hearing will be held at E.R.C. Auditorium, R.T.P., North Carolina 27711. The January 28 public hearing will be held at the Office of Administration Auditorium, R.T.P., North Carolina 27711. Persons wishing to present oral testimony at the January 28 hearing should, if possible, notify Mrs. Naomi Durkee, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone (919) 541-5271.

FOR FURTHER INFORMATION CONTACT: Susan R. Wyatt, Standards Development Branch (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5477.

SUPPLEMENTARY INFORMATION: On December 17, 1980, EPA proposed a standard of performance for new stationary sources; bulk gasoline terminals (FR Vol. 45, No. 244, p. 83126). It was also announced that a public hearing will be held on January 21, 1981, to receive oral comments on this proposal and that the end of the comment period would be February 17, 1981.

Subsequently EPA received a request from the National Tank Truck Carriers (NTTC) to postpone the hearing. NTTC represents for-hire tank truck owners who would potentially be affected by the standard, and requested the postponement to provide additional time to survey their members. NTTC has indicated that a one week delay will provide sufficient additional time.

EPA agrees with this request. However, this request was not received in time to give sufficient notice to persons planning to attend the January 21, 1981, hearing. Therefore, the January 21, 1981, hearing will be held as scheduled. However, a continuation session of the hearing will be held on January 28, 1981, at 1:00 P.M. to hear NTTC comments and comments from any other persons who are unable to attend the January 21, 1981, hearing.

Requests for a 60-day delay of the public hearing and a 60-day delay of the end of the comment period were received from the American Petroleum Institute. This request expressed the need for additional time to review the technical information in the proposal. As a result of this request, the end of the comment period has been extended to March 20, 1981.

Dated: January 15, 1981.

David Hawkins,

Assistant Administrator for Air, Noise, and Radiation.

[FR Doc. 81-2861 Filed 1-26-81; 8:45 am]

40 CFR Part 60

[AD-FRL-1634-4]

Standards of Performance for New Stationary Sources; Bulk Gasoline Terminals

Correction

In FR Doc. 80-38932, appearing at page 83126, in the issue of Wednesday, December 17, 1980, please make the following changes:

(1) On page 83127, first column, first full paragraph, fifth line, "0.7" should be corrected to read "0.07".

(2) On page 83127, first column, third full paragraph, seventh line, "terminals should read "Terminals".

(3) On page 83128, first column, third full paragraph, eighth line, "EPS" should read "EPA".

(4) On page 83129, first column, second paragraph, third line from the end, "Multiplerack" should read as two words, "Multiple rack".

(5) On page 83130, third column, first full paragraph, third line, "absorption" should read "adsorption" and again on the sixth line, "absorption" should read "adsorption".

(6) On page 83131, third column, third paragraph, third line, "CRC" should read "CRA".

(7) On page 83132, second column, eighth line, "In separate" should read "In a separate".

(8) On page 83132, "in this area" should read "In this area".

(9) On page 83132, second column, second full paragraph, "achiveable" should read "achievable".

(10) On page 83132, third column, second full paragraph, fourteenth line, "absorption" should read "adsorption".

(11) On page 83135, first column, first full paragraph, last line, "$650/Mg(590/ton)" should read "$650/Mg ($590/ton)".

(12) On page 83138, first column, first full paragraph, eighth line, "outley" should read "outlet".

(13) On page 83138, first column, third full paragraph, fourth line, "as the basis for the proposed standards, was selected" should be inserted in between "selected" and "to".

(14) On page 83138, second column, first full paragraph, ninth line, "competent" should read "component"

(15) On page 83140, second column, first full paragraph, eighteenth line, "form" should be corrected to read "from".

(16) On page 83141, second column, second full paragraph, fifth line, "proposed" should read "proposes".

(17) On page 83141, second column, second full paragraph, sixth line, "promulgated" should read "promulgates".

(18) On page 83141, third column, first full paragraph, eleventh line, "which would be quarterly reports of excess emissions" should be removed from the sentence beginning with the word "Third".

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 60

[AD-FRL-1634-4]

Standards of Performance for New Stationary Sources; Bulk Gasoline Terminals

Correction

In FR Doc. 80-38932, published at page 83126, on Wedneday, December 17, 1980, on page 83142, in the third column, the last line, "(date of publication in Federal Register" should be corrected to read "December 17, 1980".

BILLING CODE 1505-01-M

ENVIRONMENTAL PROTECTION AGENCY

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STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

REFERENCE METHODS

APPENDIX A

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 60

[AD-FRL 1625-7]

Standards of Performance for New Stationary Sources; Proposed Revisions to General Provisions and Additions to Appendix A, and Reproposal of Revisions to Appendix B

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed Rule and Notice of Public Hearing.

SUMMARY: This proposed rule (1) revises the monitoring requirements (§ 60.13) of the General Provisions, (2) adds Methods 6A and 6B to Appendix A, and (3) reproposes revisions to Performance Specifications 2 and 3 to Appendix B of 40 CFR Part 60. The proposed revisions to § 60.13 are being made to make this section consistent with the proposed revisions to Appendix B. Methods 6A and 6B are being proposed because they simplify the determination of the SO_2 emission rates in terms of ng/J. Performance Specifications 2 and 3 revisions are being reproposed because the changes that have been made to the performance specifications as a result of comments received on the original proposal of October 10, 1979 (44 FR 58602) are substantial and involve an entirely new concept.

DATES: *Comments.* Comments must be received on or before March 27, 1981.

Public Hearing. A public hearing will be held on February 19, 1981 beginning at 9 a.m.

Request to Speak at Hearings. Persons wishing to present oral testimony must contact EPA by February 12, 1981 (1 week before hearing).

ADDRESSES: *Comments.* Comments should be submitted (in duplicate if possible) to: Central Docket Section (A-130), Attention: Docket Number OAQPS-79-4, U.S. Environmental Protection Agency, 401 M Street, SW., Washington, D.C. 20460.

Public Hearing. The public hearing will be held at Emission Measurement Labatory, R.T.P. North Carolina. Persons wishing to present oral testimony should notify Ms. Vivian Phares, Emission Measurement Branch (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5423.

Docket. Docket Number OAQPS-79-4 (Performance Specifications 2 and 3) and Docket Number A-80-30 (Methods 6A and 6B), containing supporting information used in developing the proposed rulemaking are located in the U.S. Enviromental Protection Agency, Central Docket Section, West Tower Lobby, Gallery 1, Waterside Mall, 401 M Street, S.W., Washington, D.C. 20460. The docket may be inspected between 8 a.m. and 4 p.m. on weekdays, and a reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: Mr. Roger T. Shigehara (MD-19). U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-2237.

SUPPLEMENTARY INFORMATION: The discussion in this section has been divided into three separate parts. Part A discusses proposed changes to the General Provisions of 40 CFR Part 60, Part B discusses the addition of proposed Methods 6A and 6B to Appendix A, and Part C discusses reproposal of revisions to Performance Specifications 2 and 3 to Appendix B.

Part A

The proposed revisions to § 60.13 of the General Provisions are being made to make this section consistent with the proposed revisions to Appendix B. Since the reproposal to Appendix B uses the concept of evaluating the continuous emission monitors as a system, based on relative accuracy test results, the use of certified cylinder gases, optical filters, or gas cells is not necessary. The requirement for quantification of the zero and span drifts is not a change, but a clarification of what is required under the existing performance specifications.

Part B

Two reference methods (Methods 6A and 6B) are proposed. Method 6A, "Determination of Sulfur Dioxide, Moisture, and Carbon Dioxide Emissions from Fossil Fuel Combustion Sources," combines the sampling and analysis of SO_2 and CO_2. The SO_2 is collected in a hydrogen peroxide solution and analyzed by the barium-thorin titration procedure described in Method 6. The CO_2 is collected by a solid absorbent and analyzed gravimetrically. The sample gas volume is measured to allow determination of SO_2 concentration, CO_2 concentration, moisture, and emission rate from combustion sources in ng/J. If the only measurement needed is in terms of emission rate or if the CO_2 and moisture concentrations are not needed, e.g., to convert NO_x concentration to ng/J, the volume meter is not required. It is intended that Method 6A be used as an alternative to Methods 6 and 3 for the purpose of determining SO_2 emission rates in ng/J.

Method 6B, "Determination of Sulfur Dioxide and Carbon Dioxide Daily Average Emissions from Fossil Fuel Combustion Sources," employs the same sampling train and analysis procedures as Method 6A, but the operation of the train is controlled on an intermittent basis by a timer or on a continuous basis by using a low, constant flow-rate pump. This allows an extended sampling time period and the determination of an average value for that time period of SO_2 concentration, CO_2 concentration, and emission rate from combustion sources in ng/J. Method 6B is proposed as an acceptable procedure for compliance with § 60.47a (f) of 40 CFR Part 60, Subpart Da. This paragraph (f) requires that in the event of CEMS breakdown, emission data will be obtained by using other monitoring systems or reference methods approved by the Administrator.

Part C

Revisions to Performance Specifications 2 and 3 for the initial evaluation of continuous emission monitoring systems (CEMS) for SO_2, NO_x, and diluent gases were proposed on October 10, 1979 (44 FR 58602). Comments received as a result of this proposal led to reevaluation of the provisions and a change in the overall approach to the performance specifications. The reproposed performance specifications deemphasize instrument equipment specifications and add emphasis to the evaluation of the CEMS and its location as a system. The specification requirements are limited to calibration drift tests and relative accuracy tests. The acceptability limits for relative accuracy remain the same as in the previously proposed revisions to the performance specifications.

CEMS guidelines will also be published in a separate document at the time of proposal to provide vendors, purchasers, and operators of CEMS with supplementary equipment and performance specifications. The guidelines will contain additional procedures and specifications that may provide further evaluation of the CEMS beyond that required by Performance Specifications 2 and 3, e.g., response time, 2-hour zero and calibration drifts, sampling locations, and calibration value analyses.

Applicability

The proposed revisions would apply to all CEMS currently subject to Performance Specifications 2 and 3. These include sources subject to standards of performance that have

already been promulgated and sources subject to Appendix P to 40 CFR Part 51. Since the requirements of the reproposed performance specification revisions are limited to daily calibration drift tests and relative accuracy tests, existing CEMS that met the specifications of the current Performance Specifications 2 and 3 also meet the requirements of these revised specifications and, therefore, do not require retesting.

This reproposal has retained the definition of a "continuous emission monitoring system" and includes the diluent monitor, if applicable. This definition requires the relative accuracy of the CEMS to be determined in terms of the emission standard, e.g., mass per unit calorific value for fossil fuel-fired steam generators. Several commenters felt that the limits of relative accuracy should be relaxed from the present 20 percent because of the addition of the diluent analyzer output. Others added that errors with the manual reference methods could increase the possibility of poor relative accuracy determinations now that an additional measurement is required. The Administrator has reviewed a number of relative accuracy tests and has concluded that the variations in the manual reference method determinations are not the major cause of failure, but that the difference between the mean of the reference method and the CEMS values is the most probable cause. This situation is correctable.

Comments on Proposal

Numerous commenters noted that the proposed revisions go far beyond clarification and considered them as significant changes. A large part of this concern was because they felt that many existing CEMS were not installed according to the proposed installation specifications. In addition, many commenters felt the need for greater flexibility in selecting alternative CEMS measurement locations. Several commenters desired the inclusion of test procedures to evaluate single-pass, in situ CEMS. Others objected to the length and cost of testing. Opposing views were presented on the need for stratification checks. Many commenters dealt with specific parts of the proposal and a few raised issues beyond the scope of the revisions. Because the Administrator has changed the overall approach to performance specifications as mentioned in the beginning of Part C, many of these comments no longer apply and many of the objections have been resolved.

The quality assurance requirements for CEMS and associated issues were raised by many commenters. Most commenters stated that there was a need for EPA to issue guidelines or requirements for quality assurance. EPA is developing such procedures, and they will be published later this year or early next year as Appendix E to 40 CFR Part 60. Some commenters erroneously assumed that the quality assurance procedures were an integral part of the specifications. Although related, this specification should be evaluated on the basis of its adequacy in evaluating a CEMS after their initial installation.

The reproposed performance specifications include a provision that the relative accuracy of a CEMS must be within ±20 percent of the mean reference value or ±10 percent of the applicable standard, whichever is greater. Several commenters endorsed this change, while one felt the change to allow an accuracy of ±10 percent of the applicable standard is too lenient at low emission rates. The Administrator feels that it is restrictive to require a high degree of relative accuracy when the actual emission levels are equivalent to 50 percent or less of the applicable emission standard.

Request for Comments on Other Views

A number of suggestions were received which were not incorporated in these revisions. Because they represent differing views, EPA requests comments on them to determine what course of action should be taken in the final rule making. The suggestions are as follows:

1. Section 60.13(b) was revised to exclude the mandatory 7-day conditioning period used to verify the CEMS operational status. Once commenter feels that the mandatory conditioning period should not only be retained, but should be made longer depending on how the CEMS is used (i.e., for operation and maintenance requirements or for compliance/enforcement purposes) as follows:

a. The presently required 7-day conditioning period should be retained for CEMS used for operation and maintenance requirements.

b. If the CEMS is used for compliance/enforcement purposes, a 30-day conditioning period should be required and that the relative accuracy tests should be spread over 3 days instead of one.

c. All CEMS, whether for operation and maintenace requirements or for compliance/enforcement purposes, should be installed and operational for 60 or 90 days prior to the initial NSPS test.

If the above are done, the commenter feels that (1) the owner/operator/agency would be aware of the progress made by the control system in complying with the emission standards, (2) there would be a greater chance of the CEMS passing the performance specification test and of the facility complying with the regulations within the time requirements of § 60.8, and (3) the operator/vendor/tester/agency would minimize loss of valuable resources and time.

2. Once commenter feels that § 60.13(c) should require all CEMS Performance Specification Tests to be done concurrent with NSPS tests under § 60.8. This would streamline the process and save resources for owners and agencies alike.

3. Section 60.13(d) was revised to delete the requirements listed under (d)(1) and (d)(2) because EPA felt that the relative accuracy test would validate the CEMS system which includes the calibration gases or devices. One commenter, however, feels that the requirement to introduce zero and span gas mixtures into the measurement system at the probe at the stack wall should be retained and conducted in such a way that the entire system including the sample interface is checked. This requirement would provide a means to check the CEMS on a daily basis. In addition, the commenter feels that the requirement for checking the calibration gases at 6-month intervals may be deleted provided that the values used for replacement gas cylinders, calibration gas cells or optical filters are approved by the control agency.

4. One commenter feels that the following specifications should be added in Section 4 of Performance Specification 2:

a. The CEMS relative accuracy should be relaxed by using a sliding function of the allowable emission standard and/or the reference method tests for very low emission limits, e.g., 0.10 pounds per 10^6 Btu emission limit under PSD permits.

b. Each new compliance/enforcement CEMS installed after 1983 must have an external means of checking the calibration of the instrument using separate calibration/audit materials.

c. A minimum data recovery specification of at least 18 hours in at least 22 out of 30 days (or similar) should be included. This would mean that a performance specification test would not be officially completed until after the 30 days.

5. One commenter feels that EPA should consider using Section 7.1 of Performance Specification 2 to specify that during the CEMS performance specification test all data be recorded both in separate units of measurements (ppm and percent CO_2 or O_2) as well as combined units of the standard.

6. In Performance Specification 2, the definition of "Relative Accuracy" is incorrect. Instead of a degree of correctness, it is actually a measure of "relative error." One commenter feels that "relative accuracy" should be changed to "relative error."

7. In Section 7.3 of Performance Specification 2, the tester is allowed to reject up to three samples provided that the total number of test results used to determine the relative accuracy is greater than or equal to nine. EPA had considered using statistical techniques to reject outliers, but found that these techniques were too restrictive. One commenter feels that statistical techniques should be used. At a minimum, the commenter feels that the control agencies should be consulted before any data is rejected.

Miscellaneous

Authority: This proposed rule making is issued under the authority of sections 111, 114, and 301(a) of the Clean Air Act as amended (42 U.S.C. 7411, 7414, and 7601(a)).

Dated: January 13, 1981.

Douglas M. Costle,

Administrator.

It is proposed that §§ 60.13, 60.46, and 60.47a, Appendix A, and Appendix B of 40 CFR Part 60 be amended as follows:

1. By revising § 60.13(b), 60.13(c)(2)(ii), and 60.13(d), by removing subparagraphs (1), (2), and (3) of § 60.13(b), and by removing subparagraphs (1), (2), and (3) of § 60.13(d) as follows:

§ 60.13 Monitoring requirements.

* * * * *

(b) All continuous monitoring systems and monitoring devices shall be installed and operational prior to conducting performance tests under § 60.8. Verification of operational status shall, as a minimum, include completion of the manufacturer's written requirements or recommendations for installation, operation, and calibration of the device.

(c) * * *

(2) * * *

(ii) Continuous monitoring systems for measurement of nitrogen oxides or sulfur dioxide shall be capable of measuring emission levels within ±20 percent with a confidence level of 95 percent. The performance tests and calculation procedures set forth in Performance Specification 2 of Appendix B shall be used for demonstrating compliance with this specification.

* * * * *

(d) Owners and operators of all continuous emission monitoring systems installed in accordance with the provisions of this part shall check the zero and span drift at least once daily in accordance with the method prescribed by the manufacturer of such systems unless the manufacturer recommends adjustments at shorter intervals in which case such recommendations shall be followed. The zero and span shall, as a minimum, be adjusted whenever the 24-hour zero drift of 24-hour span drift limits of the applicable performance specifications in Appendix B are exceeded. The amount of excess zero and span drift measured at the 24-hour interval checks shall be quantified and recorded. For continuous monitoring systems measuring opacity of emissions, the optical surfaces exposed to the effluent gases shall be cleaned prior to performing the zero and span drift adjustments except that for systems using automatic zero adjustments, the optical surfaces shall be cleaned when the cumulative automatic zero compensation exceeds 4 percent opacity. Unless otherwise approved by the Administrator, the following procedures shall be followed for continuous monitoring systems measuring opacity of emissions. Minimum procedures shall include a method for producing a simulated zero opacity condition and an upscale(span) opacity condition using a certified neutral density filter or other related technique to produce a known obscuration of the light beam. Such procedures shall provide a system check of the analyzer internal optical surfaces and all electronic circuitry including the lamp and photodetector assembly.

* * * * *

2. By revising § 60.46(a)(4) as follows:

§ 60.46 Test methods and procedures.

(a) * * *

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

* * * * *

3. By revising § 60.47a(h)(1) as follows:

§ 60.47a Emission monitoring.

* * * * *

(h) * * *

(1) Reference Methods 3, 6, and 7 as applicable, are used. Method 6B may be used whenever Methods 6 and 3 data are used to determine the SO_2 emission rate in ng/J. The sampling location(s) are the same as those used for the continuous monitoring system.

* * * * *

4. By adding to Appendix A of 40 CFR Part 60 two new methods, Methods 6A and Method 6B, to read as follows:

Appendix A—Reference Test Methods

* * * * *

Method 6A—Determination of Sulfur Dioxide, Moisture, and Carbon Dioxide Emissions from Fossil Fuel Combustion Sources

1. *Applicability and Principle*

1.1 *Applicability.* This method applies to the determination of sulfur dioxide (SO_2) emissions from fossil fuel combustion sources in terms of concentration (mg/m³) and in terms of emission rate (ng/J) and to the determination of carbon dioxide (CO_2) concentration (percent). Moisture, if desired, may also be determined by this method.

The minimum detectable limit, the upper limit, and the interferences of the method for the measurement of SO_2 are the same as for Method 6. For a 20-liter sample, the method has a precision of 0.5 percent CO_2 for concentrations between 2.5 and 25 percent CO_2 and 1.0 percent moisture for moisture concentrations greater than 5 percent.

1.2 *Principle.* The principle of sample collection is the same as for Method 6 except that moisture and CO_2 are collected in addition to SO_2 in the same sampling train. Moisture and CO_2 fractions are determined gravimetrically.

2. *Apparatus*

2.1 *Sampling.* The sampling train is shown in Figure 6A-1; the equipment required is the same as for Method 6, except as specified below:

2.1.1 *Midget Impingers.* Two 30-ml midget impingers with a 1-mm restricted tip.

2.1.2 *Midget Bubbler.* One 30-ml midget bubbler with an unrestricted tip.

2.1.3 CO_2 *Absorber.* One 250-ml Erlenmeyer bubbler with an unrestricted tip, or equivalent.

2.2 *Sample Recovey and Analysis.* The equipment needed for sample recovery and analysis is the same as required for Method 6. In addition, a balance to measure within 0.05 g is needed for analysis.

3. *Reagents*

Unless otherwise indicated, all reagents must conform to the specifications established by the Committee on Analytical Reagents of the American Chemical Society. Where such specifications are not available, use the best available grade.

3.1 *Sampling.* The reagents required for sampling are the same as specified in Method 6, except that 80 percent isopropanol and 10 percent potassium iodide solutions are not required. In addition, the following reagents are required:

BILLING CODE 6560-26-M

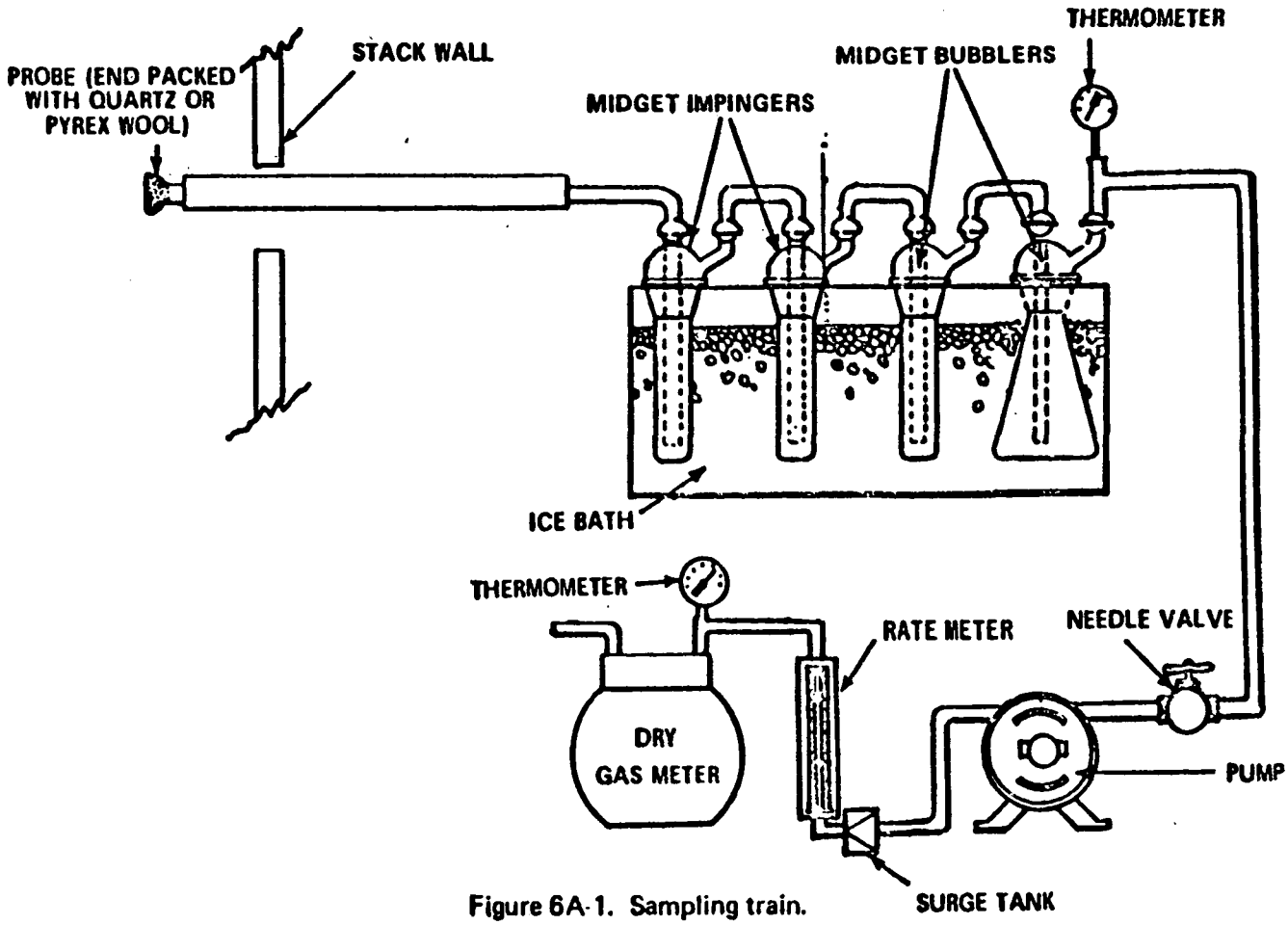

Figure 6A-1. Sampling train.

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3.1.1 *Drierite.** Anhydrous calcium sulfate ($CaSO_4$) desiccant, 8 mesh.

3.1.2. *Ascarite.* Sodium hydroxide coated asbestos for absorption of CO_2, 8 to 20 mesh.

3.2 .*Sample Recovery and Analysis.* The reagents needed for sample recovery and analysis are the same as for Method 6, Sections 3.2 and 3.3, respectively.

4. *Procedure*

4.1 *Sampling*

4.1.1 *Preparation of Collection Train.* Measure 15 ml of 3 percent hydrogen peroxide into each of the first two midget impingers. Into the midget bubbler, place about 25 g of drierite. Clean the outsides of the impingers and the drierite bubbler and weigh (at room temperature, ~ 20° C) to the nearest 0.1 g. Weigh the three vessels simultaneously and record this initial mass.

Place a small amount of glass wool in the Erlenmeyer bubbler. The glass wool should cover the entire bottom of the flask and be about 1-cm thick. Place about 100 g of ascarite on top of the glass wool and carefully insert the bubbler top. Plug the bubbler exhaust leg and invert the bubbler to remove any ascarite fom the bubbler tube. A wire may be useful in assuring that no ascarite remains in the tube. With the plug removed and the outside of the bubbler cleaned, weigh (at room temperature (at room temperature, ~ 20° C), to the nearest 0.1 g. Record this initial mass.

Assemble the train as shown in Figure 6A-1. Adjust the probe heater to a temperature sufficient to prevent water condensation. Place crushed ice and water around the impingers and bubblers.

Note.—For stack gas streams with high particulate loadings, an in-stack or heated out-of-stack glass fiber mat filter may be used in place of the glass wool plug in the probe.

4.1.2 *Leak-Check Procedure and Sample Collection.* The leak-check procedure and sample collection procedure are the same as specified in Method 6, Sections 4.1.2 and 4.1.3, respectively.

4.2 *Sample Recovery.*

4.2.1 *Moisture Measurement.* Disconnect the peroxide impingers and the drierite bubbler from the sample train. Allow time (about 10 minutes) for them to reach room temperature, clean the outsides and then weigh them simultaneously in the same manner as in Section 4.1.1. Record this final mass.

4.2.2 *Peroxide Solution.* Pour the contents of the midget impingers into a leak-free polyethylene bottle for shipping. Rinse the two midget impingers and connecting tubes with deionized distilled water, and add the washings to the same storage container.

*Mention of trade names or specific products does not constitute endorsement by the U.S. Environmental Protection Agency.

4.2.3 CO_2 *Absorber.* Allow the Erlenmeyer bubbler to warm to room temperature (about 10 minutes), clean the outside, and weigh to the nearest 0.1 g in the same manner as in Section 4.1.1. Record this final mass and discard the used ascarite.

4.3 *Sample Analysis.* The sample analysis procedure for SO_2 is the same as specified in Method 6, Section 4.3.

5. *Calibration*

The calibrations and checks are the same as required in Method 6, Section 5.

6. *Calculations*

Carry out calculations, retaining at least 1 extra decimal figure beyond that of the acquired data. Round off figures after final calculation. The calculation nomenclature and procedure are the same as specified in Method 6 with the addition of the following:

6.1 Nomenclature.

C_{H_2O} = Concentration of moisture, percent.

$co\mu$ = Concentration of CO_2, dry basis, percent.

m_{wi} = Initial mass of peroxide impingers and drierite bubbler, g.

m_{wf} = Final mass of peroxide impingers and drierite bubbler, g.

m_{ai} = Initial mass of ascarite bubbler, g.

m_{af} = Final mass of ascarite bubbler, g.

$V_{co\mu(std)}$ = Standard equivalent volume of CO_2 collected, dry basis, m^3.

6.2 CO_2 volume collected, corrected to standard conditions.

$$V_{CO_2(std)} = 5.467 \times 0^{-4}(m_{af} - m_{ai}) \quad \text{(Eq. 6A-1)}$$

6.3 Moisture volume collected, corrected to standard conditions.

$$V_{w(std)} = 1.336 \times 10^{-3} (m_{wf} - m_{wi}) \quad \text{(Eq. 6A-2)}$$

6.4 SO_2 concentration.

$$C_{SO_2} = 32.03 \frac{(V_t - V_{tb}) N(\frac{V_{soln}}{V_a})}{V_{m(std)} + V_{CO_2(std)}} \quad \text{(Eq. 6A-3)}$$

6.5 CO_2 concentration.

$$C_{CO_2} = \frac{V_{CO_2(std)}}{V_{m(std)} + V_{CO_2(std)}} \times 100 \quad \text{(Eq. 6A-4)}$$

6.6 Moisture concentration.

$$C_{H_2O} = \frac{V_{H_2O(std)}}{V_{m(std)} + V_{H_2O(std)} + V_{CO_2(std)}} \quad \text{(Eq. 6A-5)}$$

7. *Emission Rate Procedure*

If the only emission measurement desired is in terms of emission rate of SO_2 (ng/J), an abbreviated procedure may be used. The differences between Method 6A and the abbreviated procedure are described below.

7.1 *Sample Train.* The sample train is the same as shown in Figure 6A-1 and as described in Section 4, except that the dry gas meter is not needed.

7.2 *Preparation of the collection train.* Follow the same procedure as in Section 4.1.1, except that the peroxide impingers and drierite bubbler need not be weighed before or after the test run.

7.3 *Sampling.* Operate the train as described in Section 4.1.3, except that dry gas

meter readings, barometric pressure, and dry gas meter temperatures need not be recorded.

7.4 *Sample Recovery.* Follow the procedure in Section 4.2, except that the peroxide impingers and drierite bubbler need not be weighed.

7.5 *Sample Analysis.* Analysis of the peroxide solution is the same as described in Section 4.3.

7.6 Calculations.

7.6.1 SO_2 mass collected.

$$m_{SO_2} = 32.03\ (V_t - V_{tb})\ N\left(\frac{V_{soln}}{V_a}\right) \qquad \text{(Eq. 6A-7)}$$

Where:

m_{SO_2} = Mass of SO_2 collected, mg.

7.6.2 Sulfur dioxide emission rate.

$$E_{SO_2} = F_c\ (1.829 \times 10^9)\ \frac{m_{SO_2}}{(m_{af} - m_{ai})} \qquad \text{(Eq. 6A-8)}$$

Where:

$E_{SO\mu}$ = Emission rate of SO_2, ng/J.

F_c = Carbon F factor for the fuel burned, m^3/J, from Method 19.

8. *Bibliography*

8.1 Same as for Method 6, citations 1 through 8, with the addition of the following:

8.2 Stanley, Jon and P.R. Westlin. An Alternate Method for Stack Gas Moisture Determination. Source Evaluation Society Newsletter. *Volume 3, Number 4.* November 1978.

8.3 Whittle, Richard N. and P.R. Westlin. Air Pollution Test Report: Development and Evaluation of an Intermittent Integrated SO_2/CO_2 Emission Sampling Procedure. Environmental Protection Agency, Emission Standard and Engineering Division, Emission Measurement Branch. Research Triangle Park, North Carolina. December 1979. 14 pages.

Method 6B—Determination of Sulfur Dioxide and Carbon Dioxide Daily Average Emissions From Fossil Fuel Combustion Sources

1. *Applicability and Principle*

1.1 Applicability. This method applies to the determination of sulfur dioxide (SO_2) emissions form combustion sources in terms of concentration (mg/M^3) and emission rate (ng/J), and for the determination of carbon dioxide (CO_2) concentration (percent) on a daily (24 hours) basis.

The minimum detectable limit, upper limit, and the interferences for SO_2 measurements are the same as for Method 6. For a 20-liter sample, the method has a precision of 0.5 percent CO_2 for concentrations between 2.5 and 25 percent CO_2.

1.2 Principle. A gas sample is extracted from the sampling point in the stack intermittently over a 24-hour or other specified time period. Sampling may also be conducted continuously if the apparatus and procedure are modified (see the note in Section 4.1.1). The SO_2 and CO_2 are separated and collected in the sampling train. The SO_2 fraction is measured by the barium-thorin titration method and CO_2 is determined gravimetrically.

2. *Apparatus*

The equipment required for this method is the same as specified for Method 6A, Section 2, with the addition of an industrial timer-switch designed to operate in the "on" position from 3 to 5 continuous minutes and "off" the remaining period over a repeating, 2-hour cycle.

3. *Reagents*

All reagents for sampling and analysis are the same as described in Method 6A, Section 3.

4. *Procedure*

4.1 *Sampling*

4.1.1 *Preparation of Collection Train.* Preparation of the sample train is the same as described in Method 6A, Section 4.1.4 with the addition of the following:

Assemble the train as shown in Figure 6B-1. The probe must be heated to a temperature sufficient to prevent water condensation and must include a filter (either in-stack, out-of-stack, or both) to prevent particulate entrainment in the perioxide impingers. The electric supply for the probe heat should be continuous and separate from the timed operation of the sample pump.

Adjust the timer-switch to operate in the "on" position form 2 to 4 minutes on a 2-hour repeating cycle. Other timer sequences may be used provided there are at least 12 equal, evenly spaced periods of operation over 24 hours and the total sample volume is between 20 and 40 liters for the amounts of sampling reagents prescribed in this method.

Add cold water to the tank until the impingers and bubblers are covered at least two-thirds of their length. The impingers and bubbler tank must be covered and protected from intense heat and direct sunlight. If freezing conditions exist, the impinger solution and the water bath must be protected.

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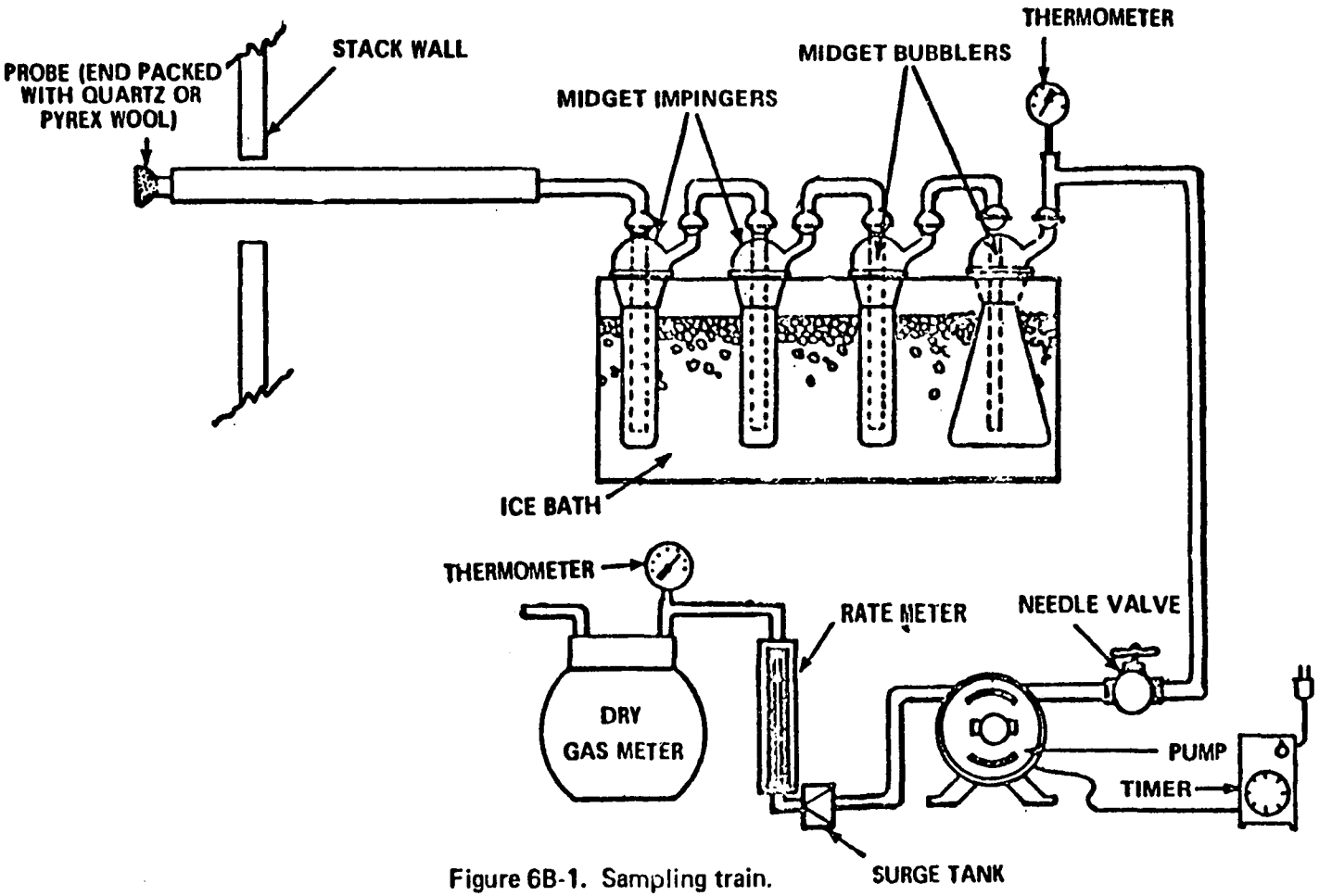

Figure 6B-1. Sampling train.

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Note.—Sampling may be conducted continuously if a low flow-rate sample pump (>24ml/min) is used. Then the timer-switch is not necessary. In addition, if the sample pump is designed for constant rate sampling, the rate meter may be deleted. The total gas volume collected should be between 20 and 40 liters for the amounts of sampling reagents prescribed in this method.

4.1.2 *Leak-Check Procedure.* The leak-check procedure is the same as describedf in Method 6, Section 4.1.2.

4.1.3 *Sample Collection.* Record the initial dry gas meter reading. To begin sampling, position the tip of the probe at the sampling point, connect the probe to the first impinger (or filter), and start the timer and the sample pump. Adjust the sample flow to a constant rate of approximately 1.0 liter/min as indicated by the rotameter. Assure that the timer is operating as intended, i.e., in the "on" position 3 to 5 minutes at 2-hour intervals, or other time interval specified.

During the 24-hour sampling period, record the dry gas meter temperature between 9:00 a.m. and 11:00 a.m., and the barometric pressure.

At the conclusion of the run, turn off the timer and the sample pump, remove the probe from the stack, and record the final gas meter volume reading. Conduct a leak check as described in Section 4.1.2. If a leak is found, void the test run or use procedures acceptable to the Administrator to adjust the sample volume for leakage. Repeat the steps in this Section (4.1.3) for successive runs.

4.2 *Sample Recovery.* The procedures for sample recovery (moisture measurement, peroxide solution, and ascarite bubbler) are the same as in Method 6A, Section 4.2.

4.3 *Sample Analysis.* Analysis of the peroxide impinger solutions is the same as in Method 6, Section 4.3.

5. *Calibration*

5.1 *Metering System.*

5.1.1 *Initial Calibration.* The initial calibration for the volume metering system is the same as for Method 6, Section 5.1.1.

5.1.2 *Periodic Calibration Check.* After 30 days of operation of the test train conduct a calibration check as in Section 5.1.1 above, except for the following variations: (1) The leak check is not be conducted, (2) three or more revolutions of the dry gas meter may be used, and (3) only two independent runs need be made. If the calibration factor does not deviate by more than 5 percent from the initial calibration factor determined in Section 5.1.1, then the dry gas meter volumes obtained during the test series are acceptable and use of the train can continue. If the calibration factor deviates by more than 5 percent, recalibrate the metering system as in Section 5.1.1; and for the calculations for the preceding 30 days of data, use the calibration factor (initial or recalibration) that yields the lower gas volume for each test run. Use the latest calibration factor for succeeding tests.

5.2 *Thermometers.* Calibrate against mercury-in-glass thermometers initially and at 30-day intervals.

5.3 *Rotameter.* The rotameter need not be calibrated, but should be cleaned and maintained according to the manufacturer's instruction.

5.4 *Barometer.* Calibrate against a mercury barometer initially and at 30-day intervals.

5.5 *Barium Perchlorate Solution.* Standardize the barium perchlorate solution against 25 ml of standard sulfuric acid to which 100 ml of 100 percent isopropanal has been added.

6. *Calculations*

The nomenclature and calculation procedures are the same as in Method 6A with the following exceptions:

P_{bar} = Initial barometric pressure for the test period, mm Hg.

T_m = Absolute meter temperature for the test period, °K.

7. *Emission Rate Procedure*

The emission rate procedure is the same as described in Method 6A, Section 7, except that the timer is needed and is operated as described in this method.

8. *Bibliography*

The bibliography is the same as described in Method 6A, Section 8.

40 CFR Part 60

[AD-FRL 1718-5]

Standards of Performance for New Stationary Sources; Appendix A—Reference Methods

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule.

SUMMARY: The purpose of this action is to propose a test method for determining total reduced sulfur from kraft pulp mills to be added to Appendix A of 40 CFR Part 60. On February 23, 1978, the Environmental Protection Agency promulgated Method 16 for total reduced sulfur compounds. Method 16 utilizes costly and complex sampling and analytical equipment. Method 16A, "Determination of Total Reduced Sulfur Emissions from Stationary Sources (Impinger Technique)," is being proposed because the procedure is simple, much cheaper to operate than Method 16, and involves fewer and less complicated components that reduces chances of measurement error. An amendment to § 60.285 of Subpart BB referencing Method 16A is also being proposed.

DATES: *Comments.* Comments must be received on or before August 17, 1981.

Public Hearing. A public hearing will be held, if requested. Persons wishing to request a public hearing must contact EPA by August 31, 1981. If a hearing is requested, an announcement of the date and place will appear in a separate **Federal Register** notice.

ADDRESSES: *Comments.* Comments should be submitted (in duplicate if possible) to: Central Docket Section (A-130), Attention: Docket Number A-80-38, U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, D.C. 20460.

Public Hearing. Persons wishing to present oral testimony should notify Mrs. Naomi Durkee, Office of the Director, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5571.

Docket. Docket Number A-80-38, containing materials relevant to this rulemaking, is available for public inspection and copying between 8:00 a.m. and 4:00 p.m., Monday through Friday, at EPA's Central Docket Section, West Tower Lobby, Gallery 1, Waterside Mall, 401 M Street S.W., Washington, D.C. 20460. A reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: Mr. Roger Shigehara, Emission Measurement Branch (MD-19), Emission Standards and Engineering Division, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone (919) 541-2237.

SUPPLEMENTARY INFORMATION: This proposed method for kraft pulp mills utilizes the impinger collection method and barium-thorin titration producer outlined in Method 6 of Appendix A. In the sample, SO_2 is first removed by a scrubber system; then the reduced sulfur compounds are oxidized to SO_2 which is subsequently collected and analyzed by Method 6. This procedure offers the following advantages over Method 16:

1. Needed testing equipment is much cheaper.

2. The method is simpler. The Method 6 collection and titration eliminates the need of instrumentation. No gas dilution system is needed.

3. Sampling can be performed on the stack.

4. Samples need not be analyzed in the field.

5. The method has few interferences.

These advantages, plus satisfactory performance during laboratory and field testing, have prompted the proposal of the procedure as an alternative method. This means that this method may be used at the discretion of the owner or operator of the affected facility to determine compliance with the standards. The owner or operator, however, should understand that Method 16A measures all reduced sulfur in contrast to the four reduced sulfur compounds specified in Method 16. Therefore, Method 16A may give higher results than Method 16. EPA, however, feels that any difference is expected to be insignificant.

When the kraft pulp mill standard was developed and originally adopted, the intent was to include all reduced sulfur compounds. But, during the emission testing program, EPA found that the four compounds—hydrogen sulfide, methyl mercaptan, dimethyl sulfide, and dimethyl disulfide—were the only significant compounds being emitted. Comments from the industry confirmed this finding. Therefore, as a practical matter, Method 16 was written to require that only the four major reduced sulfur compounds be measured. If EPA determines that other compounds are now being emitted as a result, for example, of different process conditions, EPA would consider this as an indication of the need to investigate and possibly revise the standard.

The Administrator certifies that a regulatory flexibility analysis under 5 U.S.C 601 *et seq.* is not required for this rulemaking, because the rulemaking would not have a significant impact on a substantial number of small entities. The rulemaking would not impose any new requirements; on the contrary, it would reduce the cost of demonstrating compliance with the NSPS. The Administrator has considered Executive Order 12291 and concluded that since Method 16A allows industry a less expensive alternative to the existing reference method, the costs of implementing this method do not outweigh the benefits obtained.

(Sections 114 and 301(a) of the Clean Air Act as amended [42 U.S.C. 7414, and 7601(a)])

Dated: June 12, 1981.

Anne M. Gorsuch,

Administrator.

It is proposed that in 40 CFR Part 60, § 60.285 and Appendix A be amended as follows:

1. By revising paragraph (d)(1) of § 60.285 to read as follows:

§ 60.285 Test methods and procedures.

* * * * *

(d) * * *

(1) Method 16 or, at the discretion of the owner or operator, Method 16A for the concentration of TRS.

* * * * *

2. By amending Appendix A by adding a new method as follows:

Appendix A—Reference Methods

* * * * *

Method 16A. Determination of Total Reduced Sulfur Emissions From Stationary Sources

(Impinger Technique)

1. *Applicability and Principle*—1.1 Applicability. This is an alternative method to Method 16 for determining total reduced sulfur (TRS) compounds from recovery furnaces, lime kilns, and smelt dissolving tanks at kraft pulp mills. The TRS compounds include hydrogen sulfide, methyl mercaptan, dimethyl sulfide, dimethyl disulfide, and other reduced sulfur compounds (e.g., cabonyl sulfide, if present). Therefore, Method 16A might yield higher TRS concentrations than Method 16.

The minimum detectable limit of the method has been determined to be 0.04 ppm TRS (compounds with single sulfur atom) when sampling at 2 liters/min for 60 minutes. For an analytical accuracy of at least ±5 percent, a minimum sulfur dioxide (SO_2) mass of 500 μg should be collected. The upper concentration limit of the method generally exceeds all encountered TRS levels from kraft pulp mills.

1.2 Principle. A gas sample is extracted from the sampling point in the stack. SO_2 is selectively removed from the sample using a citrate buffer solution. Then reduced sulfur compounds are oxidized and analyzed as SO_2 using the barium-thorin titration procedure of Method 6.

2. *Apparatus*—2.1 Sampling. The sampling train is shown in Figure 16A–1. The apparatus is the same as listed in Method 6, except as listed below. Other designs are acceptable provided that the sampling system meets the performance check of Section 5.

2.1.1 SO_2 Scrubber. Two midget impingers in series packed with glass wool to eliminate entrained mist and charged with potassium citrate-citric acid buffer.

2.1.2 Combustion Tube. Quartz glass with an expanded combustion chamber of 22 to 25 mm and at least 30.5 cm long. The tube ends shall have an outside diameter of about 6 mm to accept Teflon tubing or Swagelok fittings.

2.1.3 Combustion Tube Furnace. A furnace of sufficient size to enclose the combustion chamber of the combustion tube with a temperature regulator capable of maintaining the temperature at 815 ±15°C.

2.1.4 Rate Meters. Rotameters, or equivalent, capable of measuring flow rate to within 2 percent of the selected flow rate.

2.1.5 Probe Brush. Nylon bristle brush with stainless steel wire handle. The brush shall be properly sized and shaped and of sufficient length to brush out the entire length of the probe.

2.2 Sample Recovery. Same as in Method 6, Section 2.2.

2.3 Analysis. Same as in Method 6, Section 2.3, except a 10-ml buret with 0.1-ml graduations is required and the spectrophotometer is not needed.

3. *Reagents*—Unless otherwise indicated, all reagents must conform to the specifications established by the Committee on Analytical Reagents of the American Chemical Society. Where such specifications are not available, use the best available grade.

3.1 Sampling. The following reagents are needed:

3.1.1 Water. Same as Method 6, Section 3.1.1.

3.1.2 Hydrogen Peroxide, 3 percent. Same as Method 6, Section 3.1.3 (40 ml is needed per sample).

3.1.3 Citrate Buffer. Dissolve 300 g of potassium citrate (or 284 g of sodium citrate) and 41 g of anhydrou citric acid in 1 liter of deionized distilled water.

3.1.4 Calibration Gas. Hydrogen sulfide in nitrogen (30 to 50 ppm) stored in aluminum cylinders. Verify the concentration by Method 11.

3.1.5 Combustion Gas. Air or oxygen containing less than 50 ppb total sulfur compounds and less than 10 ppm total hydrocarbons.

3.2 Sample Recovery and Analysis. Deionized distilled water (as in 3.1.1) and the same reagents as in Method 6, Section 3.3, are required.

4. *Procedure*—4.1 Sampling.

4.1.1 Preparation of Collection Train. For the SO_2 scrubber, measure 20 ml citrate buffer solution into each of two midget impingers with glass wool packed in top. For the Method 6 part of the train, measure 20 ml of 3 percent hydrogen peroxide into each of the first two midget impingers. Leave the final midget impinger dry. Assemble the train as shown in figure 16A–1. Place the SO_2 scrubber as close to the stack wall as practical. Adjust the probe heater to a temperature sufficient to prevent water condensation. Maintain the oxidation furnace at 815°C. Place crushed ice and water around the impingers.

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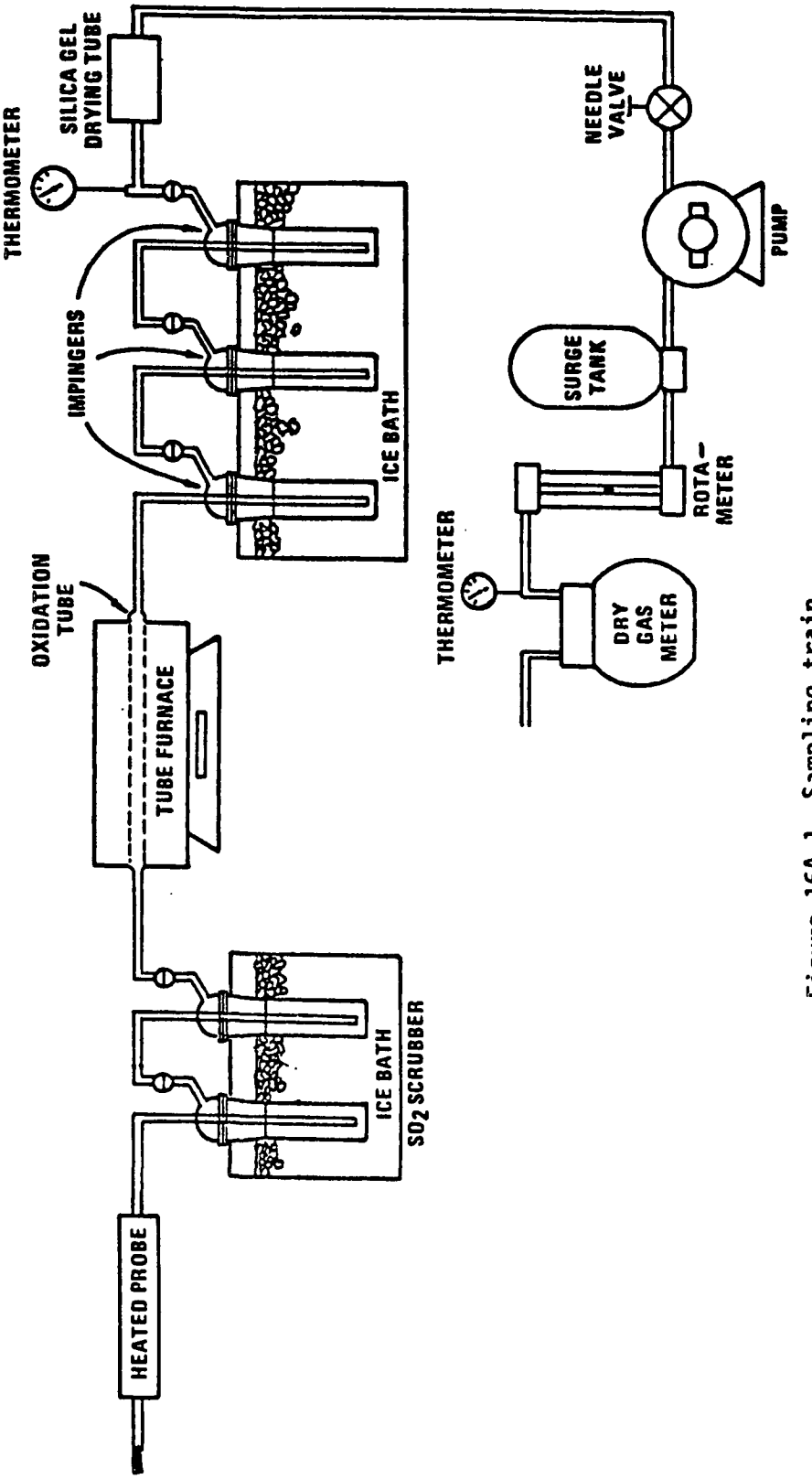

Figure 16A-1. Sampling train

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4.1.2 Leak-Check Procedure. Same as Method 6, Section 4.1.2.

4.1.3 Sample Collection. Same as Method 6, Section 4.1.3, except for the following: Adjust the sample flow to a constant rate of approximately 2.0 liters/min (±10 percent) as indicated by the rotameter. Other constant flow rates may also be used provided its acceptability is checked as in Section 5. Collect the sample for 60 minutes. The 15-minute purge of the train following collection need not be performed.

In Method 16, a sample run is composed of 16 individual analyses (injects) performed over a period of not less than 3 hours or more than 6 hours. For Method 16A to be consistent with Method 16, the following may be used to obtain a sample run: (1) collect three 60-minute samples or (2) collect one 3-hour sample with a total gas sample volume of 120 liters either intermittently (equal samples, equally spaced) or continuously over 3 hours.

After collecting the sample, disconnect the probe and tubing from the SO_2 scrubber and allow to cool. Before conducting the next run, do the following. Clean the inside surface of the probe using a nylon brush and deionized distilled water from a wash bottle until the rinse shows no visible particles. Replace the probe filter. Thoroughly rinse the sample line connecting the probe to the scrubber until all visible particles are removed.

4.2 Sample Recovery. Disconnect the impingers. Replace the SO_2 scrubber contents and the glass wool if saturated with solution for subsequent runs. Pour the contents of the midget impingers of the Method 6 part of the train into a leak-free polyethylene bottle for shipment. Rinse the three midget impingers, the connecting tubes, and the sample line between the furnace and the first impinger with deionized distilled water, and add the washings to the same storage container. Mark the fluid level. Seal and identify the sample container.

4.3 Sample Analysis. Note level of liquid in container, and confirm whether any sample was lost during shipment; note this on analytical data sheet. If a noticeable amount of leakage has occurred, either void the sample or use methods, subject to the approval of the Administrator, to correct the final results.

Transfer the contents of the storage container to a 100-ml graduated cylinder. Rinse the container with deionized distilled water and add to the cylinder. Measure the volume, and pour into a 250-ml Erlenmeyer flask. Using the cylinder, add sufficient 100 percent isopropanol to give a final sample concentration of 80 percent (v/v) isopropanol. Add four to six drops of thorin indicator and titrate to a pink end point using 0.0100N barium perchlorate. Run a blank with each series of samples.

Note.—Protect the 0.0100 N barium perchlorate solution from evaporation at all times.

5. *Calibration*—5.1 Metering System, Thermometers, Rotameters, Barometer, and Barium Perchlorate Solution. Follow the same calibration procedure as in Method 6, Sections 5.1 to 5.5, respectively.

5.2 System Performance Check. Using H_2S cylinder gas and combustion gas (as specified in Sections 3.1.4 and 3.1.5), generate a series of samples in the suspected concentration range of TRS in the stack. Using the set-up shown in Figure 16A-2, take at least two 30-minute samples to determine system performance efficiency. Use the cylinder regulator to set the combustion gas rotameter flow rate to the desired level. Adjust the H_2S regulator to a slightly higher than desired flow rate to ensure excess gas for the system. With the pump valve completely closed, turn on the pump and open the valve slowly until a 2 liter/min flow rate (or other selected flow rate) is obtained. Observe the pressure control vessel while opening the valve and during the sampling run to maintain an excess flow. The samples must be transported through the entire sampling system in the normal manner. Compare the resulting measured concentration to the known concentration by subtracting the corrected volume of combustion gas from the corrected total sample volume and treating as in Section 6.3. The sampling system is considered acceptable when two consecutive samples of calibration gas produce results which do not vary by more than ±5 percent from their mean, and this mean value is within ±15 percent of the known value.

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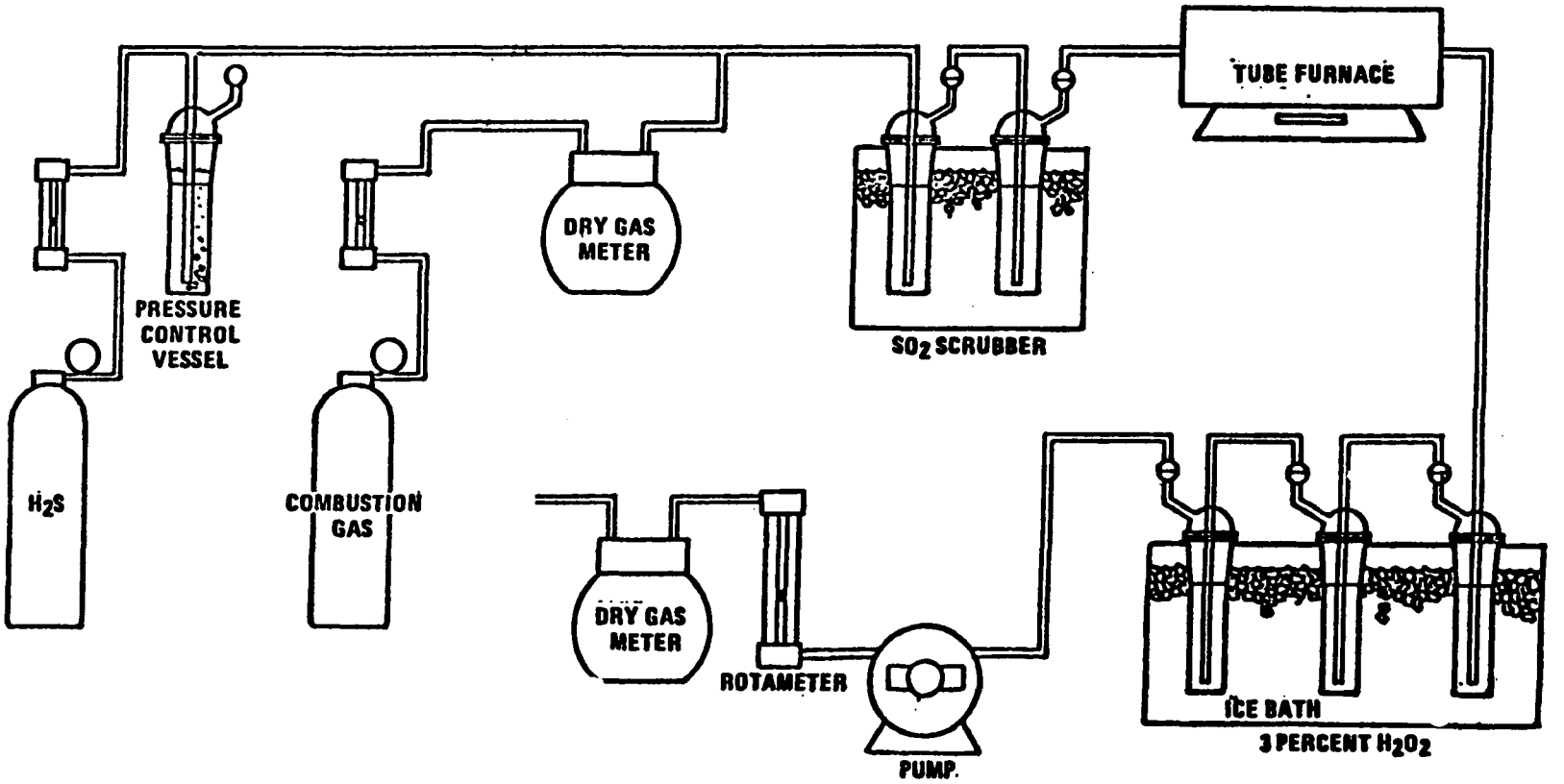

Figure 16A-2. Calibration System

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Conduct this performance check before the test to validate the test procedure, sampling system and tester. In addition, field validation samples shall be taken to monitor losses in the probe due to absorption by stack components. Perform this test by collecting a known H_2S sample (in the applicable concentration range) after each third field sample and before cleaning the probe. Introduce the gas into the probe and collect in the usual manner. The obtained concentration shall be within ±15 percent of the known value. Otherwise, void the previous three samples or make corrections by dividing the sample concentration by the fraction of recovery if the losses are between 0–20 percent. Substitute a field audit sample for one known sample during the collection period if available. Such audit samples are usually available from the Quality Assurance Division, Environmental Monitoring Systems Laboratory, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711.

6. *Calculations*—Carry out calculations, retaining at least one extra decimal figure beyond that of the acquired data. Round off figures after final calculation.

6.1 Standard Dry Sample Gas Volume. Using Equation 6–1 of Method 6, calculate the dry sample gas volume $V_{m(std)}$ at standard conditions.

6.2 TRS Concentration as SO_2. Calculate the TRS concentration in ppm as SO_2 by using Equation 6–2 of Method 6, except use $KSO_2 = 12.020\mu/meq$.

7. *Bibliography*—7.1 Curtis, F. and G.D. McAlister. Development and Evaluation of an Oxidation/Method 6 TRS Emission Sampling Procedure. Emission Measurement Branch, Emission Standards and Engineering Division, OAQPS, Environmental Protection Agency, Research Triangle Park, North Carolina 27711. February 1980.

7.2 Blosser, R.O., H.S. Oglesby, and A.K. Jain. A Study of Alternate SO_2 Scrubber Designs Used for TRS Monitoring. A Special Report by the National Council of the Paper Industry for Air and Stream Improvement, Inc., New York, N.Y. July 1977.

7.3 Gellma, I. A Laboratory and Field Study of Reduced Sulfur Sampling and Monitoring Systems. Atmospheric Quality Improvement Technical Bulletin No. 81. National Council of the Paper Industry for Air and Stream Improvement, Inc., New York, N.Y. October 1975.

7.4 Annual Book of ASTM Standards. Part 31; Water, Atmospheric Analysis. American Society for Testing and Materials. Philadelphia, Pennsylvania, 1974. pp. 40–42.

[FR Doc. 81-18096 Filed 6-17-81; 8:45 am]
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ENVIRONMENTAL PROTECTION AGENCY

■

STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

CONTINUOUS MONITORING PERFORMANCE SPECIFICATIONS

APPENDIX B

40 CFR Part 60

[FRL 1276-4]

Standards of Performance for New Stationary Sources; Continuous Monitoring Performance Specifications

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed Revisions.

SUMMARY: On October 6, 1975 (40 FR 46250), the EPA promulgated revisions to 40 CFR Part 60, Standards of Performance for New Stationary Sources, to establish specific requirements pertaining to continuous emission monitoring. An appendix to the regulation contained Performance Specifications 1 through 3, which detailed the continuous monitoring instrument performance and equipment specifications, installation requirements, and test and data computation procedures for evaluating the acceptability of continuous monitoring systems. Since the promulgation of these performance specifications, the need for a number of changes which would clarify the specification test procedures, equipment specifications, and monitoring system installation requirements has become apparent. The purpose of the revisions is to incorporate these changes into Performance Specifications 1 through 3.

The proposed revisions would apply to all monitoring systems currently subject to performance specifications 1, 2, or 3, including sources subject to Appendix P to 40 CFR Part 51.

DATES: Comments must be received on or before December 10, 1979.

ADDRESSES: *Comments.* Comments should be submitted (in duplicate if possible) to the Central Docket Section (A-130), Attn: Docket No. OAQPS-79-4, U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, D.C. 20460.

Docket. Docket No. OAQPS-79-4, containing material relevant to this rulemaking, is located in the U.S. Environmental Protection Agency, Central Docket Section, Room 2903B, 401 M Street, S.W., Washington, D.C. The docket may be inspected between 8 A.M. and 4 P.M. on weekdays, and a reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: Don R. Goodwin, Director, Emission Standards and Engineering Division (MD-13), Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5271.

SUPPLEMENTARY INFORMATION: Changes common to all three of the performance specifications are the clarification of the procedures and equipment specifications, especially the requirement for intalling the continuous monitoring sample interface and of the calculation procedure for relative accuracy. Specific changes to the specifications are as follows:

Performance Specification

1. The optical design specification for mean and peak spectral responses and for the angle of view and projection have been changed from "500 to 600 nm" range to "515 to 585 nm" range and from "5°" to "3°", respectively.

2. The following equipment specifications have been added:

a. Optical alignment sight indicator for readily checking alignment.

b. For instruments having automatic compensation for dirt accumulation on exposed optical surfaces, a compensation indicator at the control panel so that the permissible maximum 4 percent compensation can be determined.

c. Easy access to exposed optical surfaces for cleaning and maintenance.

d. A system for checking zero and upscale calibration (previously required in paragraph 60.13).

e. For systems with slotted tubes, a slotted portion greater than 90 percent of effluent pathlength (shorter slots are permitted if shown to be equivalent).

f. An equipment specification for the monitoring system data recorder resolution of <5 percent of full scale.

3. A procedure for determining the acceptability of the optical alignment sight has been specified; the optical alignment sight must be capable of indicating that the instrument is misaligned when an error of ± 2 percent opacity is caused by misalignment of the instrument at a pathlength of 8 meters.

4. Procedures for calibrating the attenuators used during instrument calibrations have been added; these procedures require the use of a laboratory spectrophotometer operating in the 400–700 nm range with a detector angle view of <10 degrees and an accuracy of 1 percent.

5. The following changes have been made to the procedures for the operational test period:

a. The requirement for an analog strip chart recorder during the performance tests has been deleted; all data are collected on the monitoring system data recorder.

b. Adjustment of the zero and span at 24-hour intervals during the drift tests is optional; adjustments are required only when the accumulated drift exceeds the 24-hour drift specification.

c. The amount of automatic zero compensation for dirt accumulation must be determined during the 24-hour zero check so that the actual zero drift can be quantified. The automatic zero compensation system must be operated during the performance test.

d. The requirement for offsetting the data recorder zero during the operational test period has been deleted.

e. Off the stack "zero alignment" of the instrument prior to installation is permitted.

Performance Specification 2

1. "Continuous monitoring system" has been redefined to include the diluent monitor, if applicable. The change requires that the relative accuracy of the system be determined in terms of the emission standard, e.g., mass per unit calorific value for fossil-fuel fired steam generators.

2. The applicability of the test procedures excludes single-pass, in-situ continuous monitoring systems. The procedures for determining the acceptability of these systems are evaluated on a case-by-case basis.

3. For extractive systems with diluent monitors, the pollutant and diluent monitors are required to use the same sample interface.

4. The procedure for determining the acceptability of the calibration gases has been revised, and the 20 percent (with 95 percent confidence interval) criterion has been changed to 5 percent of mean value with no single value being over 10 percent from the mean.

5. For low concentrations, a 10 percent of the applicable standard limitation for the relative accuracy has been added.

6. An equipment specification for the system data recorder requiring that the chart scale be readable to within <0.50 percent of full-scale has been added.

7. Instead of spanning the instrument at 90 percent of full-scale, a mid-level span is required.

8. The response time test procedure has been revised and the difference limitation between the up-scale and down-scale time has been deleted.

9. The relative accuracy test procedure has been revised to allow different tests (e.g., pollutant, diluent, moisture) during a 1-hour period to be correlated.

10. A low-level drift may be substituted for the zero drift test.

Performance Specification 3

1. The applicability of the test procedures has been limited to those monitors that introduce calibration gases directly into the analyzer and are used as diluent monitors. Alternative procedures for other types of monitors are evaluated on a case-by-case basis.

2. Other changes were made to be consistent with the revisions under Performance Specification 2.

The proposed revised performance specifications would apply to all sources subject to Performance Specifications 1, 2, or 3. These include sources subject to standards of performance that have already been promulgated and sources subject to Appendix P to 40 CFR Part 51. Since the purpose of these revisions is to clarify the performance specifications which were promulgated on October 6, 1975, not to establish more stringent requirements, it is reasonable to conclude that most continuous monitoring instruments which met and can continue to meet the October 6, 1975, specifications can also meet the revised specifications.

Under Executive Order 12044, the Environmental Protection Agency is required to judge whether a regulation is "significant" and therefore subject to the procedural requirements of the Order or whether it may follow other specialized development procedures. EPA labels these other regulations "specialized". I have reviewed this regulation and determined that it is a specialized regulation not subject to the procedural requirements of Executive Order 12044.

Dated: October 1, 1979.

Douglas M. Costle,

Administrator.

It is proposed to revise Appendix B, Part 60 of Chapter I, Title 40 of the Code of Federal Regulations as follows:

Appendix B—Performance Specifications

Performance Specification 1—Specifications and Test Procedures For Opacity Continuous Monitoring Systems in Stationary Sources

1. Applicability and Principle

1.1 Applicability. This Specification contains instrument design, performance, and installation requirements, and test and data computation procedures for evaluating the acceptability of continuous monitoring systems for opacity. Certain design requirements and test procedures established in the Specification may not be applicable to all instrument designs; equivalent systems and test procedures may be used with prior approval by the Administrator.

1.2 Principle. The opacity of particulate matter in stack emissions is continuously monitored by a measurement system based upon the principle of transmissometry. Light having specific spectral characteristics is projected from a lamp through the effluent in the stack or duct and the intensity of the projected light is measured by a sensor. The projected light is attenuated due to absorption and scatter by the particulate matter in the effluent; the percentage of visible light attenuated is defined as the opacity of the emission. Transparent stack emissions that do not attenuate light will have a transmittance of 100 percent or an opacity of zero percent. Opaque stack emissions that attenuate all of the visible light will have a transmittance of zero percent or an opacity of 100 percent.

This specification establishes specific design criteria for the transmissometer system. Any opacity continuous monitoring system that is expected to meet this specification is first checked to verify that the design specifications are met. Then, the opacity continuous monitoring system is calibrated, installed, an operated for a specified length of time. During this specified time period, the system is evaluated to determine conformance with the established performance specifications.

2. Definitions

2.1 Continuous Monitoring System. The total equipment required for the determination of opacity. The system consists of the following major subsystems:

2.1.1 Sample Interface. That portion of the system that protects the analyzer from the effects of the stack effluent and aids in keeping the optical surfaces clean.

2.1.2 Analyzer. That portion of the system that senses the pollutant and generates a signal output that is a function of the opacity.

2.1.3 Data Recorder. That portion of the system that processes the analyzer output and provides a permanent record of the output signal in terms of opacity. The data recorder may include automatic data reduction capabilities.

2.2 Transmissometer. That portion of the system that includes the sample interface and the analyzer.

2.3 Transmittance. The fraction of incident light that is transmitted through an optical medium.

2.4 Opacity. The fraction of incident light that is attenuated by an optical medium. Opacity (Op) and transmittance (Tr) are related by: $Op = 1 - Tr$.

2.5 Optical Density. A logarithmic measure of the amount of incident light attenuated. Optical density (D) is related to the transmittance and opacity as follows:

$D = -\log_{10} Tr = -\log_{10} (1 - Op)$.

2.6 Peak Spectral Response. The wavelength of maximum sensitivity of the transmissometer.

2.7 Mean Spectral Response. The wavelength which bisects the total area under the effective spectral response curve of the transmissometer.

2.8 Angle of View. The angle that contains all of the radiation detected by the photodetector assembly of the analyzer at a level greater than 2.5 percent of the peak detector response.

2.9 Angle of Projection. The angle that contains all of the radiation projected from the lamp assembly of the analyzer at a level of greater than 2.5 percent of the peak illuminace.

2.10 Span Value. The opacity value at which the continuous monitoring system is set to produce the maximum data display output as specified in the applicable subpart.

2.11 Upscale Calibration Value. The opacity value at which a calibration check of the monitoring system is performed by simulating an upscale opacity condition as viewed by the receiver.

2.12 Calibration Error. The difference between the opacity values indicated by the continuous monitoring system and the known values of a series of calibration attenuators (filters or screens).

2.13 Zero Drift. The difference in continuous monitoring system output readings before and after a stated period of normal continuous operation during which no unscheduled maintenance, repair, or adjustment took place and when the opacity (simulated) at the time of the measurements was zero.

2.14 Calibration Drift. The difference in the continuous monitoring system output readings before and after a stated period of normal continuous operation during which no unscheduled maintenance, repair, or adjustment took place and when the opacity (simulated) at the time of the measurements was the same known upscale calibration value.

2.15 Response Time. The amount of time it takes the continuous monitoring system to display on the data recorder 95 percent of a step change in opacity.

2.16 Conditioning Period. A period of time (168 hours minimum) during which the continuous monitoring system is operated without unscheduled maintenance, repair, or adjustment prior to initiation of the operational test period.

2.17 Operational Test Period. A period of time (168 hours) during which the continuous monitoring system is expected to operate within the established performance specifications without any unscheduled maintenance, repair, or adjustment.

2.18 Pathlength. The depth of effluent in the light beam between the receiver and the transmitter of a single-pass transmissometer, or the depth of effluent between the transceiver and reflector of a double-pass transmissometer. Two pathlengths are referenced by this Specification as follows:

2.18.1 Monitor Pathlength. The pathlength at the installed location of the continuous monitoring system.

2.18.2 Emission Outlet Pathlength. The pathlength at the location where emissions are released to the atmosphere.

3. Apparatus

3.1 Continuous Monitoring System. Use any continuous monitoring system for opacity which is expected to meet the design specifications in Section 5 and the performance specifications in Section 7. The data recorder may be an analog strip chart recorder type or other suitable device with an input signal range compatible with the analyzer output.

3.2 Calibration Attenuators. Use optical filters with neutral spectral characteristics or screens known to produce specified optical densities to visible light. The attenuators must be of sufficient size to attenuate the entire light beam of the transmissometer. Select and calibrate a minimum of three attenuators according to the procedures in Sections 8.1.2. and 8.1.3.

3.3 Upscale Calibration Value Attenuator. Use an optical filter with neutral spectral characteristics, a screen, or other device that produces an opacity value (corrected for pathlength, if necessary) that is greater than the sum of the applicable opacity standard and one-fourth of the difference between the opacity standard and the instrument span value, but less than the sum of the opacity standard and one-half of the difference between the opacity standard and the instrument span value.

3.4 Calibration Spectrophotometer. To calibrate the calibration attenuators use a laboratory spectrophotometer meeting the following minimum design specification:

Parameter	Specification
Wavelength range	400–700 nm
Detector angle of view	≤ 10°
Accuracy	≤ 0.5 pct. transmittance

4. Installation Specifications

Install the continuous monitoring system where the opacity measurements are representative of the total emissions from the affected facility. Use a measurement path that represents the average opacity over the cross section. Those requirements can be met as follows:

4.1 Measurement Location. Select a measurement location that is (a) downstream from all particulate control equipment; (b) where condensed water vapor is not present; (c) accessible in order to permit routine maintenance; and (d) free of interference from ambient light (applicable only if transmissometer is responsive to ambient light).

4.2 Measurement Path. Select a measurement path that passes through the centroid of the cross section. Additional requirements or modifications must be met for certain locations as follows:

4.2.1 If the location is in a straight vertical section of stack or duct and is less than 4 equivalent diameters downstream or 1 equivalent diameter upstream from a bend, use a path that is in the plane defined by the bend.

4.2.2 If the location is in a vertical section of stack or duct and is less than 4 diameters downstream and 1 diameter upstream from a bend, use a path in the plane defined by the bend upstream of the transmissometer.

4.2.3 If the location is in a horizontal section of duct and is at least 4 diameters downstream from a vertical bend, use a path in the horizontal plane that is one-third the distance up the vertical axis from the bottom of the duct.

4.2.4 If the location is in a horizontal section of duct and is less than 4 diameters downstream from a vertical bend, use a path in the horizontal plane that is two-thirds the distance up the vertical axis from the bottom of the duct for upward flow in the vertical section, and one-third the distance up the vertical axis from the bottom of the duct for downward flow.

4.3 Alternate Locations and Measurement Paths. Other locations and measurement paths may be selected by demonstrating to the Administrator that the average opacity measured at the alternate location or path is equivalent (± 10 percent) to the opacity as measured at a location meeting the criteria of Sections 4.1 and 4.2. To conduct this demonstration, measure the opacities at the two locations or paths for a minimum period of two hours. The opacities of the two locations or paths may be measured at different times, but must be measured at the same process operating conditions.

5. Design Specifications

Continuous monitoring systems for opacity must comply with the following design specifications:

5.1 Optics.

5.1.1 Spectral Response. The peak and mean spectral responses will occur between 515 nm and 585 nm. The response at any wavelength below 400 nm or above 700 nm will be less than 10 percent of the peak spectral response.

5.1.2 Angle of View. The total angle of view will be no greater than 4 degrees.

5.1.3 Angle of Projection. The total angle of projection will be no greater than 4 degrees.

5.2 Optical Alignment sight. Each analyzer will provide some method for visually determining that the instrument is optically aligned. The system provided will be capable of indicating that the unit is misaligned when an error of ± 2 percent opacity occurs due to misalignment at a monitor pathlength of eight (8) meters.

5.3 Simulated Zero and Upscale Calibration System. Each analyzer will include a system for simulating a zero opacity and an upscale opacity value for the purpose of performing periodic checks of the transmissometer calibration while on an operating stack or duct. This calibration system will provide, as a minimum, a system check of the analyzer internal optics and all electronic circuitry including the lamp and photodetector assembly.

5.4 Access to External Optics. Each analyzer will provide a means of access to the optical surfaces exposed to the effluent stream in order to permit the surfaces to be cleaned without requiring removal of the unit from the source mounting or without requiring optical realignment of the unit.

5.5 Automatic Zero Compensation Indicator. If the monitoring system has a feature which provides automatic zero compensation for dirt accumulation on exposed optical surfaces, the system will also provide some means of indicating that a compensation of 4 ± 0.5 percent opacity has been exceeded; this indicator shall be at a location accessible to the operator (e.g., the data output terminal). During the operational test period, the system must provide some means for determining the actual amount of zero compensation at the specified 24-hour intervals so that the actual 24-hour zero drift can be determined (see Section 8.4.1).

5.6 Slotted Tube. For transmissometers that use slotted tubes, the length of the slotted portion(s) must

be equal to or greater than 90 percent of the monitor pathlength, and the slotted tube must be of sufficient size and orientation so as not to interfere with the free flow of effluent through the entire optical volume of the transmissometer photodetector. The manufacturer must also show that the transmissometer uses appropriate methods to minimize light reflections; as a minimum, this demonstration shall consist of laboratory operation of the transmissometer both with and without the slotted tube in position. Should the operator desire to use a slotted tube design with a slotted portion equal to less than 90 percent of the monitor pathlength, the operator must demonstrate to the Administrator that acceptable results can be obtained. As a minimum demonstration, the effluent opacity shall be measured using both the slotted tube instrument and another instrument meeting the requirement of this specification but not of the slotted tube design. The measurements must be made at the same location and at the same process operating conditions for a minimum period of two hours with each instrument. The shorter slotted tube may be used if the average opacity measured is equivalent (± 10 percent) to the opacity measured by the non-slotted tube design.

6. Optical Design Specifications Verifciation Procedure.

These procedures will not be applicable to all designs and will require modification in some cases; all modifications are subject to the approval of the Administrator.

Test each analyzer for conformance with the design specifications of Sections 5.1 and 5.2 or obtain a certificate of conformance from the analyzer manufacturer as follows:

6.1 Spectral Response. Obtain detector response, lamp emissivity and filter transmittance data for the components used in the measurement system from their respective manufacturers.

6.2 Angle of View. Set up the receiver as specified by the manufacturer's written instructions. Draw an arc with radius of 3 meters in the horizontal direction. Using a small (less than 3 centimeters) non-directional light source, measure the receiver response at 4-centimeter intervals on the arc for 24 centimeters on either side of the detector centerline. Repeat the test in the vertical direction.

6.3 Angle of Projection. Set up the projector as specified by the manufacturer's written instructions. Draw an arc with radius of 3 meters in the horizontal direction. Using a small (less than 3 centimeters) photoelectric light detector, measure the light intensity at 4-centimeter intervals on the arc for 24 centimeters on either side of the light source centerline of projection. Repeat the test in the vertical direction.

6.4 Optical Alignment Sight. In the laboratory set up the instrument as specified by the manufacturers written instructions for a monitor pathlength of 8 meters. Assure that the instrument has been properly aligned and that a proper zero and span have been obtained. Insert an attenuator of 10 percent (nominal) opacity into the instrument pathlength. Slowly misalign the projector unit until a positive or negative shift of two percent opacity is obtained by the data recorder. Then, following the manufacturer's written instructions, check the alignment and assure that the alignment procedure does in fact indicate that the instrument is misaligned. Realign the instrument and follow the same procedure for checking misalignment of the receiver or retroreflector unit.

6.5 Manufacturer's Certificate of Conformance (Alternative to above). Obtain from the manufacturer a certificate of conformance which certifies that the first analyzer randomly sampled from each month's production was tested according to Sections 6.1 through 6.3 and satisfactorily met all requirements of Section 5 of this Specification. If any of the requirements were not met, the certificate must state that the entire month's analyzer production was resampled according to the military standard 105D sampling procedure (MIL-STD-105D) inspection level II; was retested for each of the applicable requirements under Section 5 of this Specification; and was determined to be acceptable under MIL-STD-105D procedures, acceptable quality level 1.0. The certificate of conformance must include the results of each test performed for the analyzer(s) sampled during the month the analyzer being installed was produced.

7. Performance Specifications

The opacity continuous monitoring system performance specifications are listed in Table 1-1.

Table 1-1.—*Performance specifications*

Parameter	Specifications
1. Calibration error [a]	≤ 3 pct opacity.
2. Response time	≤ 10 seconds.
3 Conditioning period [b]	≥ 168 hours.
4 Operational test period [b]	≥ 168 hours.
5 Zero drift (24-hour) [a]	≤ 2 pct opacity.
6. Calibration drift (24-hour) [a]	≤ 2 pct opacity.
7. Data recorder resolution	≤ 0.50 pct of full scale span value.

[a] Expressed as sum of absolute mean and the 95 percent confidence interval.

[b] During the conditioning and operational test periods, the continuous monitoring system shall not require any corrective maintenance, repair, replacement, or adjustment other than that clearly specified as routine and required in the operation and maintenance manuals.

8. Performance Specification Verification Procedure

Test each continuous monitoring system that conforms to the design specifications (Section 5) using the following procedures to determine conformance with the performance specifications of Section 7.

8.1 Preliminary Adjustments and Tests. Prior to installation of the system on the stack, perform these steps or tests at the affected facility or in the manufacturer's laboratory.

8.1.1 Equipment Preparation. Set up and calibrate the monitoring system for the monitor pathlength to be used in the installation as specified by the manufacturer's written instructions. If the monitoring system has automatic pathlength adjustment, follow the manufacturer's instructions to adjust the signal output from the analyzer to equivalent values based on the emission outlet pathlength. Set the span at the value specified in the applicable subpart. At this time perform the zero alignment by balancing the response of the continuous monitoring system so that the simulated zero check coincides with the actual zero check performed across the simulated monitor pathlength. Then, assure that the upscale calibration value is within the required opacity range (Section 3.3).

8.1.2 Calibrated Attenuator Selection. Based on the span value specified in the applicable subpart, select a minimum of three calibrated attenuators (low, mid, and high range) using Table 1-2. If the system is operating with automatic pathlength compensation, calculates the attenuator values required to obtain a system response equivalent to the applicable values shown in Table 1-2; use equation 1-1 for the conversion. A series of filters with nominal optical density (opacity) values of 0.1(20), 0.2(37), 0.3(50), 0.4(60), 0.5(68), 0.6(75), 0.7(80), 0.8(84), 0.9(88), and 1.0(90) are commercially available. Within this limitation of filter availability, select the calibrated

attenuators having the values given in Table 1-2 or having values closest to those calculated by Equation 1-1.

Table 1-2.—*Required Calibrated Attenuator Values (Nominal)*

Span value (percent opacity)	Calibrated attenuator optical density (equivalent opacity in parenthesis)		
	Low-range D_2	Mid-range	High-range
50	0.1 (20)	0.2 (37)	0.3 (50)
60	.1 (20)	.2 (37)	.3 (50)
70	.1 (20)	.3 (50)	.4 (60)
80	.1 (20)	.3 (50)	.6 (75)
90	.1 (20)	.4 (60)	.7 (80)
100	.1 (20)	.4 (60)	.9 (87½)

$$D_1 = D_2 (L_1/L_2) \qquad \text{Equation 1-1}$$

Where:

D_1 = Nominal optical density value of required mid, low, or high range calibration attenuators.

D_2 = Desired attenuator optical density output value from Table 1-2 at the span required by the applicable subpart.

L_1 = Monitor pathlength.

L_2 = Emission outlet pathlength.

8.1.3 Attenuator Calibration. Calibrate the required filters or screens using a laboratory spectrophotometer meeting the specifications of Section 3.4 to measure the transmittance in the 400 to 700 nm wavelength range; make measurements at wavelength intervals of 20 nm or less. As an alternate procedure use an instrument meeting the specifications of Section 3.4 to measure the C.I.E. Daylight$_C$ Luminous Transmittance of the attenuators. During the calibration procedure assure that a minimum of 75 percent of the total area of the attenuator is checked. The attenuator manufacturer must specify the period of time over which the attenuator values can be considered stable, as well as any special handling and storing procedures required to enhance attenuator stability. To assure stability, attenuator values must be rechecked at intervals less than or equal to the period of stability guaranteed by the manufacturer. However, values must be rechecked at least every 3 months. If desired, these stability checks may be performed on an instrument other than that initially used for the attenuator calibration (Section 3.4). However, if a different instrument is used, the instrument shall be a high quality laboratory transmissometer or spectrophotometer and the same instrument shall always be used for the stability checks. If a secondary instrument is to be used for stability checks, the value of the calibrated attenuator shall be measured on this secondary instrument immediately following calibration and prior to being used. If over a period time an attenuator value changes by more than ±2 percent opacity, it shall be recalibrated or replaced by a new attenuator.

If this procedure is conducted by the filter or screen manufacturer or independent laboratory, obtain a statement certifying the values and that the specified procedure, or equivalent, was used.

8.1.4 Calibration Error Test. Insert the calibrated attenuators (low, mid, and high range) in the transmissometer path at or as near to the midpoint as feasible. The attenuator must be placed in the measurement path at a point where the effluent will be measured; i.e., do not place the calibrated attenuator in the instrument housing. While inserting the attenuator, assure that the entire projected beam will pass through the attenuator and that the attenuator is inserted in a manner which minimizes interference from reflected light. Make a total of five nonconsecutive readings for each filter. Record the monitoring system output readings in percent opacity (see example Figure 1-1).

8.1.5 *System Response Test.* Insert the high-range calibrated attenuator in the transmissometer path five times and record the time required for the system to respond to 95 percent of final zero and high-range filter values (see example Figure 1-2).

8.2 Preliminary Field Adjustments. Install the continuous monitoring system on the affected facility according to the manufacturer's written instructions and perform the following preliminary adjustments:

8.2.1 Optical and Zero Alignment. When the facility is not in operation, conduct the optical alignment by aligning the light beam from the transmissometer upon the optical surface located across the duct or stack (i.e., the retroflector or photodetector, as applicable) in accordance with the manufacturer's instructions. Under clear stack conditions, verify the zero alignment (performed in Section 8.1.1) by assuring that the monitoring system response for the simulated zero check coincides with the actual zero measured by the transmissometer across the clear stack. Adjust the zero alignment, if necessary. Then, after the affected facility has been started up and the effluent stream reaches normal operating temperature, recheck the optical alignment. If the optical alignment has shifted realign the optics.

8.2.2 Optical and Zero Alignment (Alternative Procedure). If the facility is already on line and a zero stack condition cannot practicably be obtained, use the zero alignment obtained during the preliminary adjustments (Section 8.1.1) prior to installation of the transmissometer on the stack. After completing all the preliminary adjustments and tests required in Section 8.1, install the system at the source and align the optics, i.e., align the light beam from the transmissometer upon the optical surface located across the duct or stack in accordance with the manufacturer's instruction. The zero alignment conducted in this manner shall be verified and adjusted, if necessary, the first time the facility is not in operation after the operational test period has been completed.

8.3 Conditioning Period. After completing the preliminary field adjustments (Section 8.2), operate the system according to the manufacturer's instructions for an initial conditioning period of not less than 168 hours while the source is operating. Except during times of instrument zero and upscale calibration checks, the continuous monitoring system will analyze the effluent gas for opacity and produce a permanent record of the continuous monitoring system output. During this conditioning period there shall be no unscheduled maintenance, repair, or adjustment. Conduct daily zero calibration and upscale calibration checks, and, when accumulated drift exceeds the daily operating limits, make adjustments and/or clean the exposed optical surfaces. The data recorder shall reflect these checks and adjustments. At the end of the operational test period, verify that the instrument optical alignment is correct. If the conditioning period is interrupted because of source breakdown (record the dates and times of process shutdown), continue the 168-hour period following resumption of source operation. If the conditioning period is interrupted because of monitor failure, restart the 168-hour conditioning period when the monitor becomes operational.

8.4 Operational Test Period. After completing the conditioning period operate the system for an additional 168-hour period. It is not necessary that the 168-hour operational test period immediately follow the 168-hour conditioning period. Except during times of instrument zero and upscale calibration checks, the continuous monitoring system will analyze the effluent gas for opacity and will produce a permanent record of the continuous monitoring system output. During this period, there will be no unscheduled maintenance, repair, or adjustment. Zero and calibration adjustments, optical surface cleaning, and optical realignment may be performed (optional) only at 24-hour intervals or at

such shorter intervals as the manufacturer's written instructions specify. Automatic zero and calibration adjustments made by the monitoring system without operator intervention or initiation are followable at any time. If the operational test period is interrupted because of source breakdown, continue the 168-hour period following resumption of source operation. If the test period is interrupted because of monitor failure, restart the 168-hour period when the monitor becomes operational. During the operational test period, perform the following test procedures:

8.4.1 Zero Drift Test. At the outset of the 168-hour operational test period, record the initial simulated zero and upscale opacity readings (see example Figure 1-3). After each 24-hour interval check and record the final zero reading before any optional or required cleaning and adjustment. Zero and upscale calibration adjustments, optical surface cleaning, and optical realignment may be performed only at 24-hour intervals (or at such shorter intervals as the manufacturer's written instructions specify) but are optional. However, adjustments and/or cleaning must be performed when the accumulated zero calibration or upscale calibration drift exceeds the 24-hour drift specifications (±2 percent opacity). If no adjustments are made after the zero check the final zero reading is recorded as the initial reading for the next 24-hour period. If adjustments are made, the zero value after adjustment is recorded as the initial zero value for the next 24-hour period. If the instrument has an automatic zero compensation feature for dirt accumulation on exposed lens, and the zero value cannot be measured before compensation is entered then record the amount of automatic zero compensation for the final zero reading of each 24-hour period. (List the indicated zero values of the monitoring system in parenthesis.)

8.4.2 Upscale Drift Test. At each 24-hour interval, after the zero calibration value has been checked and any optional or required adjustments have been made, check and record the simulated upscale calibration value. If no further adjustments are made to the calibration system at this time, the final upscale calibration value is recorded as the initial upscale value for the next 24-hour period. If an instrument span adjustment is made, the upscale value after adjustment is recorded as the initial upscale for the next 24-hour period.

During the operational test period record all adjustments, realignments and lens cleanings.

9. Calculation, Data Analysis, and Reporting

9.1 Arithmetic Mean. Calculate the mean of a set of data as follows:

$$\bar{x} = \frac{1}{n}\sum_{i=1}^{n} x_i \qquad \text{Equation 2-1}$$

Where:

$\bar{x}$ = mean value.
n = number of data points.
Σx_i = algebraic sum of the individual measurements, x_i

9.2 Confidence Interval. Calculate the 95 percent confidence interval (two-sided) as follows:

$$C.I._{95} = \frac{t_{.975}}{n\sqrt{n-1}} \sqrt{n(\Sigma x_i^2) - (\Sigma x_i)^2}$$

Equation 2-2

Where:

$C.I._{95}$ = 95 percent confidence interval estimate of the average mean value.
$t_{.975} = t_{(1-\alpha/2)}$.

Table 1-3—*t.975 Values*

n	t.975	n	t.975	n	t.975
2	12.706	7	2.447	12	2.201
3	4.303	8	2.365	13	2.179
4	3.182	9	2.306	14	2.160
5	2.776	10	2.262	15	2.145
6	2.571	11	2.228	16	2.131

The values in this table are already corrected for n-1 degrees of Freedom. Use n equal to the number of data points.

9.3 Conversion of Opacity Values from Monitor Pathlength to Emission Outlet Pathlength. When the monitor pathlength is different than the emisson outlet pathlength, use either of the following equations to convert from one basis to the other (this conversion may be automatically calculated by the monitoring system):

$$\log(1-Op_2) = (L_2/L_1)\,\text{Log}\,(1-Op_1) \qquad \text{Equation 1-4}$$

$$D_2 = (L_2/L_1) \qquad \text{Equation 1-5}$$

Where:

Op_1 = opacity of the effluent based upon L_1
Op_2 = opacity of the effluent based upon L_2
L_1 = monitor pathlength
L_2 = emission outlet pathlength
D_1 = optical density of the effluent based upon L_1
D_2 = optical density of the effleunt based upon L_2

9.4 Spectral Response. Using the spectral data obtained in Section 6.1, develop the effective spectral response curve of the transmissometer. Then determine and report the peak spectral response wavelength, the mean spectral response wavelength, and the maximum response at any wavelength below 400 nm and above 700 nm expressed as a percentage of the peak response.

9.5 Angle of View. For the horizontal and vertical directions, using the data obtained in Section 6.2, calculate the response of the receiver as a function of viewing angle (21 centimeters of arc with a radius of 3 meters equal 4 degrees), report relative angle of view curves, and determine and report the angle of view.

9.6 Angle of Projection. For the horizontal and vertical directions, using the data obtained in Section 6.3, calculate the response of the photoelectric detector as a function of projection angle, report relative angle of projection curves, and determine and report the angle of projection.

9.7 Calibration Error. See Figure 1-1. If the pathlength is not adjusted by the measurement system, subtract the actual calibrated attenuator value from the value indicated by the measurement system recorder for each of the 15 readings obtained pursuant to Section 8.1.4. If the pathlength is adjusted by the measurement system subtract the "path adjusted" calibrated attenuator values from the values indecated by the measurement system recorder the "path adjusted" calibrated attenuator values are calculated using equation 1-4 or 1-5). Calculate the arithmetic mean difference and the 95 percent confidence interval of the five tests at each attenuator value using Equations 1-2 and 1-3. Calculate the sum of the absolute value of the mean difference and the 95 percent confidence interval for each of the three test attenuators; report these three values as the calibration error.

9.8 Zero and Upscale Calibration Drifts. Using the data obtained in Sections 8.4.1 and 8.4.2 calculate the zero and upscale calibration drifts. Then calculate the arithmetic means and the 95 percent confidence intervals using Equations 1-2 and 1-3. Calculate the sum of the absolute value of the mean and the 95 percent confidence interval and report these values as the 24-hour zero drift and the 24-hour calibration drift.

9.9 Response Time. Using the data collected in Section 8.1.5, calculate the mean time of the 10 upscale and downscale tests and report this value as the system response time.

9.10 Reporting. Report the following (summarize in tabular form where appropriate).

9.10.1 General Information.

a. Instrument Manufacturer.
b. Instrument Model Number.
c. Instrument Serial Number.

d. Person(s) responsible for operational and conditioning test periods and affiliation.
e. Facility being monitored.
f. Schematic of monitoring system measurement path location.
g. Monitor pathlength, meters.
h. Emission outlet pathlength, meters.
i. System span value, percent opacity.
j. Upscale calibration value, percent opacity.
k. Calibrated Attenuator values (low, mid, and high range), percent opacity.

9.10.2 Design Specification Test Results
a. Peak spectral response, nm.
b. Mean spectral response, nm.
c. Response above 700 nm, percent of peak.
d. Response below 400 nm, percent of peak.
e. Total angle of view, degrees.
f. Total angle of projection, degrees.

9.10.3 Operational Test Period Results.
a. Calibration error, high-range, percent opacity.
b. Calibration error, mid-range, percent opacity.
c. Calibration error, low-range, percent opacity.
d. Response time, seconds.
e. 24-hour zero drift, percent opacity.
f. 24-hour calibration drift, percent opacity.
g. Lens cleaning, clock time.
h. Optical alignment adjustment, clock time.

9.10.4 Statements. Provide a statement that the conditioning and operational test periods were completed according to the requirements of Sections 8.3 and 8.4. In this statement, include the time periods during which the conditioning and operational test periods were conducted.

9.10.5 Appendix. Provide the data tabulations and calculations for the above tabulated results.

9.11 Retest. If the continuous monitoring system operates within the specified performance parameters of Table 1-1, the operational test period will be successfully concluded. If the continuous monitoring system fails to meet any of the specified performance parameters, repeat the operational test period with a system that meets the design specifications and is expected to meet the performance specifications.

10. Bibliograpny.

10.1 "Experimental Statistics," Department of Commerce, National Bureau of Standards Handbook 91, 1963, pp. 3-31, paragraphs 3-3.1.4.

10.2 "Performance Specifications for Stationary-Source Monitoring Systems for Gases and Visible Emissions," Environmental Protection Agency, Research Triangle Park, N. C., EPA-650/2-74-013, January 1974.

Person Conducting Test _____ Analyzer Manufacturer _____
Affiliation _____ Model/Serial No. _____
Date _____ Location _____
Monitor Pathlength, L_1 _____ Emission Outlet Pathlength, L_2 _____
Monitoring System Output Pathlength Corrected? Yes ___ No ___

Calibrated Neutral Density Filter Values

Actual Optical Density (Opacity):
Low Range _____(_____)
Mid Range _____(_____)
High Range _____(_____)

Path Adjusted Optical Density (opacity)
Low Range _____(_____)
Mid Range _____(_____)
High Range _____(_____)

Run Number	Calibration Filter Value (Path Adjusted Percent Opacity)	Instrument Reading (Percent Opacity)	Arithmetic Difference (% Opacity)		
			Low	Mid	High
1 – Low				–	–
2 – Mid			–		–
3 – High			–	–	
4 – Low				–	–
5 – Mid			–		–
6 – High			–	–	
7 – Low				–	–
8 – Mid			–		–
9 – High			–	–	
10–Low				–	–
11–Mid			–		–
12–High			–	–	
13–Low				–	–
14–Mid			–		–
15–High			–	–	–
			X	X	X
Arithmetic Mean (Equation 1 – 2): A					
Confidence Interval (Equation 1 – 3): B					
Calibration Error $\lvert A \rvert + \lvert B \rvert$					

Figure 1 – 1. Calibration error determination

Person Conducting Test _____ Analyzer Manufacturer _____

Affiliation _____ Model/Serial No. _____

Date _____ Location _____

High Range Calibration Filter Value: Actual Optical Density (Opacity) _____(_____)

Path Adjusted Optical Density (Opacity)_____(_____)

Upscale Response Value (0.95 x filter value)_____percent opacity

Downscale Response Value (0.05 x filter value)_____percent opacity

Upscale	1 _____	seconds
	2 _____	seconds
	3 _____	seconds
	4 _____	seconds
	5 _____	seconds
Downscale	1 _____	seconds
	2 _____	seconds
	3 _____	seconds
	4 _____	seconds
	5 _____	seconds
	Average response _____	seconds

Figure 1-2. Response Time Determination

Person Conducting Test _____ Analyzer Manufacturer _____

Affiliation _____ Model/ Serial No. _____

Date _____ Location _____

Monitor Pathlength, L_1 _____ Emission Outlet Pathlength, L_2 _____

Monitoring System Output Pathlength Corrected: ? Yes ____ No ____

Upscale Calibration Value : Actual Optical Density (Opacity) _____(____)

Path Adjusted Optical Density (Opacity) _____(____)

Date	Time		Percent Opacity										Alignment	
			Zero Reading*		Zero Drift	zero adjusted?	Upscale Calibration Reading		Upscale Drift	Calibration Drift	span adjusted?	lens cleaned?	checked?	adjusted?
	Begin	End	Initial A	Final B	C = B−A		Initial D	Final E	F = E−D	G = F−C**				
Arithmetic Mean (Eq. 1–2)														
Confidence Interval (Eq. 1–3)														
Zero Drift								Calibration Drift						

*without automatic zero compensation

**if zero was adjusted (manually or automatically) prior to upscale check, then use c = 0 .

Figure 1 - 3. Zero Calibration Drift Determination

Performance Specification 2—Specifications and Test Procedures for SO_2 and NO_x Continuous Monitoring Systems in Stationary Sources

1. Applicability and Principle

1.1 Applicability. This Specification contains (a) installation requirements, (b) instrument performance and equipment specifications, and (c) test procedures and data reduction procedures for evaluating the acceptability of SO_2 and NO_x continuous monitoring systems, which may include, for certain stationary sources, diluent monitors. The test procedures in item (c), above, are not applicable to single-pass, in-situ continuous monitoring systems; these systems will be evaluated on a case-by-case basis upon written request to the Administrator and alternative test procedures will be issued separately.

1.2 Principle. Any SO_2 or NO_x continuous monitoring system that is expected to meet this Specification is installed, calibrated, and operated for a specified length of time. During this specified time period, the continuous monitoring system is evaluated to determine conformance with the Specification.

2. Definitions

2.1 Continuous Monitoring System. The total equipment required for the determination of a gas concentration or a gas emission rate. The system consists of the following major sub-systems:

2.1.1 Sample Interface. That portion of a system that is used for one or more of the following: sample acquisition, sample transportation, sample conditioning, or protection of the monitor from the effects of the stack effluent.

2.1.2. Pollutant Analyzer. That portion of the system that senses the pollutant gas and generates an output that is proportional to the gas concentration.

2.1.3. Diluent Analyzer (if applicable). That portion of the system that senses the diluent gas (e.g., CO_2 or O_2) and generates an output that is proportional to the gas concentration.

2.1.4 Data Recorder. That portion of the monitoring system that provides a permanent record of the analyzer output. The data recorder may include automatic data reduction capabilities.

2.2 Types of Monitors. Continuous monitors are categorized as "extractive" or "in-situ," which are further categorized as "point," "multipoint," "limited-path," and "path" type monitors or as "single-pass" or "double-pass" type monitors.

2.2.1 Extractive Monitor. One that withdraws a gas sample from the stack and transports the sample to the analyzer.

2.2.2 In-situ Monitor. One that senses the gas concentration in the stack environment and does not extract a sample for analysis.

2.2.3 Point Monitor. One that measures the gas concentration either at a single point or along a path which is less than 10 percent of the length of a specified measurement line.

2.2.4 Multipoint Monitor. One that measures the gas concentration at 2 or more points.

2.2.5 Limited-Path Monitor. One that measures the gas concentration along a path, which is 10 to 90 percent of the length of a specified measurement line.

2.2.6 Path Monitor. One that measures the gas concentration along a path, which is greater than 90 percent of the length of a specified measurement line.

2.2.7 Single-Pass Monitor. One that has the transmitter and the detector on opposite sides of the stack or duct.

2.2.8 Double-Pass Monitor. One that has the transmitter and the detector on the same side of the stack or duct.

2.3 Span Value. The upper limit of a gas concentration measurement range which is specified for affected source categories in the applicable subpart of the regulations.

2.4 Calibration Gases. A known concentration of a gas in an appropriate diluent gas.

2.5 Calibration Gas Cells or Filters. A device which, when inserted between the transmitter and detector of the analyzer, produces the desired output level on the data recorder.

2.6 Relative Accuracy. The degree of correctness including analytical variations of the gas concentration or emission rate determined by the continuous monitoring system, relative to the value determined by the reference method(s).

2.7 Calibration Error. The difference between the gas concentration indicated by the continuous monitoring system and the known concentration of the calibration gas, gas cell, or filter.

2.8 Zero Drift. The difference in the continuous monitoring system output readings before and after a stated period of operation during which no unscheduled maintenance, repair, or adjustment took place and when the pollutant concentration at the time of the measurements was zero (i.e., zero gas, or zero gas cell or filter).

2.9 Calibration Drift. The difference in the continuous monitoring system output readings before and after a stated period of operation during which no unscheduled maintenance, repair or adjustment took place and when the pollutant concentration at the time of the measurements was a high-level value (i.e., calibration gas, gas cell or filter).

2.10 Response Time. The amount of time it takes the continuous monitoring system to display on the data recorder 95 percent of a step change in pollutant concentration.

2.11 Conditioning Period. A minimum period of time over which the continuous monitoring system is expected to operate with no unscheduled maintenance, repair, or adjustments prior to initiation of the operational test period.

2.12 Operational Test Period. A minimum period of time over which the continuous monitoring system is expected to operate within the established performance specifications with no unscheduled maintenance, repair or adjustment.

3. Installation Specifications

Install the continuous monitoring system at a location where the pollutant concentration measurements are representative of the total emissions from the affected facility and are representative of the concentration over the cross section. Both requirements can be met as follows:

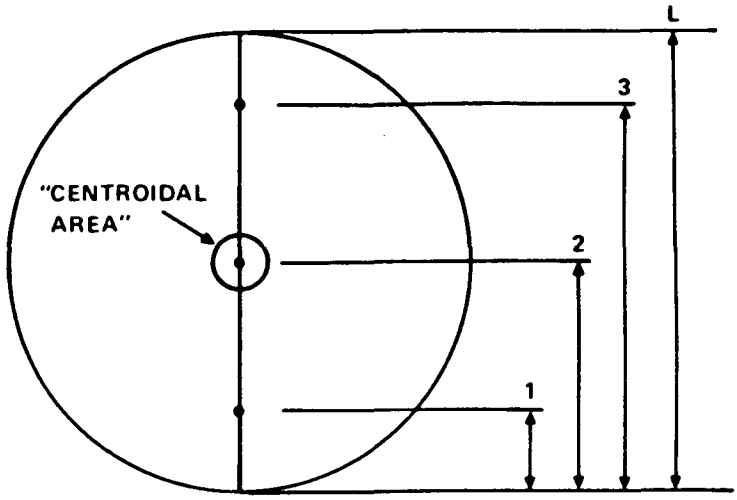
3.1 Measurement Location. Select an accessible measurement location in the stack or ductwork that is at least 2 equivalent diameters downstream from the nearest control device or other point at which a change in the pollutant concentration may occur and at least 0.5 equivalent diameters upstream from the effluent exhaust. Individual subparts of the regulations may contain additional requirements. For example, for steam generating facilities, the location must be downstream of the air preheater.

3.2 Measurement Points or Paths. There are two alternatives. The tester may choose either (a) to conduct the stratification check procedure given in Section 3.3 to select the point, points, or path of average gas concentration, or (b) to use the options listed below without a stratification check.

Note.—For the purpose of this section, the "centroidal area" is defined as a concentric area that is geometrically similar to the stack cross section and is no greater than 1 percent of the stack cross-sectional area.

3.2.1 SO_2 and NO_x Path Monitoring Systems. The tester may choose to centrally locate the sample interface (path) of the monitoring system on a measurement line that passes through the "centroidal area" of the cross section.

3.2.2 SO_2 and NO_x Multipoint Monitoring Systems. The tester may choose to space 3 measurement points along a measurement line that passes through the "centroidal area" of the stack cross section, at distances of 16.7, 50.0, and 83.3 percent of the way across it (see Figure 2-1).



POINT NO.	DISTANCE (% OF L)
1	16.7
2	50.0
3	83.3

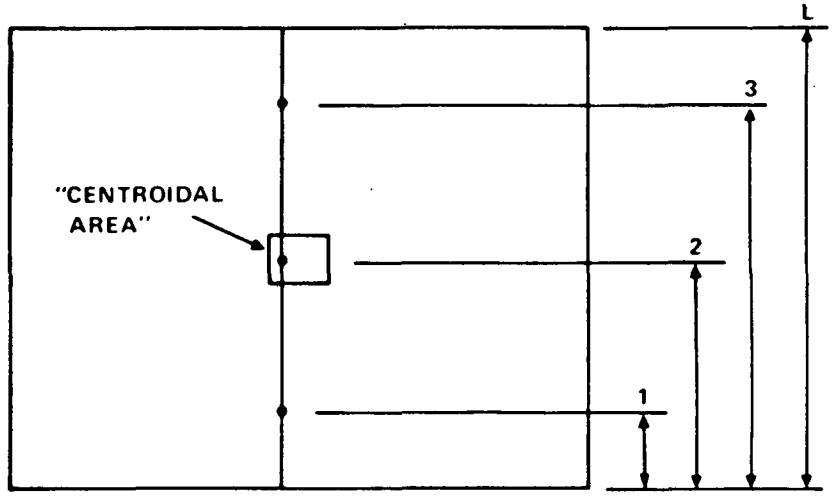


Figure 2-1. Location of an example measurement line (L) and measurement points.

The following sampling strategies, or equivalent, for measuring the concentrations at the 3 points are acceptable: (a) The use of a 3-probe or a 3-hole single probe arrangment, provided that the sampling rate in each of the 3 probes or holes is maintained within 10 percent of their average rate (This option requires a procedure, subject to the approval of the Administrator, to demonstrate that the proper sampling rate is maintained); or (b) the use of a traversing probe arrangement, provided that a measurement at each point is made at least once every 15 minutes and all 3 points are traversed and sampled for equal lengths of time within 15 minutes.

3.2.3 SO_2 Single-Point and Limited-Path Monitoring Systems. Provided that (a) no "dissimilar" gas streams (i.e., having greater than 10 percent difference in pollutant concentration from the average) are combined upstream of the measurement location, and (b) for steam generating facilities, a CO_2 or O_2 cotinuous monitor is installed in addition to the SO_2 monitor, according to the guidelines given in Section 3.1 or 3.2 of Performance Specification 3, the tester may choose to monitor SO_2 at a single point or over a limited path. Locate the point in or centrally locate the limited path over the "centroidal area." Any other location within the inner 50 percent of the stack cross-sectional area that has been demonstrated (see Section 3.4) to have a concentration within 5 percent of the concentration at a point within the "centroidal area" may be used.

3.2.4 NO_x Single-Point and Limited-Path Monitoring Systems. For NO_x monitors, the tester may choose the single-point or limited-path option described in Section 3.2.3 only in coal-burning steam generators (does not include oil and gas-fired units) and nitric acid plants, which have no dissimilar gas streams combining upstream of the measurement location.

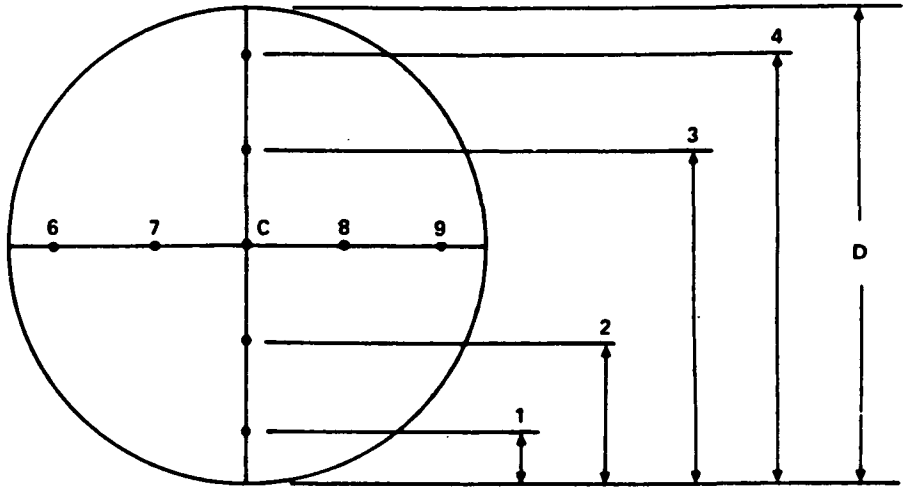
3.3 Stratification Check Procedure. Unless specifically approved in Section 3.2., conduct a stratification check and select the measurement point, points, or path as follows:

3.3.1 Locate 9 sample points, as shown in Figure 2-2, a or b. The tester may choose to use more than 9 points, provided that the sample points are located in a similar fashion as in Fgure 2-2.

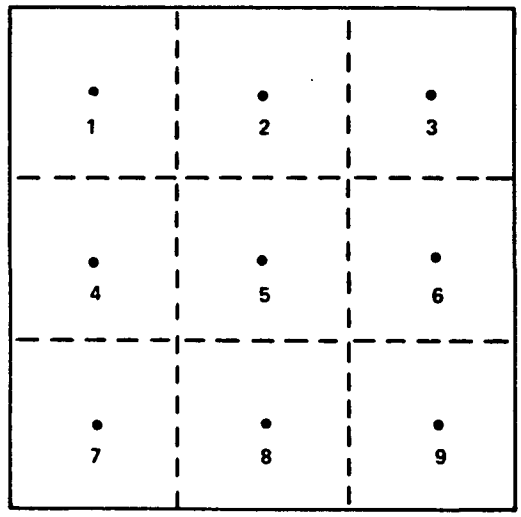
3.3.2 Measure at least twice the pollutant and, if applicable (as in the case of steam generators), CO_2 or O_2 concentrations at each of the sample points. Moisture need not be determined for this step. The following methods are acceptable for the measurements: (a) Reference Methods 3 (grab-sample), 6 or 7 of this part; (b) appropriate instrumental methods which give relative responses to the pollutant (i.e., the methods need not be absolutely correct), subject to the approval of the Administrator; or (c) alternative methods subject to the approval of the Administrator. Express all measurements, if applicable, in the units of the applicable standard.

3.3.3 Calculate the mean value and select a point, points, limited-path, or path which gives an equivalent value to the mean. The point or points must be within, and the limited-path or path must pass through, the inner 50 percent of the stack cross-sectional area. All other locations must be approved by the Administrator.

POINT NO.	DISTANCE (% OF D)
1, 9	10.0
2, 8	30.0
C	50.0
3, 7	70.0
4, 6	90.0



(a)



(b)

Figure 2-2. Location of 9 sampling points for stratification check.

3.4 Acceptability of Single Point or Limited Path Alternative Location. Any of the applicable measurement methods mentioned in Section 3.3.2, above, may be used. Measure the pollutant and, if applicable, CO_2 or O_2 concentrations at both the centroidal area and the alternative locations. Moisture need not be measured for this test. Collect a 21-minute integrated sample or 3 grab-samples, either at evenly spaced (7 ± 2 min.) intervals over 21 minutes or all within 3 minutes, at each location. Run the comparative tests either concurrently or within 10 minutes of each other. Average the results of the 3 grab-samples.

Repeat the measurements until a minimum of 3 paired measurements spanning a minimum of 1 hour of process operation are obtained. Determine the average pollutant concentrations at the centroidal area and the alternative locations. If applicable, convert the data in terms of the standard for each paired set before taking the average. The alternative sampling location is acceptable if each alternative location value is within ± 10 percent of the corresponding centroidal area value and if the average at the alternative location is within 5 percent of the average of the centroidal area.

4. Performance and Equipment Specifications

The continuous monitoring system performance and equipment specifications are listed in Table 2-1. To be considered acceptable, the continuous monitoring system must demonstrate compliance with these specifications using the test procedures of Section 6.

5. Apparatus

5.1 Continuous Monitoring System. Use any continuous monitoring system of SO_2 or NO_x which is expected to meet the specifications in Table 2-1. For sources which are required to convert the pollutant concentrations to other emission units using diluent gas measurements, the diluent gas continuous monitor, as described in Performance Specification 3 of this Appendix, is considered part of the continuous monitoring system. The data recorder may be an analog strip chart recorder type or other suitable device with an input signal range compatible with the analyzer output.

5.2 Calibration Gases. For continuous monitoring systems that allow the introduction of calibration gases to the analyzer, the calibration gases may be SO_2 in air or N_2, NO in N_2, and NO_2 in air or N_2. Two or more calibration gases may be combined in the same gas cylinder, except do not combine the NO and air. For NO_x monitoring systems that oxidize NO to NO_2, the calibration gases must be in the form of NO. Use three calibration gas mixtures as specified below:

5.2.1 High-Level Gas. A gas concentration that is equivalent to 80 to 90 percent of the span value.

Table 2-1.—*Continuous Monitoring System Performance and Equipment Specifications*

Parameter	Specification
1. Conditioning period [a].	≥168 hours.
2. Operational test period [a].	≥168 hours.
3. Calibration error [b].	≤5 pct of each mid-level and high-level calibration value.
4. Response time.....	≤15 minutes (5 minutes for 3-point traversing probe arrangement).
5. Zero drift (2-hour) [b,c].	≤2 pct of span value.
6. Zero drift (24-hour) [b,c].	≤2 pct of span value.
7. Calibration drift (2-hour) [b].	≤2 pct of span value.
8. Calibration drift (24-hour) [b].	≤2.5 pct of span value.
9. Relative accuracy [b]	≤20 pct of the mean value of reference method(s) test data in terms of emission standard or 10 percent of the applicable standard, whichever is greater.
10 Calibration gas cells or filters	Must provide a check of all analyzer internal mirrors and lenses and all electronic circuitry including the radiation source and detector assembly which are normally use in sampling and analysis.
11. Data recorder chart resolution	Chart scales must be readable to within ≤0.50 pct of full-scale.
12. Extractive systems with diluent monitors	Must use the same sample interface to sample both the pollutant and diluent gases. Place in series (diluent after pollutant analyzer) or use a "T." During the conditioning and operational test periods, the continuous monitoring system shall not require any corrective maintenance, repair, replacement, or adjustment other than that clearly specified as routine and required in the operation and maintenance manuals. [b] Expressed as the sum of the absolute mean value plus the 95 percent confidence interval of a series of tests divided by a reference value. [c] A low-level (5-15 percent of span value) drift test may be substituted for the zero Drift tests.

5.2.2 Mid-Level Gas. A gas concentration that is equivalent to 45 to 55 percent of the span value.

5.2.3 Zero Gas. A gas concentration of less than 0.25 percent of the span value. Ambient air may be used for the zero gas.

5.3 Calibration Gas Cells or Filters. For continuous monitoring systems which use calibration gas cells or filters, use three certified calibration gas cells or filters as specified below:

5.3.1 High-Level Gas Cell or Filter. One that produces an output equivalent to 80 to 90 percent of the span value.

5.3.2 Mid-Level Gas Cell or Filter. One that produces an output equivalent to 45 to 55 percent of the span value.

5.3.3 Zero Gas Cell or Filter. One that produces an output equivalent to zero. Alternatively, an analyzer may produce a zero value check by mechanical means, such as a movable mirror.

5.4 Calibration Gas—Gas Cell or Filter Combination. Combinations of the above may be used.

6. Performance Specification Test Procedures.

6.1 Pretest Preparation.

6.1.1 Calibration Gas Certification. The tester may select one of the following alternatives: (a) The tester may use calibration gases prepared according to the protocol defined in Citation 10.5, i.e. These gases may be used as received without reference method analysis (obtain a statement from the gas cylinder supplier certifying that the calibration gases have been prepared according to the protocol); or (b) the tester may use calibration gases not prepared according to the protocol. In case (b), he must perform triplicate analyses of each calibration gas (mid-level and high-level, only) within 2 weeks prior to the operational test period using the appropriate reference methods. Acceptable procedures are described in Citations 10.6 and 10.7. Record the results on a data sheet (example is shown in Figure 2-3). Each of the individual analytical results must be within 10 percent (or 15 ppm, whichever is greater) of the average; otherwise, discard the entire set and repeat the triplicate analyses. If the average of the triplicate reference method test results is within 5 percent of the calibration gas manufacturer's tag value, use the tag value; otherwise, conduct at least 3 additional reference method test analyses until the results of 6 individual runs (the 3 original plus 3 additional) agree within 10 percent or 15 ppm, whichever is greater, of the average. Then use this average for the cylinder value.

Figure 2-3. Analysis of Calibration Gases[a]

Date_____(Must be within 2 weeks prior to the operational test period)

Reference Method Used_____

Sample Run	Mid-level[b] ppm	High-level[c] ppm
1		
2		
3		
Average		
Maximum % Deviation[d]		

[a] Not necessary if the protocol in Citation 10.5 is used to prepare the gas cylinders.

[b] Average must be 45 to 55 percent of span value.

[c] Average must be 80 to 90 percent of span value.

[d] Must be ≤ ± 10 percent of applicable average or 15 ppm, whichever is greater.

6.1.2 Calibration Gas Cell or Filter Certification. Obtain (a) a statement from the manufacturer certifying that the calibration gas cells or filters (zero, mid-level, and high-level) will produce the stated instrument responses for the continuous monitoring system, and (b) a description of the test procedure and equipment used to calibrate the cells or filters. At a minimum, the manufacturer must have calibrated the gas cells or filters against a simulated source of known concentration.

6.2 Conditioning Period. Prepare the monitoring system for operation according to the manufacturer's written instructions. At the outset of the conditioning period, zero and span the system. Use the mid-level calibration gas (or gas cell or filter) to set the span at 50 percent of recorder full-scale. If necessary to determine negative zero drift, offset the scale by 10 percent. (Do not forget to account for this when using the calibration curve.) If a zero offset is not possible or is impractical, a low-level drift may be substituted for the zero drift, by using a low-level (5 to 15 percent of span value) calibration gas (or gas cell or filter). This low-level calibration gas (or gas cell or filter) need not be certified. Operate the continuous monitoring system for an initial 168-hour period in the manner specified by the manufacturer. Except during times of instrument zero, calibration checks, and system backpurges, the continuous monitoring system shall collect and condition the effluent gas sample (if applicable), analyze the sample for the appropriate gas constituents, and produce a permanent record of the system output. Conduct daily zero and mid-level calibration checks and, when drift exceeds the daily operating limits, make adjustments. The data recorder shall reflect these checks and adjustments. Keep a record of any instrument failure during this time. If the conditioning period is interrupted because of source breakdown (record the dates and times of process shutdown), continue the 168-hour period following resumption of source operation. If the conditioning period is interrupted because of monitor failure, restart the 168-hour conditioning period when the monitor becomes functional.

6.3 Operational Test Period. Operate the continuous monitoring system for an additional 168-hour period. The continuous monitoring system shall monitor the effluent, except during periods when the system calibration and response time are checked or during system backpurges; however, the system shall produce a permanent record of all operations. Record any system failure during this time on the data recorder output sheet.

It is not necessary that the 168-hour operational test period immediately follow the 168-hour conditioning period. During the operational test period, perform the following test procedures:

6.3.1 Calibration Error Determination. Make a total of 15 nonconsecutive zero, mid-level, and high-level measurements (e.g., zero, mid-level, zero, high-level, mid-range, etc.).

This will result in a set of 5 each of zero, mid-level, and high-level measurements. Convert the data output to concentration units, if necessary, and record the results on a data sheet (example is shown in Figure 2–4). Calculate the differences between the reference calibration gas concentrations and the measurement system reading. Then calculate the mean, confidence interval, and calibration errors separately for the mid-level and high-level concentrations using Equations 2–1, 2–2, and 2–3. In Equation 2–3, use each respective calibration gas concentration for R.V.

Figure 2-4. Calibration Error Determination

Run no.	Calibration gas concentration[a] ppm	Measurement system reading ppm	Arithmetic differences ppm	
	A	B	A-B	
			Mid	High
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
Arithmetic Mean (Eq. 2-1) =				
Confidence Interval (Eq. 2-2) =				
Calibration Error (Eq. 2-3)[b] =				

[a] Calibration Data from Section 6.1.1 or 6.1.2

Mid-level: C = _____ppm

High-level: D = _____ppm

[b] Use C or D as R.V. in Eq. 2-3

Figure 2-5. Response Time

Date_____ High-level = _____ppm

Test Run	Upscale min.	Downscale min.
1		
2		
3		
Average	A =	B =

System Response Time (slower of A and B) = _____ min.

6.3.2 Response Time Test Procedure. At a minimum, each response time test shall provide a check of the entire sample transport line (if applicable), any sample conditioning equipment (if applicable), the pollutant analyzer, and the data recorder. For in-situ systems, perform the response time check by introducing the calibration gases at the sample interface (if applicable), or by introducing the calibration gas cells or filters at an appropriate location in the pollutant analyzer. For extractive monitors, introduce the calibration gas at the sample probe inlet in the stack or at the point of connection between the rigid sample probe and the sample transport line. If an extractive analyzer is used to monitor the effluent from more than one source, perform the response time test for each sample interface.

To begin the response time test, introduce zero gas (or zero cell or filter) into the continuous monitor. When the system output has stabilized, switch to monitor the stack effluent and wait until a "stable value" has been reached. Record the upscale response time. Then, introduce the high-level calibration gas (or gas cell or filter). Once the system has stabilized at the high-level concentration, switch to monitor the stack effluent and wait until a "stable value" is reached. Record the downscale response time. A "stable value" is equivalent to a change of less than 1 percent of span value for 30 seconds or 5 percent of measured average concentration for 2 minutes. Repeat the entire procedure three times. Record the results of each test on a data sheet (example is shown in Figure 2–5). Determine the means of the upscale and downscale response times using Equation 2–1. Report the slower time as the system response time.

6.3.3 Field Test for Zero Drift and Calibration Drift. Perform the zero and calibration drift tests for each pollutant analyzer and data recorder in the continuous monitoring system.

6.3.3.1 Two-hour Drift. Introduce consecutively zero gas (or zero cell or filter) and high-level calibration gas (or gas cell or filter) at 2-hour intervals until 15 sets (before and after) of data are obtained. Do not make any zero or calibration adjustments during this time unless otherwise prescribed by the manufacturer. Determine and record the amount that the output had drifted from the recorder zero and high-level value on a data sheet (example is shown in Figure 2–6). The 2-hour periods over which the measurements are conducted need not be consecutive, but must not overlap. Calculate the zero and calibration drifts for each set. Then calculate the mean, confidence interval, and zero and calibration drifts (2-hour) using Equations 2–1, 2–2, and 2–3. In Equation 2–3, use the span value for R.V.

6.3.3.2 Twenty-Four Hour Drift. In addition to the 2-hour drift tests, perform a series of seven 24-hour drift tests as follows: At the beginning of each 24-hour period, calibrate the monitor, using mid-level value. Then introduce the high-level calibration gas (or gas cell or filter) to obtain the initial reference value. At the end of the 24-hour period, introduce consecutively zero gas (or gas cell or filter) and high-level calibration gas (or gas cell or filter); do not make any adjustments at this time. Determine and record the amount of drift from the recorder zero and high-level value on a data sheet (example is shown in Figure 2–7). Calculate the zero and calibration drifts for each set. Then calculate the mean, confidence interval, and zero and calibration drifts (24-hour) using Equations 2–1, 2–2, and 2–3. In Equation 2–3, use the span value for R.V.

Data set no.	Date	Time		Zero Rdg		Zero drift	Hi-level Rdg		Span drift	Calib. drift
		Begin	End	Init. A	Fin. B	C=B-A	Init. D	Fin. E	F=E-D	G=F-C
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
Arithmetic Mean (Eq. 2-1)										
Confidence Interval (Eq. 2-2)										
Zero Drift[a]							Calibration drift[a]			

[a] Use Equation 2-3, with span value for R. V.

Figure 2-6. Zero and Calibration Drift (2 hour)

Data set no.	Date	Time		Zero Rdg		Zero drift	Hi-level Rdg		Span drift	Calib. drift
		Begin	End	Init. A	Fin. B	C=B-A	Init. D	Fin. E	F=E-D	G=F-C
1										
2										
3										
4										
5										
6										
7										
Arithmetic Mean (Eq. 2-1)										
Confidence Interval (Eq. 2-2)										
Zero drift							Calibration drift[a]			

[a] Use Equation 2-3, with the span value for R. V.

Figure 2-7. Zero and Calibration Drift (24-hour)

Note.—Automatic zero and calibration adjustments made by the monitoring system without operator intervention or initiation are allowable at any time. Manual adjustments, however, are allowable only at 24-hour intervals, unless a shorter time is specified by the manufacturer.

6.4 System Relative Accuracy. Unless otherwise specified in an applicable subpart of the regulations, the reference methods for SO_2, NO_x, diluent (O_2 or CO_2), and moisture are Reference Methods 6, 7, 3, and 4, respectively. Moisture may be determined along with SO_2 using Method 6. See Citation 10.8. Reference Method 4 is necessary only if moisture content is needed to enable comparison between the Reference Method and monitor values. Perform the accuracy test using the following guidelines:

6.4.1 Location of Pollutant Reference Method Sample Points. The following specifies the location of the Reference Method sample points which are on the same cross-sectional plane as the monitor's. However, any cross-sectional plane within 2 equivalent diameter of straight runs may be used, by using the projected image of the monitor on the selected plane in the following criteria.

6.4.1.1 For point monitors, locate the Reference Method sample point no further than 30 cm (or 5 percent of the equivalent diameter of the cross section, whichever is less) from the pollutant monitor sample point.

6.4.1.2 For multipoint monitors, locate each Reference Method sample traverse point no further than 30 cm (or 5 percent of the equivalent diameter of the cross section, whichever is less) from each corresponding pollutant monitor sample point.

6.4.1.3 For limited-path and path monitors, locate 3 sample points on a line parallel to the monitor path and no further than 30 cm (or 5 percent of the equivalent diameter of the cross section, whichever is less) from the centerline of the monitor path. The three points of the Reference Method shall correspond to points in the monitor path at 16.7, 50.0, and 83.3 percent of the effective length of the monitor path.

6.4.2 Location of Diluent and Moisture Reference Method Sample Points.

6.4.2.1 For sources which require diluent monitors in addition to pollutant monitors, locate each of the sample points for the diluent Reference Method measurements within 3 cm of the corresponding pollutant Reference Method sample point as defined in Sections 6.4.1.1, 6.4.1.2, or 6.4.1.3. In addition, locate each pair of diluent and pollutant Reference Method sample points no further than 30 cm (or 5 percent of the equivalent diameter of the cross section, whichever is less) from *both* the diluent and pollutant continuous monitor sample points or paths.

6.4.2.2 If it is necessary to convert pollutant and/or diluent monitor concentrations to a dry basis for comparison with the Reference data, locate each moisture Reference Method sample point within 3 cm of the corresponding pollutant or diluent Reference Method sample point as defined in Sections 6.4.1.1, 6.4.1.2, 6.4.1.3, or 6.4.2.1.

6.4.3 Number of Reference Method Tests.

6.4.3.1 For NO_x monitors, make a minimum of 27 NO_x Reference Method measurements, divided into 9 sets.

6.4.3.2 For SO_2 monitors, make a minimum of 9 SO_2 Reference Method tests.

6.4.3.3 For diluent monitors, perform one diluent Reference Method test for each SO_2 and/or NO_x Reference Method test(s).

6.4.3.4 For moisture determinations, perform one moisture Reference Method test for each or each set of pollutant(s) and diluent (if applicable) Reference Method tests.

Note.—The tester may choose to perform more than 9 sets of NO_x measurements or more than 9 SO_2 reference method diluent, or moisture tests. If this option is chosen, the tester may, at his discretion, reject up to 3 of the set or test results, so long as the total number of set or test results used to determine the relative accuracy is greater than or equal to 9. Report all data including rejected data.

6.4.4 Sampling Strategy for Reference Method Tests. Schedule the Reference Method tests so that they will not be in progress when zero drift, calibration drift, and response time data are being taken. Within any 1-hour period, conduct the following tests: (a) one set, consisting of 3 individual measurements, of NO_x and/or one SO_2; (b) one diluent, if applicable; and (c) one moisture (if needed). Whenever two or more reference tests (pollutant, diluent, and moisture) are conducted, the tester may choose to run all these reference tests within a 1-hour period. However, it is recommended that the tests be run concurrently or consecutively within a 4-minute interval if two reference tests employ grab sampling techniques. Also whenever an integrated reference test is run together with grab sample reference tests, it is recommended that the integrated sample be started one-sixth the test period before the first grab sample is collected.

In order to properly correlate the continuous monitoring system and Reference Method data, mark the beginning and end of each Reference Method test period (including the exact time of day) on the pollutant and diluent (if applicable) chart recordings. Use one of the following strategies for the Reference Method tests:

6.4.4.1 Single Point Monitors. For single point sampling, the tester may: (a) take a 21-minute integrated sample (e.g. Method 6, Method 4, or the integrated bag sample technique of Method 3); (b) take 3 grab samples (e.g. Method 7 or the grab sample technique of Method 3), equally spaced at 7-minute (±2 min) intervals (or one-third the test period); or (c) take 3 grab samples over a 3-minute test period.

6.4.4.2 Multipoint or Path Monitors. For multipoint sampling, the tester may either: (a) make a 21-minute integrated sample traverse, sampling for 7 minutes (±2 min) (or one-third the test period) at each point; or (b) take grab samples at each traverse point, scheduling the grab samples to that they are an equal interval (7±2 minutes) of time apart (or one-third the test period).

Note.—If the number of sample points is greater than 3, make appropriate adjustments to the individual sampling time intervals. At times NSPS performance test data may be used as part of the data base of the continuous monitoring relative accuracy tests. In these cases, other test periods as specified in the applicable subparts of the regulations may be used.

6.4.5 Correlation of Reference Method and Continuous Monitoring System Data. Correlate the continuous monitoring system data with the Reference Method test data, as to the time and duration of the Reference Method tests. To accomplish this, first determine from the continuous monitoring system chart recordings, the integrated average pollutant and diluent (if applicable) concentration(s) for each Reference Method test period. Be sure to consider system response time. Then, compare each integrated average concentration against the corresponding average concentration obtained by the Reference Method; use the following guidelines to make these comparisons:

6.4.5.1 If the Reference Method is an integrated sampling technique (e.g., Method 6), make a direct comparison of the Reference Method results and the continuous monitoring system integrated average concentration.

6.4.5.2 If the Reference Method is a grab-sampling technique (e.g., Method 7), first average the results from all grab-samples taken during the test period, and then compare this average value against the integrated value obtained from the continuous monitoring system chart recording.

6.5 Data Summary for Relative Accuracy Tests. Summarize the results on a data sheet; example is shown in figure 2-8. Calculate the arithmetic differences between the reference method and the continuous monitoring output sets. Then calculate the mean, confidence interval, and system relative accuracy, using Equation 2-1, 2-2, and 2-3. In Equation 2-3, use the average of the reference method test results for R.V.

7. Equations

7.1 Arithmetic Mean. Calculate the mean of a data set as follows:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^{n} x_i \qquad \text{Equation 1-2}$$

Where:

x = arithmetic mean.
n = number of data points.
Σx_i = algebraic sum of the individual values, x_i.

When the mean of the differences of pairs of data is calculated, be sure to correct the data for moisture.

7.2 Confidence Interval. Calculate the 95 percent confidence interval (two-sided) as follows:

$$C.I._{.95} = \frac{t_{.975}}{n\sqrt{n-1}} \sqrt{n\Sigma x_i^2 - (\Sigma x_i)^2} \qquad \text{Equation 1-3}$$

Where:

$C.I._{.95}$ = 95 percent confidence interval estimate of mean value.
$t_{.975} = t_{(1-\alpha/2)}$ (see Table 2-2)

BILLING CODE 6560-01-M

Table 2-2.—*t* = *Values*

n*	$t_{.975}$	n*	$t_{.975}$	n*	$t_{.975}$
2	12.706	7	2.447	12	2.201
3	4.303	8	2.365	13	2.179
4	3.182	9	2.306	14	2.160
5	2.776	10	2.262	15	2.145
6	2.571	11	2.228	16	2.131

* The values in this table are already corrected for n-1 degrees of freedom. Use *n* equal to the number of individual values.

Run no.	Date and time	SO_2			NO_x [b]			CO_2 or O_2 [a]		SO_2 [a]			NO_x [a]		
		RM	M [d]	Diff	RM	M [d]	Diff	RM [d]	M [d]	RM	M	Diff	RM	M	Diff
		ppm			ppm			%	%	mass/GCV			mass/GCV		
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
Average															
Confidence Interval															
Accuracy [c]															

[a] For steam generators [b] Average of 3 samples [c] Use average of reference method test results for R.V.

[d] Make sure that RM and M data are on a consistent basis, either wet or dry

Figure 2-8. Relative accuracy determination

7.3 Relative Accuracy. Calculate the relative accuracy of a set of data as follows:

$$R.A. = \frac{|\bar{x}|+|C.I._{95}|}{R.V.} \times 100 \quad \text{Equation 2-3}$$

Where: R. A. = relative accuracy

$|\bar{x}|$ = absolute value of the arithmetic mean (from Equation 2-1).

$|C.I._{95}|$ = absolute value of the 95 percent confidence interval (from Equation 2-2).

R.V. = reference value, as defined in Sections 6.3.1, 6.3.3.1, 6.3.3.2, and 6.5.

8. Reporting.

At a minimum (check with regional offices for additional requirements, if any) summarize the following results in tabular form: calibration error for mid-level and high-level concentrations, the slower of the upscale and downscale response times, the 2-hour and 24-hour zero and calibration drifts, and the system relative accuracy. In addition, provide, for the conditioning and operational test periods, a statement to the effect that the continuous monitoring system operated continuously for a minimum of 168 hours each, except during times of instrument zero, calibration checks, system backpurges, and source breakdown, and that no corrective maintenance, repair, replacement, or adjustment other than that clearly specified as routine and required in the operation and maintenance manuals were made. Also include the manufacturer's certification statement (if applicable) for the calibration gas, gas cells, or filters. Include all data sheets and calculations and charts (data outputs), which are necessary to substantiate that the system met the performance specifications.

9. Retest

If the continuous monitoring system operates within the specified performance parameters of Table 2-1, the operational test period will be successfully concluded. If the continuous monitoring system fails to meet any of the specifications, repeat that portion of the testing which is related to the failed specification.

10. Bibliography

10.1 "Monitoring Instrumentation for the Measurement of Sulfur Dioxide in Stationary Source Emissions," Environmental Protection Agency, Research Triangle Park, N.C., February 1973.

10.2 "Instrumentation for the Determination of Nitrogen Oxides Content of Stationary Source Emissions," Environmental Protection Agency, Research Triangle Park, N.C., Volume 1, APTD-0847, October 1971; Volume 2, APTD-0942, January 1972.

10.3 "Experimental Statistics," Department of Commerce, Handbook 91, 1963, pp. 3-31, paragraphs 3-3.1.4.

10.4 "Performance Specifications for Stationary-Source Monitoring Systems for Gases and Visible Emissions," Environmental Protection Agency, Research Triangle Park, N.C., EPA-650/2-74-013, January 1974.

10.5 Traceability Protocol for Establishing True Concentrations of Gases Used for Calibration and Audits of Continuous Source Emission Monitors (Protocol No. 1). June 15, 1978. Environmental Monitoring and Support Laboratory; Office of Research and Development, U.S. EPA, Research Triangle Park, N.C. 27711.

10.6 Westlin, P. R. and J. W. Brown. Methods for Collecting and Analyzing Gas Cylinder Samples. Emission Measurement Branch, Emission Standards and Engineering Division, Office of Air Quality Planning and Standards, U.S. EPA, Research Triangle Park, N.C., July 1978.

10.7 Curtis, Foston. A Method for Analyzing NO_x Cylinder Gases—Specific Ion Electrode Procedure. Emission Measurement Branch, Emission Standards and Engineering Division, Office of Air Quality and Standards, U.S. EPA, Research Triangle Park, N.C., October 1978.

10.8 Stanley, Jon and P. R. Westlin. An Alternative Method for Stack Gas Moisture Determination. Emission Measurement Branch, Emission Standards and Engineering Division, Office of Air Quality Planning and Standards, U.S. EPA, Research Triangle Park, N.C., August 1978.

Performance Specification 3—Specifications and Test Procedures for CO_2 and O_2 Continuous Monitors in Stationary Sources

1. Applicability and Principle

1.1 Applicability. This Specification contains (a) installation requirements, (b) instrument performance and equipment specifications, and (c) test procedures and data reduction procedures for evaluating the acceptability of continuous CO_2 and O_2 monitors that are used as diluent monitors. The test procedures are primarily designed for systems that introduce calibration gases directly into the analyzer; other types of monitors (e.g., single-pass monitors, as described in Section 2.2.7 of Performance Specification 2 of this Appendix) will be evaluated on a case-by-case basis upon written request to the Administrator, and alternative procedures will be issued separately.

1.2 Principle. Any CO_2 or O_2 continuous monitor, which is expected to meet this Specification, is operated for a specified length of time. During this specified time period, the continuous monitor is evaluated to determine conformance with the Specification.

2. Definitions

The definitions are the same as those listed in Section 2 of Performance Specification 2.

3. Installation Specifications

3.1 Measurement Location and Measurement Points or Paths. Select and install the continuous monitor at the same sampling location used for the pollutant monitor(s). Locate the measurement points or paths as shown in Figure 3-1 or 3-2.

3.2 Alternative Measurement Location and Measurement Points or Paths. The diluent monitor may be

installed at a different location from that of the pollutant monitor, provided that the diluent gas concentrations at both locations differ by no more than 5 percent from that of the pollutant monitor location for CO_2 or the quantity, 20.9-percent O_2, for O_2. See Section 3.4 of Performance Specification 2 for the demonstration procedure.

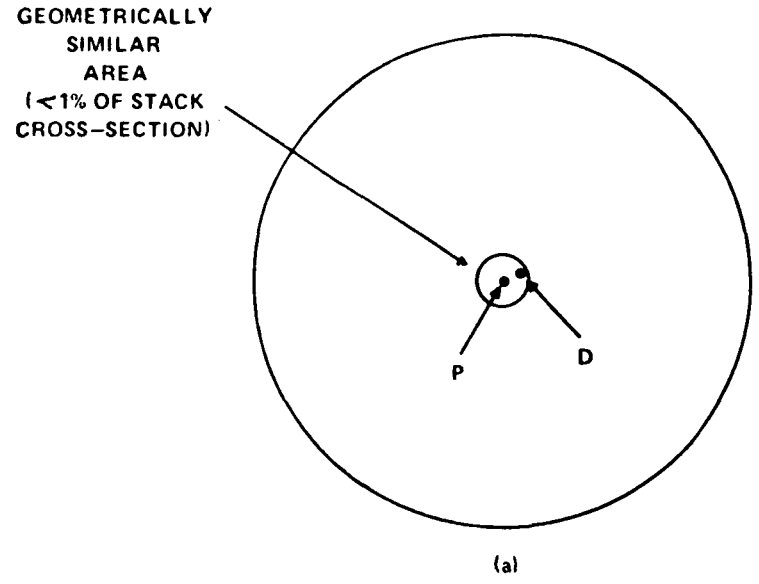
4. Continuous Monitor Performance and Equipment Specifications

The continuous monitor performance and equipment specifications are listed in Table 3–1. To be considered acceptable, the continuous monitor must demonstrate compliance with these specifications, using the test procedures in Section 6.

5. Apparatus

5.1 CO_2 or O_2 Continuous Monitor. Use any continuous monitor, which is expected to meet this Specification. The data recorder may either be an analog strip-chart recorder or other suitable device having an input voltage range compatible with the analyzer output.

5.2 Calibration Gases. Diluent gases shall be air or N_2 for CO_2 mixtures, and shall be N_2 for O_2 mixtures. Use three calibration gases as specified below:



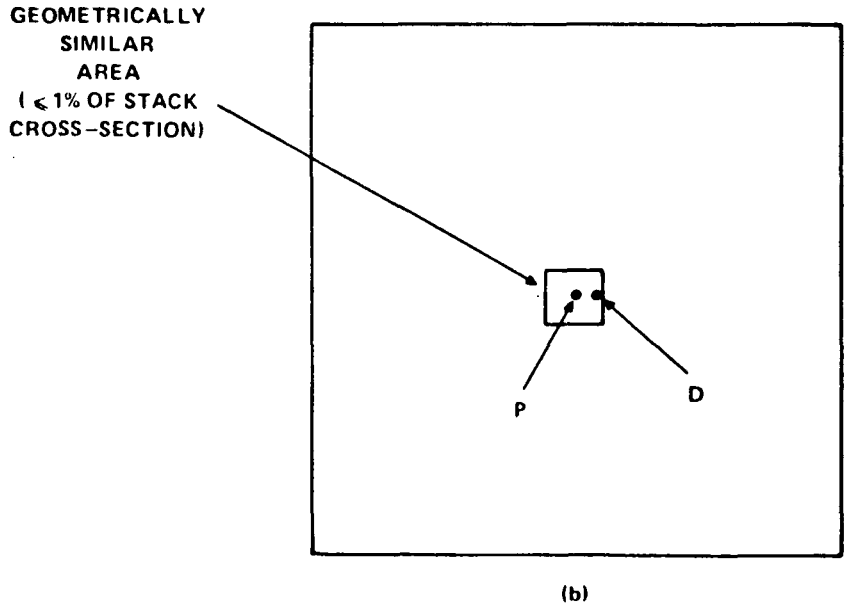


Figure 3-1. Relative locations of pollutant (P) and diluent (D) measurement points in (a) circular and (b) rectangular ducts. P is located at the centroid of the geometrically similar area. Note: The geometrically similar area need not be concentric.

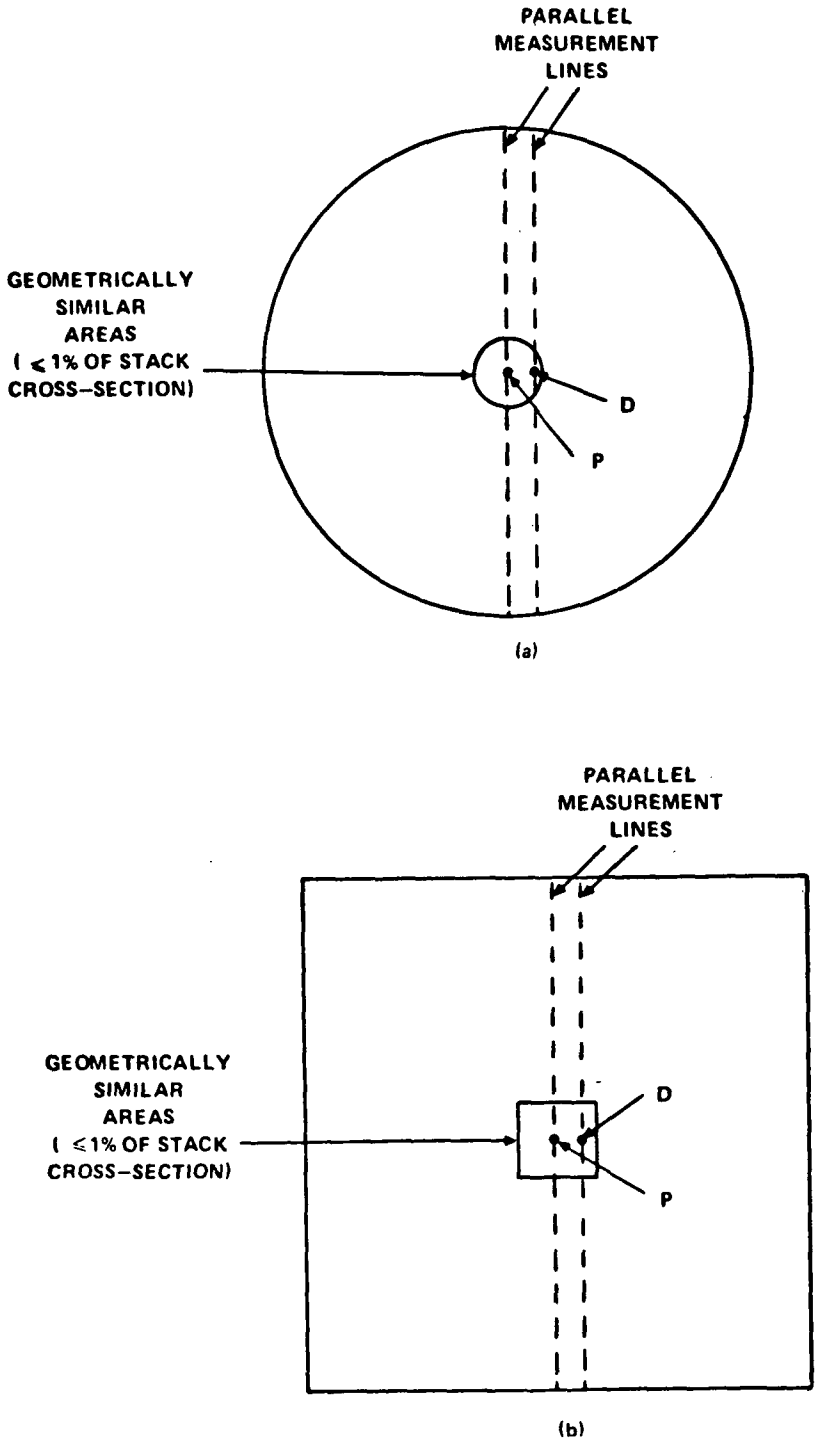


Figure 3-2. Relative locations of pollutant (P) and diluent (D) measurement paths for (a) circular and (b) rectangular ducts. P is located at the centroid of both the geometrically similar areas and the pollutant monitor path cross-sectional areas. D is located at the centroid of the diluent monitor path cross-sectional area.

Table 3-1.—*Performance and Equipment Specifications*

Parameter	Specification
1. Conditioning period [a].	≥ 168 hours.
2. Operational test period [a].	≥ 168 hours.
3. Calibration error [b] ...	≤ 5 pct. of each (mid-range and high-range, only) calibration gas value.
4. Reponse time	≤ 15 minutes.
5. Zero drift (2-hour) [b, c].	≤ 0.4 pct. CO_2 or O_2.
6. Zero drift (24-hour) [b, c].	≤ 10.5 pct. CO_2 or O_2.
7. Calibration drift (2-hour) [b].	≤ 0.4 pct. CO_2 or O_2.
8. Calibration drift (24-hour) [b].	≤ 0.5 pct. CO_2 or O_2.
9. Data recorder chart resolution.	Chart scales must be readable to within ≤ 0.50 pct. of full-scale.
10. Extractive monitors	Must use the same interface as the pollutant monitor. Place in a series (diluent after pollutant analyzer) or use a "T."

[a] During the conditioning and operational test periods, the continuous monitor shall not require any corrective maintenance, repair, replacement, or adjustment other than that clearly specified as routine and required in the operation and maintenance manuals.

[b] Expressed as the sum of the absolute mean value plus the 95 percent confidence interval of a series of tests.

[c] A low-level (5–15 percent of span value) drift tests may be substituted for the zero drift tests.

5.2.1 High-Level Gas. A CO_2 or O_2 concentration of 20.0 to 22.5 percent. For O_2 analyzers, ambient air (20.9 percent O_2) may be used as the high-range calibration gas; lower high-level O_2 concentration may be used, subject to the approval of the Administrator.

5.2.2 Mid-Level Gas. A CO_2 or O_2 concentration of 11.0 to 14.0 percent; for O_2 analyzers, concentrations in the operational range may be used.

5.2.3 Zero Gas. A CO_2 or O_2 concentration of less than 0.05 percent. For CO_2 monitors, ambient air (0.03 percent CO_2) may be used as the zero gas.

6. Performance Specification Test Procedures.

6.1 Calibration Gas Certification. Follow the procedure as outlined in Section 6.1.2 of Performance Specification 2, except use 0.5 percent CO_2 or O_2 instead of the 15 ppm. Figure 3–3 is provided as an example data sheet.

6.2 Conditioning Period. Follow the same procedure outlined in Section 6.2 of Performance Specification 2.

6.3 Operational Test Period. Follow the same procedures outlined in Section 6.3 of Performance Specification 2, to evaluate the calibration error, response time, and the 2-hour and 24-hour zero and calibration drifts. See example data sheets (Figures 3–4 through 3–7).

6.4 System Relative Accuracy. (Note: The relative accuracy is not determined separately for the diluent monitor, but is determined for the pollutant-diluent system.) Unless otherwise specified in an applicable subpart of the regulations, the Reference Methods for the diluent concentration determination shall be Reference Method 3 for CO_2 or O_2. For this test, Fyrite analyses may be used for CO_2 and O_2 determinations. Perform the measurements using the guidelines below (an example data sheet is shown in Figure 2–8 of Performance Specification 2):

6.4.1 Location of Reference Method 3 Sampling Points. Locate the diluent Reference Method sampling points according to the guidelines given in Section 6.4.2.1 of Performance Specification 2.

6.4.2 Number of Reference Method Tests. Perform one Reference Method 3 test according to the guideline in Performance Specification 2.

6.4.3 Sampling Strategy for Reference Method Tests. Use the basic Reference Method sampling strategy outlined in Section 6.4.4 (and related sub-sections) of Performance Specification 2.

6.4.4 Correlation of Reference Method and Continuous Monitor Data. Use the guidelines given in Section 6.4.5 of Performance Specification 2.

7. Equations, Reporting, Retest, and Bibliography. The procedure and citations are the same as in Sections 7 through 10 of Performance Specification 2.

[FR Doc. 79-31033 Filed 10-9-79; 8:45 am]

Figure 3-3. Analysis of Calibration Gases[a]

Date_____ (Must be within 2 weeks prior to the operational test period)

Reference Method Used_____

Sample run	Mid-range[c] ppm	High-range[d] ppm
1		
2		
3		
Average		
Maximum % deviation[e]		

[a] Not necessary if the protocol in Citation 10.5 of Performance Specification 2 is used to prepare the gas cylinders.

[c] Average must be 11.0 to 14.0 percent; for O_2, see Section 5.2.2.

[d] Average must be 20.0 to 22.5 percent; for O_2, see Section 5.2.1.

[e] Must be $\leq \pm$ 10 percent of applicable average or 0.5 percent, whichever is greater.

Figure 3-4. Calibration Error Determination

Run No.	Calibration Gas Concentration[a] ppm	Measurement System Reading ppm	Arithmetic Differences ppm	
	A	B	A-B	
			Mid	High
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
Arithmetic Mean (Eq. 2-1)[b] =				
Confidence Interval (Eq. 2-2)[b] =				
Calibration Error (Eq. 2-3)[b,c] =				

[a] Calibration Data from Section 6.1

Mid-level: C = _____ ppm

High-level: D = _____ ppm

[b] See Performance Specification 2

[c] Use C or D as R. V.

Figure 3-5. Response Time

Date _____ High-Range = _____ ppm

Test Run	Upscale min	Downscale min
1		
2		
3		
Average	A =	B =

System Response Time (slower of A and B) = _____ min.

Data set no	Date	Time		Zero Rd.		Zero drift	Hi-Range Rdg.		Span drift	Calib. drift
		Begin	End	Init.	Fin.		Init.	Fin.		
				A	B	C=B-A	D	E	F=E-D	G=F-C
Arithmetic Mean (Eq. 2-1)[a]										
Confidence Interval (Eq. 2-2)[a]										
Zero drift[b]							Calibration drift[b]			

[a] From Performance Specification 2.

[b] Use Equation 2-3 of Performance Specification 2 and 1.0 for R. V.

Figure 3-6. Zero and Calibration Drift (2 hour)

Data set no.	Date	Time		Zero Rdg		Zero drift	Hi-Range Rdg		Span drift	Calib. drift
		Begin	End	Init.	Fin.		Init.	Fin.		
				A	B	C=B-A	D	E	F=E-D	G=F-C
Arithmetic Mean (Eq. 2-1)[a]										
Confidence Interval (Eq. 2-2)[a]										
Zero drift [b]							Calibration drift [b]			

[a] From Performance Specification 2.

[b] Use Equation 2-3 of Performance Specification 2, with 1.0 for R. V.

Figure 3-7. Zero and Calibration Drift (24-hour)

40 CFR Part 60

[FRL 1378-3]

Standards of Performance for New Stationary Sources Continuous Monitoring Performance Specifications; Extension of Comment Period

AGENCY: Environmental Protection Agency (EPA).

ACTION: Extension of Comment Period.

SUMMARY: The deadline for submittal of comment on the proposed revisions to the continuous monitoring performance specifications, which were proposed on October 10, 1979 (44 FR 58602), is being extended from December 10, 1979, to February 11, 1980.

DATES: Written comments and information must be received on or before February 11, 1980.

ADDRESSES: *Comments.* Written comments and information should be submitted (in duplicate, if possible) to: Central Docket Section (A-130), Attention: Docket Number OAQPS-79-4, U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, D.C. 20460.

Docket. Docket Number OAQPS-79-4, containing material relevant to this rulemaking, is located in the U.S. Environmental Protection Agency Central Docket Section, Room 2903B, 401 M Street, S.W., Washington, D.C. 20460. The docket may be inspected between 8:00 a.m. and 4:00 p.m. on weekdays, and a reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: Mr. Don R. Goodwin (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, N.C. 27711; telephone (919) 541-5271.

SUPPLEMENTARY INFORMATION: On October 10, 1979 (44 FR 58602), the Environmental Protection Agency proposed revisions to the Continuous Monitoring Performance Specifications, 1, 2, and 3. The notice of proposal requested public comments on the standards by December 10, 1979. Due to delay in the shipping of copies of the performance specifications publication, a sufficient number of copies have been unavailable for distribution to all interested parties in time to allow their meaningful review and comment by December 10, 1979. An extension of this period is justified as this delay has resulted in about a 5-week delay in processing requests for the document.

Dated: December 12, 1979.

Edward F. Tuerk,

Acting Assistant Administrator for Air, Noise, and Radiation.

[FR Doc. 79-39002 Filed 12-19-79; 8:45 am]

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 60

[FRL 1389-2]

Standards of Performance for New Stationary Sources Continuous Monitoring Performance Specifications

AGENCY: Environmental Protection Agency (EPA).

ACTION: Advance notice of proposed rulemaking.

SUMMARY: This notice sets forth draft Performance Specification 4—Specifications and Test Procedures for Carbon Monoxide Continuous Monitoring Systems in Stationary Sources, which EPA is considering to propose as an addition to Appendix B of 40 CFR Part 60. The intent of this advance notice is to solicit comments on the specifications and testing procedures EPA is considering.

This advance notice of proposed rulemaking is issued under the authority of Sections 111, 114, and 301(a) of the Clean Air Act as amended (42 U.S.C. 7411, 7414, and 7601(a)).

DATES: Written comments and information should be post-marked on or before May 20, 1980.

ADDRESSES: *Comments.* Written comments and information should be submitted (in duplicate, if possible) to: Central Docket Section (A-130), Attention: Docket Number A-79-03, U.S. Environmental Protection Agency, 401 M Street, SW., Washington, D.C. 20460.

Docket. Docket Number A-79-03, containing material relevant to this rulemaking, is located in the U.S. Environmental Protection Agency Central Docket Section, Room 2903B, 401 M Street, SW., Washington, D.C. 20460. The docket may be inspected between 8:00 a.m. and 4:00 p.m. on weekdays, and a reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: Mr. Don Goodwin (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, N.C. 27711, telephone (919) 541-5271.

SUPPLEMENTARY INFORMATION: EPA promulgated standards of performance for new stationary sources pursuant to Section 111 of the Clean Air Act, as amended, on March 8, 1974 (39 FR 9308), for petroleum refineries and six other stationary sources. New or modified sources in these categories are required to demonstrate compliance with the standards of performance by means of performance tests that are conducted at the time a new source commences operation or shortly thereafter. To ensure that these sources are properly operated and maintained so as to remain in compliance, provisions were included in the standards that require sources to install and operate a continuous emission monitoring system. One such requirement was for carbon monoxide (CO) from petroleum refineries.

When the standards were initially proposed, EPA had limited knowledge about the operation of continuous monitors on such sources; thus, the continuous emission monitoring requirements were specified in general terms. Additional guidance on the selection and use of such instruments was to be provided at a later date.

On October 6, 1975 (40 FR 46259), the Environmental Protection Agency amended Part 60 of the regulations by adding Appendix B—Performance Specifications 1, 2, and 3 for continuous monitoring of (1) opacity, (2) sulfur dioxide and nitrogen oxide, and (3) oxygen or carbon dioxide, respectively. Performance specifications for CO monitors were not published at that time.

EPA has conducted short-term evaluations of the applicability of several continuous monitoring instruments and has published the results in the following documents: *Guidelines for Development of a Quality Assurance program: Volume VIII—Determination of CO Emissions from Stationary Sources by NDIR Spectrometry*, EPA-650/4-74-005-h (February 1975); and *Evaluation of Continuous Monitors for Carbon Monoxide in Stationary Sources*, EPA-600/2-77-063) March 1977). Both are available through the National Technical Information Service, Springfield, Virginia 22161.

Based on the above documents, specifications and test procedures were drafted for continuous CO monitoring instruments. the format of the draft Performance Specification 4 follows closely that of the most recent proposed revisions to Performance Specification 2 (44 FR 58602 dated Oct. 10, 1979). Several references are made in Performance Specification 4 to specific sections of the Performance Specification 2 revisions.

The Environmental Monitoring and Support Laboratory of EPA is also presently conducting a laboratory and long-term field study of CO continuous monitoring systems. Results of this study will provide essential background and technical information in support of or improvement to Performance Specification 4. The completion date is scheduled for mid-1981. For this reason, Performance Specification 4 for CO is published as an advance notice.

Specific Requests

EPA is requesting comments on the attached draft Performance Specification 4—Specifications and Test Procedures for CO Monitoring Systems in Stationary Sources. EPA is interested in comments on alternatives to the performance specifications and is particularly interested in information that could lead to the development of improved or alternative procedures. EPA is also interested in comments on the following aspects of CO continuous monitoring and Performance Specification 4: (1) Estimates of installation and operation costs including equipment costs, manpower requirements, data reduction options, and maintenance costs, (2) procedures applicable for the evaluation of single-pass, in-situ monitoring system; (3) laboratory testing procedures that are necessary for determining monitoring system performance acceptability and those laboratory tests that can be recommended as indications of the quality of equipment operation; (4) the specifications and limits set forth in Section 4; (5) the applicability of Reference Method 10 or other methods for determining relative accuracy of continuous CO monitoring systems.

Dated: February 12, 1980.

Barbara Blum,

Acting Administrator.

Performance Specification 4—Specifications and Test Procedures for Carbon Monoxide Continuous Monitoring Systems in Stationary Sources

1. Applicability and Principle

1.1 Applicability. This specification contains (a) installation requirements, (b) instrument performance and equipment specifications, and (c) test procedures and data reduction procedures for evaluating the acceptability of carbon monoxide (CO) continuous monitoring systems. The test procedures are not applicable to single-pass, in-situ monitoring systems; these systems will be evaluated on a case-by-case basis upon application to the Administrator, and alternative procedures will be issued separately.

1.2 Principle. A CO continuous monitoring system that is expected to meet this specification is installed, calibrated, and operated for a specified length of time. During the specified time period, the continuous monitoring

system is evaluated to determine conformance with the specification.

2. Definitions

The definitions are the same as those listed in Section 2 of Performance Specification 2.

3. Installation Specifications

Install the continuous monitoring system at a location where the pollutant concentration measurements are representative of the total emissions from the affected facility. Use a point, points, or a path that represents the average concentration over the cross section. Both requirements can be met as follows:

3.1 Measurement Location. Select an accessible measurement location in the stack or ductwork that is at least two (2) equivalent diameters downstream from the nearest CO control device or other point at which a change in the pollutant concentration may occur and at least 0.5 equivalent diameter upstream from the exhaust. Individual subparts of the regulations may contain additional requirements.

3.2 Measurement Points or Paths. The tester may choose to use the following measurement point, points, or path without a stratification check or he may choose to conduct the stratification check procedure given in Section 3.3 of Performance Specification 2 to select the point, points, or path of average gas concentration.

3.2.1 CO Path Monitoring Systems. Same as in Performance Specification 2, Section 3.2.2.

3.2.3 Single-Point and Limited-Path Monitoring Systems. Same as in Performance Specification 2, Section 3.2.3.

4. Performance and Equipment Specifications

The continuous monitoring system performance and equipment specifications are listed in Table 4–1. To be considered acceptable, the continuous monitoring system must demonstrate compliance with these specifications using the test procedures of Section 6.

5. Apparatus

5.1 Continuous Monitoring System. Use any continuous monitoring system for CO, which is expected to meet the specifications in Table 4–1. The data recorder may be an analog strip-chart recorder or other suitable device with an input signal range compatible with the analyzer output.

Table 4–1.—*Continuous Monitoring System Performance and Equipment Specifications*

Parameter	Specification
1. Conditioning period [a]	≥ 168 hours.
2. Operational test period [a].	≥ 168 hours.
3. Calibration error [b]	≤ 5 percent of each mid-level and high-level calibration value.
4. Response time	≤ 10 minutes.
5. Zero drift, 2 hours [a]	≤ 1 percent of span value.
6. Zero drift, 24 hours [a]	≤ 2 percent of span value.
7. Calibration drift, 2 hours [a].	≤ 2 percent of span value.
8. Calibration drift, 24 hours [a].	≤ 2.5 percent of span value.
9. Relative accuracy [a]	≤ 10 percent of Mean Ref. value.
10. Calibration gas cells or filters.	Must provide a check of all analyzer internal mirrors and lenses, and all electronic circuitry including the radiation source and detector assembly, which are normally used in sampling and analysis.
11. Data recorder chart resolution.	Chart scales must be readable to within ± 0.5 percent of full-scale.

[a] During the conditioning and operational test periods, the continuous monitoring system shall not require any corrective maintenance, replacement, or adjustment other than that clearly specified as routine and required in the operation and maintenance manuals

[b] Expressed as sum of absolute mean value plus 95 percent confidence interval of a series tests divided by a reference value.

5.2 Calibration Gases. For continuous monitoring systems that allow the introduction of calibration gases to the analyzer, the calibration gases must be CO in N_2. Use three calibration gas mixtures as specified below;

5.2.1 High-Level Gas. A gas concentration that is equivalent to 80 to 90 percent of the span value.

5.2.2 Mid-Level Gas. A gas concentration that is equivalent to 45 to 55 percent of the span value.

5.2.3 Zero Gas. A gas concentration of less than 0.25 percent of the span value. Prepurified nitrogen should be used.

5.3 Calibration Gas Cells or Filters. For continuous monitoring systems which use calibration gas cells or filters, use three certified calibration gas cells or filters as specified below:

5.3.1 High-Level Gas Cell or Filter. One that produces an output equivalent to 80 to 90 percent of the span value.

5.3.2 Mid-Level Gas Cell or Filter. One that produces an output equivalent to 45 to 55 percent of the span value.

5.3.3 Zero Gas Cell or Filter. One that produces an output equivalent to zero. Alternatively, an analyser may produce a zero value check by mechanical means, such as a movable mirror.

6. Performance Specification Test Procedures

6.1 Pretest Preparation.

6.1.1 Calibration Gas Analyses. Use calibration gas prepared according to the protocol defined in Reference 10.2.

6.1.2 Calibration Gas Cell or Filter Certification. Obtain from the manufacturer a statement certifying that the calibration gas cells or filters (zero, mid-level, and high-level) will produce the stated instrument response for the continuous monitoring system, and a description delineating the test procedure and equipment used to calibrate the cells or filters. At a minimum, the manufacturer must have calibrated the gas cells or filters against a simulated source of known concentration.

6.2 Continuous Monitoring System Preparation.

6.2.1 Installation. Install the continuous monitoring system according to the measurement location procedures outlined in Section 3 of this specification. Prepare the system for operation according to the manufacturer's written instructions.

6.2.2 Conditioning Period. Follow the procedure in Performance specification 2, Section 6.2.

6.3 Operational Test Period. Follow the procedure in Performance Specification 2, Section 6.3 and the following subsections:

6.3.1 Calibration Error Determination. Follow the procedures in Performance Specification 2, Section 6.3.1.

6.3.2 Response Time Test Procedure. Follow the procedures in Performance Specification 2, Section 6.3.2.

6.3.3 Field Test for Zero Drift and Calibration Drift. Follow the procedures in Performance specification 2, Section 6.3.3.

6.4 System Relative Accuracy. Follow the procedures in Performance Specification 2, Section 6.4 and all the accompanying subsections. The reference method is Reference Method 10.

6.5 Data Summary for Relative Accuracy Tests. Follow the procedures in Performance Specification 2, Section 6.5.

7. Equations and Reporting

Follow the procedures in Performance Specification 2, Section 7 and all the accompanying subsections.

8. Reporting

Follow the procedures in Performance Specification 2, Section 8.

9. Retest

Follow the procedures in Performance Specification 2, Section 9.

10. *Bibliography*

10.1 Repp, Mark. Evaluation of Continuous Monitors for Carbon Monoxide in Stationary Sources. U.S. Environmental Protection Agency. Research Triangle park, NC. Publication No. EPA-600/2-77-063. March 1977.

10.2 Traceability Protocol for Establishing True Concentrations of Gases Used for Calibration and Audits of Continuous Source Emission Monitors (Protocol No. 1). June 15, 1978. Environmental Monitoring and Support Laboratory, Office of Research Development, U.S. Environmental Protection Agency. Research Triangle Park, NC 27711.

10.3 Department of Commerce. Experimental Statistics. Handbook 91. Library of Congress No. 63-60072. U.S. Government Printing Office, Washington, DC.

[FR Doc. 80-5289 Filed 2-19-80; 8:45 am]

Federal Register / Vol. 46, No. 16

Monday, January 26, 1981

Proposed Rules

NOTE: The preamble to the proposed revisions to Performance Specifications 2 and 3 is included in the proposed revisions to Appendix A, Methods 6A and 6B.

* * * * * *

5. By revising Performance 2 and Performance 3 of Appendix B of 40 CFR Part 60 to read as follows:

Appendix B—Performance Specifications

* * * * *

Performance Specification 2—Specifications and Test Procedures for SO_2 and NO_x Continuous Emission Monitoring Systems in Stationary Sources

1. *Applicability and Principle*

1.1 *Applicability.* This specification is to be used for evaluating the acceptability of SO_2 and NO_x continuous emission monitoring systems (CEMS) after the initial installation and whenever specified in an applicable subpart of the regulations. The CEMS may include, for certain stationary sources, diluent (O_2 or CO_2) monitors.

1.2 *Principle.* Installation and measurement location specifications, performance and equipment specifications, test procedures, and data reduction procedures are included in this specification. Reference method (RM) tests and calibration drift tests are conducted to determine conformance of the CEMS with the specification.

2. *Definitions*

2.1 *Continuous Emission Monitoring System (CEMS).* The total equipment required for the determination of a gas concentration or emission rate. The system consists of the following major subsystems:

2.1.1 *Sample Interface.* That portion of the CEMS that is used for one or more of the following: Sample acquisition, sample transportation, and sample conditioning, or protection of the monitor from the effects of the stack effluent.

2.1.2 *Pollutant Analyzer.* That portion of the CEMS that senses the pollutant gas and generates an output that is proportional to the gas concentration.

2.1.3 *Diluent Analyzer (if applicable).* That portion of the CEMS that senses the diluent gas (e.g., CO_2 or O_2) and generates an output that is proportional to the gas concentration.

2.1.4 *Data Recorder.* That portion of the CEMS that provides a permanent record of the analyzer output. The data recorder may include automatic data reduction capabilities.

2.2 *Point CEMS.* A CEMS that measures the gas concentration either at a single point or along a path that is equal to or less than 10 percent of the equivalent diameter of the stack or duct cross section.

2.3 *Path CEMS.* A CEMS that mesures the gas concentration along a path that is greater than 10 percent of the equivalent diameter of the stack or duct cross section.

2.4 *Span Value.* The upper limit of a gas concentration measurement range that is specified for affected source categories in the applicable subpart of the regulations.

2.5 *Relative Accuracy. (RA).* The absolute mean difference between the gas concentration or emission rate determined by the CEMS and the value determined by the reference method(s) plus the 2.5 percent error confidence coefficient of a series of tests divided by the mean of the reference method (RM) tests or the applicable emission limit.

2.6 *Calibration Drift (CD).* The difference in the CEMS output readings from the established reference value after a stated period of operation during which no unscheduled maintenance, repair, or adjustment took place.

2.7 *Centroidal Area.* A concentric area that is geometrically similar to the stack or duct cross section and is no greater than 1 percent of the stack or duct cross-sectional area.

2.8 *Representative Results.* As defined by the RM test procedure outlined in this specification.

3. *Installation and Measurement Location Specifications*

3.1 *CEMS Installation and Measurement Location.* Install the CEMS at an accessible location where the pollutant concentration or emission rate measurements are directly representative or can be corrected so as to be representative of the total emissions from the affected facility. Then select representative measurement points or paths for monitoring such that the CEMS will pass the relative accuracy (RA) test (see Section 7). If the cause of failure to meet the RA test is determined to be the measurement location, the CEMS may be required to be relocated.

Suggested measurement locations and points or paths are listed below; other locations and points or paths may be less likely to provide data that will meet the RA requirements.

3.1.1 *CEMS Location.* It is suggested that the measurement location be at least two equivalent diameters downstream from the nearest control device or other point at which a change in the pollutant concentration or emission rate may occur and at least a half equivalent diameter upstream from the effluent exhaust.

3.1.2 *Point CEMS.* It is suggested that the measurement point be (1) no less than 1.0 meter from the stack or duct wall, or (2) within or centrally located over the centroidal area of the stack or duct cross section.

3.1.3 *Path CEMS.* It is suggested that the effective measurement path (1) be totally within the inner area bounded by a line 1.0 meter from the stack or duct wall, or (2) have at least 70 percent of the path within the inner 50 percent of the stack or duct cross-sectional area, or (3) be centrally located over any part of the centroidal area.

3.2 *RM Measurement Location and Traverse Points.* Select an RM measurement point that is accessible and at least two equivalent diameters downstream from the nearest control device or other point at which a change in the pollutant concentration or emission rate may occur and at least a half equivalent diameter upstream from the effluent exhaust. The CEMS and RM locations need not be the same.

Then select traverse points that assure acquisition of representative samples over the stack or duct cross section. The minimum requirements are as follows: Establish a "measurement line" that passes through the centroidal area. If this line interferes with the CEMS measurements, displace the line up to 30 cm (or 5 percent of the equivalent diameter of the cross section, whichever is less) from the centroidal area. Locate three traverse points at 16.7, 50.0, and 83.3 percent of the measurement line. If the measurement line is longer than 2.4 meters, the three traverse points may be located on the line at 0.4, 1.2, and 2.0 meters from the stack or duct wall. The tester may select other traverse points, provided that they can be shown to the satisfaction of the Administrator to provide a representative sample over the stack or duct cross section. Conduct all necessary RM tests within 3 cm (but no less than 3 cm from the stack or duct wall) of the traverse points.

4. *Performance and Equipment Specifications*

4.1 *Instrument Zero and Span.* The CEMS recorder span must be set at 90 to 100 percent of recorder full-scale using a span level of 90 to 100 percent of the span value (the Administrator may approve other span levels). The CEMS design must also allow the determination of calibration drift at the zero and span level points on the calibration curve. If this is not possible or is impractical, the design must allow these determinations to be conducted at a low-level (0 to 50 percent of span value) point and at a high-level (80 to 100 percent of span value) point. In special cases, if not already approved, the Administrator may approve a single-point calibration-drift determination.

4.2 *Calibration Drift.* The CEMS calibration must not drift or deviate from the reference value of the gas cylinder, gas cell, or optical filter by more than 2.5 percent of the span value. If the CEMS includes pollutant and diluent monitors, the calibration drift must be determined separately for each in terms of concentrations (see Performance Specification 3 for the diluent specifications).

4.3 *CEMS Relative Accuracy.* The RA of the CEMS must be no greater than 20 percent of the mean value of the RM test data in terms of the units of the emission standard or 10 percent of the applicable standard, whichever is greater.

5. *Performance Specification Test Procedure*

5.1 *Pretest Preparation.* Install the CEMS and prepare the RM test site according to the specifications in Section 3, and prepare the CEMS for operation according to the manufacturer's written instructions.

5.2 *Calibration Drift Test Period.* While the affected facility is operating at more than 50 percent capacity, or as specified in an applicable subpart, determine the magnitude of the calibration drift (CD) once each day (at 24-hour intervals) for 7 consecutive days according to the procedure given in Section 6. To meet the requirement of Section 4.2, none of the CD's must exceed the specification.

5.3 *RA Test Period.* Only after the CEMS passes the CD test, conduct the RA test according to the procedure given in Section 7 while the affected facility is operating at more than 50 percent capacity, or as specified in an applicable subpart. To meet the specifications, the RA must be equal to or less than 20 percent or 10 percent of the applicable standard, whichever is greater. For instruments that use common components to measure more than one effluent gas constituent, all channels must simultaneously pass the RA requirement, unless it can be demonstrated that any adjustments made to one channel did not affect the others.

6. *CEMS Calibration Drift Test Procedure*

The CD measurement is to verify the ability of the CEMS to conform to the established CEMS calibration used for determining the emission concentration or emission rate. Therefore, if periodic automatic or manual adjustments are made to the CEMS zero and/or calibration settings, conduct the CD test immediately before these adjustments.

Conduct the CD test at the two points specified in Section 4.1. Introduce to the CEMS the reference gases, gas cells, or optical filters (these need not be certified). Record the CEMS response and subtract this value from the reference value (see example data sheet in Figure 2-1).

If an increment addition procedure is used to calibrate the CEMS, a single-point CD test may be used as follows: Use an increment cell or calibration gas ith a value that will provide a total CEMS response (i.e., stack plus cell concentrations) between 80 and 95 percent of the span value. Compare the difference between the measured CEMS response and the expected CEMS response with the increment value to establish the CD.

BILLING CODE 6560-26-M

	Day	Date and time	Calibration value	Monitor value	Difference
Low-level					
High-level					

Figure 2-1. Calibration drift determination.

BILLING CODE 6560-26-C

Relative Accuracy Test Procedure

7.1 *Sampling Strategy for RM Tests.* Conduct the RM tests such that they will yield results representative of the emissions from the source and can be correlated to the CEMS data. Although it is preferable to conduct the diluent (if applicable), moisture (if needed), and pollutant measurements simultaneously, the diluent and moisture measurements that are taken within a 30- to 60-minute period, which includes the pollutant measurements, may be used to calculate dry pollutant concentration and emission rate.

In order to correlate the CEMS and RM data properly, mark the beginning and end of each RM test period of each run (including the exact time of the day) on the CEMS chart recordings or other permanent record of output. Use the following strategies for the RM tests:

7.1.1 For integrated samples, e.g., Method 6 and Method 4, make a sample traverse of at least 21 minutes, sampling for 7 minutes at each traverse point.

7.1.2 For grab samples, e.g., Method 7, take one sample at each traverse point, scheduling the grab samples so that they are taken simultaneously (within a 3-minute period) or are an equal interval of time apart over a 21-minute (or less) period.

Note.—At times, CEMS RA tests are conducted during NSPS performance tests. In these cases, RM results obtained during CEMS RA tests may be used to determine compliance as long as the source and test conditions are consistent with the applicable regulations.

7.2 *Correlation of RM and CEMS Data.* Correlate the CEMS and the RM test data as to the time and duration by first determining from the CEMS final output (the one used for reporting) the integrated average pollutant concentration or emission rate for each pollutant RM test period. Consider system response time, if important, and confirm that the pair of results are on a consistent moisture, temperature, and diluent concentration basis. Then, compare each integrated CEMS value against the corresponding average RM value. Use the following guidelines to make these comparisons.

7.2.1 If the RM has an integrated sampling technique, make a direct comparison of the RM results and CEMS integrated average value.

7.2.2 If the RM has a grab sampling technique, first average the results from all grab samples taken during the test run and then compare this average value against the integrated value obtained from the CEMS chart recording during the run.

7.3 *Number of RM Tests.* Conduct a minimum of nine sets of all necessary RM tests. For grab samples, e.g., Method 7, a set is made up of at least three separate measurements. Conduct each set within a period of 30 to 60 minutes.

Note.—The tester may choose to perform more than nine sets of RM tests. If this option is chosen, the tester may, at his descretion, reject a maximum of three sets of the test results so long as the total number of test results used to determine the relative accuracy is greater than or equal to nine, but he must report all data including the rejected data.

7.4 *Reference Methods.* Unless otherwise specified in an applicable subpart of the regulations, Methods 6, 7, 3, and 4, or their approved alternatives, are the reference methods for SO_2, NO_x, diluent (O_2 or CO_2), and moisture, respectively.

7.5 *Calculations.* Summarize the results on a data sheet; an example is shown in Figure 2–2. Calculate the mean of the RM values. Calculate the arithmetic differences between the RM and the CEMS output sets. Then calculate the mean of the difference, standard deviation, confidence coefficient, and CEMS RA, using Equations 2–1, 2–2, 2–3, and 2–4.

8. *Equations*

8.1 *Arithmetic Mean.* Calculate the arithmetic mean of the difference, d, of a data set as follows:

$$\bar{d} = \frac{1}{n} \sum_{i=1}^{n} d_i \qquad \text{(Eq. 2-1)}$$

Where:

n = Number of data points.

$\sum_{i=1}^{n} d_i$ = Algebraic sum of the individual differences, d_i.

When the mean of the differences of pairs of data is calculated, be sure to correct the data for moisture, if applicable.

BILLING CODE 6560-26-M

Run No.	Date and time	SO_2			NO_x [b]			CO_2 or O_2 [a]		SO_2 [a]			NO_x [a]		
		RM	M	Diff	RM	M	Diff	RM	M	RM	M	Diff	RM	M	Diff
		ppm [c]			ppm [c]			% [d]	% [d]	mass/GCV			mass/GCV		
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
Average															
Confidence Interval															
Accuracy [c]															

[a] For steam generators; [b] Average of three samples; [c] Make sure that RM and M data are on a consistent basis, either wet or dry.

Figure 2-2. Relative accuracy determination.

BILLING CODE 6560-26-C

8.2 *Standard Deviation.* Calculate the standard deviation S_d as follows:

$$S_d = \sqrt{\frac{\sum_{i=1}^{n} d_i^2 - \frac{(\sum_{i=1}^{n} d_i)^2}{n}}{n-1}} \quad \text{(Eq. 2-2)}$$

8.3 *Confidence Coefficient.* Calculate the 2.5 percent error confidence coefficient (one-tailed) CC as follows:

$$CC = t_{0.975} \frac{S_d}{\sqrt{n}} \quad \text{(Eq. 2-3)}$$

Where:

$t_{0.975}$ = t-values (see Table 2-1)

Table 2-1. t-VALUES

n*	$t_{0.975}$	n*	$t_{0.975}$	n*	$t_{0.975}$
2	12.706	7	2.447	12	2.201
3	4.303	8	2.365	13	2.179
4	3.182	9	2.306	14	2.160
5	2.776	10	2.262	15	2.145
6	2.571	11	2.228	16	2.131

* The values in this table are already corrected for n-1 degrees of freedom. Use n equal to the number of individual values.

8.4 *Relative Accuracy.* Calculate the RA of a set of data as follows:

$$RA = \frac{|\bar{d}| + |CC|}{\overline{RM}} \times 100 \quad \text{(Eq. 2-4)}$$

Where:

$|\bar{d}|$ = Absolute value of the mean of differences (from Equation 2-1).

$|CC|$ = Absolute value of the confidence coefficient (from Equation 2-3).

$\overline{RM}$ = Average RM value or applicable standard.

Where:

d = Absolute value of the mean of differences (from Equation 2-1).

CC = Absolute value of the confidence coefficient (from Equation 2-3).

RM = Average RM value or applicable standard.

9. *Reporting*

At a minimum (check with the appropriate regional office, or State or local agency for additional requirements, if any) summarize in tabular form the calibration drift tests and the RA tests. Include all data sheets, calculations, and charts (record of data outputs) that are necessary to substantiate that the performance CEMS met the performance specification.

10. *Bibliography*

10.1 "Experimental Statistics," Department of Commerce, Handbook 91, 1963, pp. 3-31, paragraphs 3-3.1.4.

Performance Specification 3—Specifications and Test Procedures for O_2 and CO_2 Continuous Emission Monitoring Systems in Stationary Sources

1. *Applicability and Principle*

1.1 *Applicability.* This specification is to be used for evaluating the acceptability of O_2 and CO_2 continuous emission monitoring systems (CEMS) after initial installation and whenever specified in an applicable subpart of the regulations. The specification applies to O_2 and CO_2 monitors that are not included under Performance Specification 2.

The definitions, installation measurement location specifications, test procedures, data reduction procedures, reporting requirements, and bibliography are the same as in Performance Specification 2, Sections 2, 3, 5, 6, 8, 9, and 10, and also apply to O_2 and CO_2 CEMS under this specification. The performance and equipment specifications and the relative accuracy (RA) test procedures for O_2 and CO_2 CEMS differ from SO_2 and NO_x CEMS, unless otherwise noted, and are therefore included here.

1.2 *Principle.* Reference method (RM) tests and calibration drift tests are conducted to determine conformance of the CEMS with the specification.

2. *Performance and Equipment Specifications*

2.1 *Instrument Zero and Span.* This specification is the same as Section 4.1 of Performance Specification 2.

2.2 *Calibration Drift.* The CEMS calibration must not drift by more than 0.5 percent O_2 or CO_2 from the reference value of the gas, gas cell, or optical filter.

2.3 *CEMS Relative Accuracy.* The RA of the CEMS must be no greater than 20 percent of the mean value of the RM test data or 1.0 percent O_2 or CO_2, whichever is greater.

3. *Relative Accuracy Test Procedure*

3.1 *Sampling Strategy for RM Tests, correlation of RM and CEMS data, Number of RM Tests, and Calculations.* This is the same as Performance Specification 2, Sections 7.1, 7.2, 7.3, and 7.5, respectively.

3.2 *Reference Method.* Unless otherwise specified in an applicable subpart of the regulations, Method 3 of Appendix A or any approved alternative is the reference method for O_2 or CO_2.

(Sec. 114, Clean Air Act, as amended (42 U.S.C. 7414))

[FR Doc. 81-2637 Filed 1-23-81; 8:45 am]

BILLING CODE 6560-26-M

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 60

[AD-FRL 1715-Y]

Standards of Performance for New Stationary Sources: Continuous Monitoring Performance Specifications; Proposed Revisions to General Provisions

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule and notice of public hearing.

SUMMARY: On February 23, 1978 (43 FR 7568) the Environmental Protection Agency promulgated standards of performance for new or modified kraft pulp mills pursuant to Section 111 of the Clean Air Act as amended. The standards require a continuous emission monitoring system (CEMS) to monitor total reduced sulfur (TRS) for operation and maintenance purposes. However, at the time the standards were promulgated performance specifications for the monitors had not been completed and monitoring requirements were not to be effective until their completion. The specifications proposed herein complete the performance specifications. In addition, changes to the general monitoring requirements of Section 60.13 are proposed.

A public hearing will be held, if requested, to provide interested persons an opportunity for oral presentation of data, views or arguments concerning the proposed performance specification and changes to Section 60.13.

DATES:

Comments. Comments must be received on or before September 18, 1981.

Public Hearing. If requested, a public hearing will be held. Persons wishing to present oral testimony must contact EPA by August 10, 1981. If a hearing is requested, an announcement of the date and place will appear in a separate **Federal Register** notice.

ADDRESS:

Comments. Comments should be submitted (in duplicate if possible) to: Central Docket Section (A-130), Attention: Docket Number A-80-57, U.S. Environmental Protection Agency, 401 M Street S.W., Washington, D.C. 20460.

Public Hearing. Persons wishing to present oral testimony should notify Mrs. Naomi Durkee, Office of the Director, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5571.

Docket. Docket No. A-80-57, containing material relevant to this rulemaking, is available for public inspection and copying between 8:00 a.m. and 4:00 p.m., Monday through Friday, at EPA's Central Docket Section, West Tower Lobby, Gallery 1, Waterside Mall, 401 M Street, S.W., Washington, D.C. 20460. A reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT:

Mr. Roger Shigehara, Emission Measurement Branch, Emission Standards and Engineering Division (MD-19), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-2237.

SUPPLEMENTARY INFORMATION: On February 23, 1978 (43 FR 7568), the Environmental Protection Agency promulgated standards of performance for new or modified kraft pulp mills pursuant to Section 111 of the Clean Air Act as amended. The regulation requires new kraft pulp mills to demonstrate compliance with the standards of performance by means of performance tests at the time the new source commences operation or shortly thereafter. To insure that these sources, including associated air pollution control equipment, would be properly operated and maintained (to insure the intent of the standards to reduce air pollution), provisions were included that require several monitoring systems to continuously monitor emission levels. One of those monitoring systems was for total reduced sulfur (TRS).

At the time the standards, which included these monitoring requirements, were initially proposed, EPA and the kraft pulp mill industry were engaged in developing performance specifications for TRS monitoring systems. The performance specifications were not completed by the time the standards of performance were promulgated; therefore, the monitoring requirements were not to be effective until a joint EPA-industry effort to develop performance specifications was completed.

In October of 1977, the National Council of the Pulp and Paper Industry for Air and Stream Improvement submitted a technical assessment study to EPA. The results of a month-long evaluation of the performance of existing TRS monitors and a comparison with Method 16 data were included in this study. This study serves as the technical background for the performance specification proposed today.

The specification requires that monitors used to measure TRS be installed and ensured to operate properly. Calibration drift and relative accuracy tests are to be conducted to determine conformance of the continuous emission monitoring systems (CEMS) with the specification. Candidate monitors include the coulometric titrator, flame photometric and photoionization detectors, and others, fitted with appropriate sample extraction and conditioning equipment. A document has been prepared to provide vendors and operators with guidelines for performance and equipment specifications and suggested test and data reduction procedures for evaluating the CEMS. This guideline document is available from Mr. Foston Curtis, Mail Drop 19, Environmental Protection Agency, Research Triangle Park, North Carolina 27711, (919) 541-2237. During the development of the TRS performance specification, a question arose concerning the possibility that the CEMS might be the same as Reference Method 16. The question concerns whether such systems should be exempted from the relative accuracy test because it would involve comparing a reference method against an automated reference method. Comments are requested on this question.

As discussed in the preamble to the final rule which established the standards of performance for kraft pulp mills (43 FR 7571), installation of continuous monitoring systems is not needed until promulgation of applicable performance specifications. Sections 60.13(a) of Title 40 indicates that continuous monitoring systems must comply with the monitoring requirements upon promulgation unless otherwise specified in an applicable subpart or by the Administrator.

When Performance Specification 5 is promulgated, the Administrator could decide if any delay in complying with the monitoring requirements after promulgation is warranted for kraft pulp mills which are already affected by the standards. However, notice of these requirements is being given with today's proposal. The time between proposal and promulgation is usually about one year. The time before promulgation should allow kraft pulp mills to initiate purchasing and installig a continuous monitoring system. A delay beyond promulgation similar to the 180 days allowed for performance tests (40 CFR 60.8) is considered reasonable. However, in certain cases, additional time may be required for kraft pulp mills

which are already affected by the standards. The Administrator plans to specify additional delays as set forth in 40 CFR 60.13(a) based on the expected time a source already affected by the standards would need to review available monitors, to purchase a monitor, to install the monitor, and to place the monitor into operation. Comments concerning the 180-day delay and additional delays are specifically requested.

The costs asociated with continuous monitoring are difficult to asess because costs will vary from source-to-source depending on the variations in the requirements for each installation, e.g., procurement, shipping, site preparation, and physical installation of the instrument system. However, for TRS monitoring systems, the normal costs of procurement are in the range of $15,000 to $30,000. The installation and testing costs required by Performance Specification 5 are approximately $3600 (30 man-days at $15 per hour).

During preparation of this performance specification, consistency with the existing monitoring requirements of 40 CFR 60.13 was checked. These existing monitoring requirements provide a general basis for continuous monitoring requirements found in standards of performance for new sources, such as the standards for kraft pulp mills. One minor inconsistency was found in paragraph 60.13(e). Because TRS was not mentioned in this paragraph, a revision to the paragraph is being proposed to make the paragraph apply to TRS and other emissions. In addition to this minor inconsistency. several paragraphs which are no longer applicable were found. These paragraphs were effective only until September 11, 1979. Therefore, to update and reduce the complexity of 40 CFR 60.13, it is proposed that the parts of paragraphs 60.13(a), 60.13(c), and 60.13(e) which are no longer applicable be removed from 40 CFR 60.13.

Pursuant to the provisions of 5 U.S.C Section 605(b), I hereby certify that the attached rule will not, if promulgated, have a significant economic impact on a substantial number of small entities. About two-thrids of the businesses owning kraft pulp mills are also engaged in other activities, such as chemical manufacture, detergent production, land development and can production. In addition, businesses owning kraft pulp mills but not engaged in these activities are almost always engaged in the production of timber or paperboard. Because most businesses owning kraft pulp mills are engaged in activities other than kraft pulping, very few small entities, as defined in 13 CFR Part 121, could be impacted by this rule. Thus, the attached rule will not, if promulgated, have a significant economic impact on a substantial number of small entities.

I have reviewed this proposed rule to determine if it is a major rule as defined in Executive Order 12291 (46 FR 18193). The costs of procurement and installation, as indicated above, do not indicate that this rule would result in an annual effect of $100 million or more, a major increase in costs or prices, or other significant adverse effects. Thus, I have determined that this rule is not a major rule.

This regulation was submitted to the Office of Management and Budget for review as required by Executive Order 12291.

This notice of proposed rulemaking is issued under the authority of Sections 111, 114, and 301(a) of the Clean Air Act as amended (42 U.S.C. 7411, 7414, and 7601(a)).

Dated: July 6, 1981.

Anne M. Gorsuch,

Administrator.

It is proposed that § 60.13 and Appendix B of 40 CFR Part 60 be amended as follows:

1. By revising § 60.13(a), 60.13(c), and 60.13(e); by removing subparagraphs (1) and (2) of § 60.13(a); by removing subparagraphs (1), (2), and (3), of § 60.13(c); and by removing subparagraph (3) of § 60.13(e) as follows:

Subpart A—General Provisions

* * * * *

§ 60.13 Monitoring requirements.

* * * * *

(a) For the purposes of this section, all caontinuous monitoring systems required under applicable subparts shall be subject to the provisions of this section upon promulgation of performance specifications for continuous monitoring systems under Appendix B to this part, unless otherwise specified in an applicable subpart or by the Administrator.

* * * * *

(c) During any performance tests required under § 60.8 or within 30 days thereafter and at such other times as may be required by the Administrator under Section 114 of the Act, the owner or operator of any affected facility shall conduct continuous monitoring system performance evaluations and furnish the Administrator within 60 days thereof two or, upon request, more copies of a written report of the results of such tests. These continuous monitoring system performance evaluations shall be conducted in accordance with the requirements and procedures contained in the applicable performance specification of Appendix B.

* * * * *

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

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

(2) All continuous monitoring systems referenced by paragraph (c) of this section for measuring emissions, except opacity, shall complete a minimum of one cycle of operation (sampling, analyzing, and data recording) for each successive 15-minute period.

* * * * *

2. By adding Performance Specification 5 to Appendix B of 40 CFR Part 60 as follows:

Appendix B—Performance Specifications

* * * * *

Performance Specification 5—Specifications and Test Procedures for TRS Continuous Emission Monitoring Systems in Stationary Sources

1. Applicability and Principle

1.1 Applicability. This specification is to be used for evaluating the acceptability of total reduced sulfur (TRS) continuous emission monitoring systems (CEMS) after initial installation and whenever specified in an applicable subpart of the regulations. The CEMS may include O_2 monitors.

The definitions, installation specifications, test procedures, data reduction procedures for determining calibration drifts and relative accuracy, and reporting of Performance Specification 2,[1] Sections 2, 3, 4, 5, 6, 8, and 9 also apply to this specification and must be consulted. The performance and equipment specifications do not differ from Performance Specification 2 except as listed below and are included in this specification.

1.2 Principle. Calibration drift and relative accuracy tests are conducted to

[1] All references to Performance Specification 2 are to the one proposed on January 26, 1981 (46 FR 8352).

determine conformance of the CEMS with the specification.

2. Performance and Equipment Specifications

2.1 Instrument Zero and Span. The CEMS recorder span must be set at 90 to 100 percent of recorder full-scale using a span level of 90 to 100 percent of the span value (other span levels may be used with the approval of the Administrator). The CEMS design shall also allow the determination of calibration at the zero and span level points of the calibration curve. If this is not possible or is impractical, these determinations may be conducted at a low level (up to 20 percent of span value) point and at a high level (80 to 100 percent of span value) point. The components of an acceptable permeation tube system are listed on pages 87–94 of Citation 2 of the bibliography.

2.2 Calibration Drift. The CEMS calibration must not drift or deviate from the reference value of the calibration gas by more than 3 percent of the established span value of 30 ppm. If the CEMS includes pollutant and diluent monitors, the calibration drift must be determined separately for each in terms of concentrations (see Performance Specification 3 for the diluent specifications).

2.3 CEMS Relative Accuracy (RA). The RA of the CEMS shall be no greater than 20 percent of the mean value of the reference method (RM) test data in terms of the units of the emission standard or 10 percent of the applicable standard, whichever is greater.

3. Relative Accuracy Test Procedure

3.1 Sampling Strategy for RM Tests, Correlation of RM and CEMS Data, Number of RM Tests, and Calculations. This is the same as Performance Specification 2, Sections, 7.1, 7.2, 7.3, and 7.5, respectively.

3.2 Reference Methods. Unless otherwise specified in an applicable subpart of the regulations, Method 16, Method 16A, or other approved alternative, shall be the reference method for TRS. Note: For Method 16, a set is made up of at least three separate injects equally spaced over time.

4. Bibliography

4.1 "Experimental Statistics," Department of Commerce, Handbook 91, 1963 pp. 3–31, paragraphs 3–3.1.4.

4.2 "A Guide to the Design, Maintenance and Operation of TRS Monitoring Systems," National Council for Air and Stream Improvement Technical Bulletin No. 89, September 1977.

4.3 "Observation of Field Performance of TRS Monitors on a Kraft Recovery Furnace," National Council for Air and Stream Improvement Technical Bulletin No. 91, January 1978.

[FR Doc. 81-21084 Filed 7-17-81; 8:45 am]

BILLING CODE 6560-26-M

TECHNICAL REPORT DATA
(Please read Instructions on the reverse before completing)

1. REPORT NO.	2.	3. RECIPIENT'S ACCESSION NO.
		EPA-340/1-82-005b

4. TITLE AND SUBTITLE	5. REPORT DATE
Standards of Performance for New Stationary Sources - A Compilation as of May 1, 1982 Volume 2: Proposed Amendments	June 1982
	6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S)	8. PERFORMING ORGANIZATION REPORT NO.
	PN 3660-1-42
9. PERFORMING ORGANIZATION NAME AND ADDRESS	10. PROGRAM ELEMENT NO.
PEDCo Environmental, Incorporated 11499 Chester Road Cincinnati, Ohio 45246	11. CONTRACT/GRANT NO. 68-01-6310 Task No. 42
12. SPONSORING AGENCY NAME AND ADDRESS	13. TYPE OF REPORT AND PERIOD COVERED
U.S. Environmental Protection Agency Stationary Source Compliance Division Washington, D.C. 20460	Compilation to May 1982
	14. SPONSORING AGENCY CODE

15. SUPPLEMENTARY NOTES
DSSE Project Officer: Kirk Foster, MD-7, Research Triangle Park, NC 27711; (919) 541-4571

16. ABSTRACT

This document is a compilation of the New Source Performance Standards promulgated under Section 111 of the Clean Air Act, represented in full as amended. The information contained herein supersedes all compilations published by the Enviornmental Protection Agency prior to 1982. Volume 1 contains Sections I through III including: Introduction, Summary Table, and Regulations as amended. Volume 2 contains Section IV, Proposed Regulations, and Volume 3 contains Section V, the full text of all regulations promulgated since 1971.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Air pollution control	New Source Performance Standards	13B
Regulations; Enforcement		14B

18. DISTRIBUTION STATEMENT	19. SECURITY CLASS *(This Report)*	21. NO. OF PAGES
Unlimited	Unclassified	
	20. SECURITY CLASS *(This page)*	22. PRICE
	Unclassified	

EPA Form 2220-1 (9-73)