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**Category:** FR – Federal Register (09 – Standards of Performance for Bulk Gasoline Terminals)

**Federal Register, Vol. 48, No. 161, 37578-37602, 08/18/1983 (224-6), "Standards of Performance for New Stationary Sources; Bulk Gasoline Terminals"**

**Summary:** Standards of performance for bulk gasoline terminals were proposed in the Federal Register on December 17, 1980 (45 FR 83126). This action promulgates standards of performance for bulk gasoline terminals. These standards implement Section 111 of the Clean Air Act and are based on the Administrator's determination that petroleum transportation and marketing cause, or contribute significantly to, air pollution which may reasonably be anticipated to endanger public health or welfare. The intended effect of these standards is to require all new, modified, and reconstructed facilities at bulk gasoline terminals to control emission to the level achievable through use of the best demonstrated system of continuous emission reduction, considering costs, non-air quality health, and environmental and energy impacts.

**ENVIRONMENTAL PROTECTION AGENCY****40 CFR Part 60**

[AD-FRL-224-6]

**Standards of Performance for New Stationary Sources; Bulk Gasoline Terminals****AGENCY:** Environmental Protection Agency (EPA).**ACTION:** Final rule.

**SUMMARY:** Standards of performance for bulk gasoline terminals were proposed in the *Federal Register* on December 17, 1980 (45 FR 83128). This action promulgates standards of performance for bulk gasoline terminals. These standards implement Section 111 of the Clean Air Act and are based on the Administrator's determination that petroleum transportation and marketing cause, or contribute significantly to, air pollution which may reasonably be anticipated to endanger public health or welfare. The intended effect of these standards is to require all new, modified, and reconstructed facilities at bulk gasoline terminals to control emissions to the level achievable through use of the best demonstrated system of continuous emission reduction, considering costs, nonair quality health, and environmental and energy impacts.

**EFFECTIVE DATE:** August 18, 1983.

Under Section 307(b)(1) of the Clean Air Act, judicial review of this new source performance standard is available *only* by the filing of a petition for review in the U.S. Court of Appeals for the District of Columbia Circuit within 60 days of today's publication of this rule. Under Section 307(b)(2) of the Clean Air Act, the requirements that are the subject of today's notice may not be challenged later in civil or criminal proceedings brought by EPA to enforce these requirements.

**ADDRESSES:**

*Background Information Document.* The background information document (BID, Volume II) for the promulgated 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 "Bulk Gasoline Terminals—Background Information for Promulgated Standard," EPA-450/3-80-038b. BID, Volume II, contains (1) a summary of all the public comments made on the proposed standards and the Administrator's response to the comments, (2) a summary of the changes made to the standards since proposal,

and (3) the final environmental impact statement which summarizes the impacts of the standards.

*Docket.* Docket No. A-79-52, containing information considered by EPA in developing the promulgated 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:** For information concerning the background information supporting the promulgated standards contact Mr. James F. Durham, Chemicals, and Petroleum Branch, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5671. For further information concerning the promulgated standards contact Mr. Gilbert H. Wood, Standards Development Branch, Emissions Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, Telephone number (919) 541-5578.

**SUPPLEMENTARY INFORMATION:****Summary of Promulgated Standards**

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)].

For convenience, this will be referred to as "best demonstrated technology" or "BDT."

The promulgated standards of performance limit volatile organic compound (VOC) emissions from each affected facility on which construction, modification, or reconstruction commenced after December 17, 1980 (after August 18, 1983, for reconstructions necessitated by State or local regulations). The affected facility is the total of all the loading racks at a bulk gasoline terminal which deliver either gasoline into any delivery tank truck or some other liquid product into trucks which have loaded gasoline on the immediately previous load.

The promulgated standards require the installation of vapor collection equipment at the terminal to collect total

organic compounds vapors displaced from gasoline tank trucks during product loading. The standards limit emissions from the collection system to 35 milligrams of total organic compounds per liter of gasoline loaded, unless the facility has an existing vapor processing system (construction or refurbishment commenced before December 17, 1980). In this latter case, the standards limit emissions from the vapor collection system to 80 mg/liter.

The Agency has concluded that it is quite costly in light of the resulting emission reduction for an owner whose existing facility becomes subject to NSPS (e.g., through modification or reconstruction) to meet 35 mg/liter when the facility already has a system capable of meeting 80 mg/liter.

To control tank truck leakage emissions during loading, the promulgated standards require that loadings be made only into gasoline tank trucks tested for vapor tightness. The terminal owner or operator is required to obtain the identification number and test documentation for each gasoline tank truck loading at the facility. In accordance with Section 111(h)(3) of the Clean Air Act, the Administrator may approve alternative procedures that assure that loading will be limited to vapor-tight trucks.

These standards are based on the use of carbon adsorption and thermal oxidation type vapor processors for the 35 mg/liter limit, which represent the best demonstrated technology. Test data show the ability of these systems of continuous emission reduction to achieve the 35 mg/liter emission limit of the standards of performance. Although only some of the refrigeration systems tested met 35 mg/liter (all the systems tested were designed to meet the State implementation plan (SIP) limit of 80 mg/liter), test data and engineering calculations also support the ability of refrigeration systems to achieve the 35 mg/liter emission limit of the standards. In addition, the major manufacturer has stated that all currently manufactured refrigeration systems can be specified to operate at 35 mg/liter. In selecting these standards, the Agency considered costs, nonair quality health and environmental impacts, and energy requirements.

The proposed section on continuous monitoring of operations, § 60.504, has been reserved pending development of monitor performance specifications. Monthly system leak inspections are required under § 60.502(j), but submission of leak inspection records is not required in the final regulation. However, under § 60.505(c), these records are required to be kept at the

terminal for at least 2 years. The requirement for quarterly reports of excess emissions under § 60.7(c) of the General Provisions is deleted under § 60.505(e).

#### Summary of Major Changes Since Proposal

Several changes of varying importance have been made to the standards since proposal. Most of the changes were made in response to comments, but some of them were made for the sake of clarity or consistency. One of the most significant of the changes dealt with proposed § 60.502(d), which required loadings of gasoline tank trucks to be restricted to vapor-tight tanks only, as evidenced by an annual vapor tightness test. Most of the comments on this requirement concerned the terminal operator's apparent liability for the condition of tank trucks owned by other parties. Several commenters felt that terminals would have to provide extra personnel at the loading racks to enforce this restriction. Section 60.502(d) [now § 60.502(e)] was expanded to delineate clearly the terminal owner or operator's responsibilities and to clarify that on-the-spot monitoring of product loadings would not be necessary. A terminal operator need only compare a tank identification number against the file of vapor tightness documentation within 2 weeks after a loading of that tank took place. If a terminal owner or operator checked his files and found that a nonvapor-tight truck was loaded without vapor tightness documentation, he would then be required to take steps assuring that no further loading into that tank truck took place until the proper vapor tightness documentation was received by the terminal. Thus, the final standard clarifies that a terminal owner or operator can comply with this part of the standard by cross-checking files and does not have to monitor loadings.

One paragraph about facilities with existing vapor processing equipment was added to § 60.502. The Agency has concluded that it is quite costly in light of the resulting emission reduction for an owner whose existing facility becomes subject to NSPS (e.g., through modification or reconstruction) to meet 35 mg/liter when the facility already has a system capable of meeting 80 mg/liter, but not 35 mg/liter. For this reason, EPA has added § 60.502(c), which permits affected facilities with such vapor control equipment to meet 80 mg/liter if construction or substantial rebuilding (i.e., "refurbishment") of that equipment commenced before the proposal date, December 17, 1980. This is based on the Administrator's judgment that BDT for

these facilities is no further control, while BDT for facilities with vapor processing systems on which construction or refurbishment commenced after proposal is the replacement or add-on of technology that would enable the facility to achieve 35 mg/liter.

Several commenters objected to the requirement for excess emissions reports and to using an average monitored value as the basis for an excess emissions determination. Section 60.504, Monitoring of Operations, has been reserved pending the development and promulgation of performance specifications for continuous monitoring devices. Therefore, specific comments concerning the proposed continuous monitoring requirements cannot be addressed at this time. The Agency is currently investigating several types of simple, low-cost monitors for various types of vapor processors. After specifications have been selected, they will be proposed in a separate action in the *Federal Register* for public comment.

A new § 60.500(c) has been added to change the applicability date from the date of proposal to the date of promulgation for existing facilities commencing component replacement prior to the promulgation date for the purpose of complying with State or local regulations. Such facilities are not subject to the standards by means of the reconstruction provisions. New § 60.506 was added in response to commenters' concerns about the burden of accumulating records of component replacements at an existing source over the lifetime of the source for the purpose of determining reconstruction. Section 60.506(b) limits the time period for determination of reconstruction to 2 years and § 60.506(a) excludes frequently replaced components for consideration in applying the reconstruction provisions to bulk gasoline terminals.

In response to industry comments, a size cutoff by gasoline throughput was added to the definition of "bulk gasoline terminal" (only facilities handling more than 76,700 liters, or 20,000 gallons, per day are covered), to clarify that bulk plants served by ship or barge are not covered by these standards. Also, the word "wholesale" has been removed because the throughput cutoff should exclude retail outlets (service stations) from possible applicability.

The terminology used in the emission limits in the standard has changed since proposal. The emission limits are now expressed in terms of total organic compounds rather than VOC (VOC is the proportion of the organic compounds

that is regarded as photochemically reactive). This change does not change the effect on stringency of the standard, but it does make the standard better reflect the intent behind the standard and the data base and test procedures used in establishing the standard.

The standard is intended to reduce emissions of VOC through the application of best demonstrated technology (BDT) (considering costs and other impacts), and the emission limits in the standard are designed to reflect the performance of BDT. The best demonstrated technologies applicable to bulk terminals do not selectively control VOC, but rather they control all organic compounds. Furthermore, the emission limits in the standard are based on test data and test procedures that measure total organic compounds, and the test methods used to determine compliance with the standard measure total organic compounds. Therefore, to reflect accurately the performance of the technologies selected as BDT and to be consistent with the data base and test methods upon which the emission limits are based, the emission limits in the proposed standard should have been expressed in terms of total organic compounds. To reflect the applicable technology and test methods, the emission limits in the promulgated standard are expressed in those terms. EPA is relying on control of total organic compounds as the best demonstrated surrogate for controlling volatile organic compounds, which react to form ozone in the atmosphere.

However, the test procedures in the proposed standard gave the owner or operator the option to subtract methane and ethane in determining compliance with the standard. Because the test procedures were proposed in this way and because the relative quantity of these compounds is expected to be small, the promulgated standard retains this option in the test procedures. The owner or operator may invoke this option only by using a method approved by the Administrator.

#### Summary of Environmental, Energy, Economic Impacts

The promulgated standards will reduce projected 1986 VOC emissions from affected bulk terminals from about 8,300 megagrams per year (Mg/yr) to about 2,600 Mg/yr, or 68 percent.

The promulgated standards are based on the use of carbon adsorption (CA) and thermal oxidation (TO) type vapor processors for the 35 mg/liter emission limit. TO systems emit a small quantity of carbon monoxide (CO) and oxides of nitrogen (NO<sub>x</sub>), but since few oxidation

systems are expected to be installed, total emissions of CO and NO<sub>x</sub> will be negligible.

Neither of these control systems uses water as a direct control medium, and so the water pollution impact will be minimal. Refrigeration (REF) systems, which may also be used to meet the standards, discharge a small amount of water which condenses in the system due to the humidity of the air. Organics are separated from the condensed water in an oil-water separator on the refrigeration unit. The excess water is subsequently handled by the bulk terminal's existing drainage system.

There will be no solid effluent from any of the control systems. CA systems may produce a small quantity of solid waste if the activated carbon must be replaced due to a loss in working capacity of the carbon beds. The worst-case nationwide waste production is estimated at about 50,000 kilograms (kg) per year, which represents a small solid waste impact.

All of the vapor processors considered in setting the standards consume electricity in the course of their operation, to power fans, dampers, pumps, compressors, valves, timers, and other miscellaneous components. However, all of the processors, except the thermal oxidizer, recover energy in the form of liquid gasoline. Therefore, while the power costs to operate control equipment to comply with the promulgated standards average about 25 percent higher than the power costs to comply with a typical SIP at a 950,000 liter per day terminal, the extra product recovery realized under these standards means that this terminal will experience a net energy savings which is equivalent to about 15,000 liters of gasoline per year greater than the SIP. The total net energy recovery experienced by the bulk terminal industry in the fifth year of the standards will be about 7.0 million liters of gasoline equivalent.

Compliance with these standards will result in net annualized costs in the bulk gasoline terminal industry of about \$1.8 million by 1986. Cumulative capital costs of complying with the promulgated standards will amount to about \$10.8 million by 1986. Net annualized and cumulative capital costs to the for-hire tank truck industry will total about \$0.9 million and \$1.4 million, respectively, by the fifth year of the standards. The total annualized cost for this standard would then be \$2.5 million. This annualized cost, coupled with the estimated emission reduction of 5,700 Mg/yr, results in a cost per unit emission reduction of \$440/Mg. The percent increase in the price of gasoline necessary to offset costs of compliance

with the promulgated standards will range from zero for certain larger terminals up to about 0.48 percent for the smallest terminals. The overall impact on national gasoline prices will be negligible. The environmental, energy, and economic impacts are discussed in greater detail in the BID, Volume II. Also discussed are all of the commenters' suggested changes in the impact calculations and the rationale for making some of these changes and not others.

The nationwide impact numbers presented here include a composite of impacts for new, modified, and reconstructed facilities in locations where States require the level of control recommended in the control techniques guideline document (CTG) and in locations where States have no control requirements. If an average size bulk terminal (950,000 liters/day gasoline throughput) subject to the standards due to modification or reconstruction were located in an area with State requirements equivalent to the level recommended by the CTG and the terminal had an existing vapor processing system which met these State requirements, no additional controls would be required. For the same size new terminal, the incremental annualized cost for a terminal using CA or TO would be negligible because the same basis control device could be used to meet either set of requirements. If a new, modified, or reconstructed terminal of the same size were located in an area with no State requirements, the uncontrolled emissions would be reduced by about 160 Mg/yr at an annualized cost of about \$38,000, which is less than \$240/Mg of VOC reduced.

#### Public Participation

Prior to proposal of the standards, interested parties were advised by public notice in the *Federal Register* (45 FR 30686, May 9, 1980), of a meeting of the National Air Pollution Control Techniques Advisory Committee (NAPCTAC) to discuss the bulk gasoline terminal standards recommended for proposal. This meeting was held on June 5, 1980. The meeting was open to the public and each attendee was given an opportunity to comment on the recommended standards. The standards were proposed and published in the *Federal Register* on December 17, 1980, (45 FR 83126). The preamble to the proposed standards discussed the availability of the background information document, "Bulk Gasoline Terminals—Background Information for Proposed Standards," EPA-450/3-80-038a (BID, Volume I), which described in detail the regulatory alternatives

considered and the impacts of those alternatives. Public comments were solicited at the time of proposal and, when requested, copies of the BID, Volume I, were distributed to interested parties. To provide interested persons the opportunity for oral presentation of data, views, or arguments concerning the proposed standards, a public hearing was held in two sessions, on January 21 and 28, 1981, at Research Triangle Park, North Carolina. The hearings were open to the public and each attendee was given an opportunity to comment on the proposed standards. The public comment period was from December 17, 1980, to March 20, 1981.

Forty-two comment letters were received and six interested parties testified at the public hearings concerning issues relative to the proposed standards of performance for bulk gasoline terminals. The comments have been carefully considered and, where determined to be appropriate by the Administrator, changes have been made in the proposed standards.

#### Major Comments on the Proposed Standards

Comments on the proposed standards were received from bulk gasoline terminal owners and operators, Federal agencies, State and local air pollution control agencies, trade associations, and air pollution control equipment suppliers. A detailed discussion of these comments and Agency responses can be found in the background information document for the promulgated standards (BID, Volume II), which is referred to in the ADDRESSES section of this preamble. The summary of comments and responses in the BID, Volume II, serves as the basis for the revisions which have been made to the standards between proposal and promulgation. The major comments and responses are summarized in this preamble.

#### Need for Standard

Several commenters recommended that the proposed standards be canceled and that no additional regulation be adopted. Instead, the State implementation plans (SIP's) should be relied upon to control VOC emissions from bulk gasoline terminals. One reason given was that gasoline demand is projected to stabilize or decline in the future, so that emissions from new, modified, or reconstructed sources should not present any increasing environmental hazard.

Other commenters felt that the additional emission reduction achieved under Alternative IV (35 mg/liter from processor plus vapor-tight tank trucks)

as opposed to Alternative II (80 mg/liter from processor plus vapor-tight tank trucks) would be insignificant. The commenters stated that the control limit of 80 mg/liter required by many SIP's has already reduced VOC emissions by 90 percent; the proposed 35 mg/liter limit would reduce nationwide bulk terminal VOC emissions by the fifth year by only an extremely small percentage. Due to these small reductions, these commenters felt that standards had been proposed simply because they are "technically feasible." Thus, the commenters felt EPA had not demonstrated, as required by Section 111, that new terminals will present a significant air pollution problem.

The Agency proposed these standards of performance under the authority of Section 111 of the Clean Air Act (42 U.S.C. 7411) as amended. Section 111(b)(1) requires the Administrator to establish standards of performance for categories of new, modified, or reconstructed stationary sources which in the Administrator's judgment cause or contribute significantly to air pollution which may reasonably be anticipated to endanger public health or welfare.

The Agency's listing of Petroleum Transportation and Marketing 23rd on the Priority List, as required under Section 111(f) (40 CFR 60.16, 44 FR 49222, August 21, 1979), reflects the Administrator's determination that this source category contributes significantly to air pollution. Before arriving at this decision, the Administrator considered the projected rate of growth in the number of facilities in this industry, the emission rates at uncontrolled facilities, and the emissions allowed under typical SIP's. EPA used the emissions forecasts in the BID, Volume I, and cited by the commenters, in analyzing these factors, and the Administrator has found no reason to alter the conclusions based on that analysis.

It is important to note that VOC is emitted by a wide variety of source categories. The emissions contribution from many categories with VOC emissions that appear small in comparison with the total VOC emitted by all source categories is nonetheless significant to ozone formation. This is because failure to control these sources to the level achievable by the best demonstrated technology would serve to undermine the Congressionally mandated effort to prevent further deterioration of air quality caused by additional ozone formation. Emission reductions from this source category also appear small because the projected number of affected facilities is only a small percentage (less than 5 percent) of

the total number of terminals nationwide.

The Agency accounted for the projected demand for gasoline in the coming years in estimating the emission reduction achievable through the NSPS. Despite a leveling off or reduction in gasoline demand, there will still be a significant number of affected terminals which will result in significant emissions reduction under these standards. Although the small number of new terminals (five in the next 5 years) reflects this leveling off in product demand, the current industry trend is toward the consolidation of existing terminals rather than the construction of new terminals. As a result, estimates indicate that there will be as many as 50 modified or reconstructed terminals in the next 5 years.

Regulatory alternatives, reflecting different levels of control technology, were evaluated for these 55 affected facilities, and it was determined that the control technology was available, at a reasonable cost, to control emissions from new, modified, and reconstructed terminals. Relying only on the SIP's for this category would mean that many sources, in areas not requiring controls under SIP's will remain uncontrolled. It appeared reasonable, therefore, to require additional controls, for the affected facilities in both controlled and uncontrolled areas, that were technologically demonstrated to be both readily achievable and economically reasonable.

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 new industries as a result of having relaxed air pollution standards relative to other States. Further, standards of performance provide documentation which reduces uncertainty in 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. This documentation includes identification and comprehensive analysis of alternative emission control technologies, development of associated costs, an evaluation and verification of applicable emission test methods, and identification of specific emission limits achievable with alternate technologies. The costs are utilized in an economic analysis that determines the affordability of controls in an unbiased

study of the economic impact of controls on an industry.

The rulemaking process that implements a performance standard assures adequate technical review and promotes participation of representatives of the industry being considered for regulation, representatives from government, and the public affected by that industry's emissions. The resultant regulation represents a balance in which government resources are applied in a well publicized national forum to reach a decision on a pollution emission level that allows for a dynamic economy and a healthful environment.

The promulgated standards reflect application of the best demonstrated technology for new, modified, and reconstructed sources in the bulk terminal subcategory. While technical feasibility is a fundamental criterion for standard-setting, EPA considered additional factors, including cost, energy requirements, and other impacts, before arriving at the final standard. Based upon these factors, the Agency selected at proposal a control alternative which reflects Alternative IV. As explained in the preamble section on "Modification and Reconstruction," the Agency has revised the standard in response to these and other comments; the standards are now based upon a combination of Alternatives II and IV.

Several commenters were concerned that a number of their smaller loading facilities, typically considered as bulk plants, would be included under the definition of a terminal for purposes of this standard. These commenters felt a throughput cutoff should be added to the definition of a terminal.

To clarify the intended applicability of the NSPS, a definition of bulk terminal dependent upon a throughput cutoff has been included in § 60.501. The purpose of this definition is to exclude the smaller bulk plant. With this intention, a bulk terminal has been defined to have a gasoline throughput greater than 75,700 liters per day. The gasoline throughput shall be the maximum calculated design throughput as may be limited by compliance with an enforceable condition under Federal, State, or local law. Reference to an enforceable condition allows a source to limit its maximum design throughput by limiting its hours of operation, or by controlling any other operating parameter. The only requirements are that this limitation be a part of an enforceable document and that the source maintain compliance with it. This document could be issued by any government entity as long as it was

discoverable by both EPA and any citizen as contemplated in Section 304 of the Clean Air Act. By obtaining such documentation, which would reflect a source's maximum expected actual throughput, ambiguities as to how one would determine throughput are eliminated. For example, a bulk plant which receives gasoline by barge, with a statement (documented in an enforceable permit) that they will not exceed a throughput of 15,140 liters/day (4,000 gal/day), would not be misconstrued as a bulk terminal.

#### *Modification and Reconstruction*

Several commenters were concerned that conversions being made to terminals to satisfy SIP control requirements, such as top-to-bottom loading conversions and installation of vapor control equipment, could subject these terminals to the more stringent requirements of these standards through the reconstruction provisions of 40 CFR 60.15. Also, the economic impact would be significant for these terminals since they have already made commitments toward complying with SIP limitations. It was suggested by some of the commenters that these conversions should be exempted from the reconstruction provisions (40 CFR 60.15).

The section entitled "Impacts of Regulatory Alternatives" in the preamble to the proposed standards discussed the environmental, costs, and economic impacts on bulk terminal facilities complying with the requirements of those standards. Included in the discussion were impacts on new, modified, and reconstructed facilities. The impacts estimated for the standards did not include any reconstructions resulting from application of State or local air pollution requirements. However, as several commenters pointed out, a large number of terminal facilities that the Agency did not project as affected could indeed become subject to the standards in the process of complying with such requirements. Thus, the preamble discussion suggested that existing facilities commencing component replacement in response to State or local requirements would not be subject to 40 CFR 60.15.

The Agency believes that this suggestion introduced some doubt as to the otherwise straightforward application of the reconstruction provisions to existing facilities undergoing such changes. Consequently, owners and operators making plans to install control systems at these facilities may have been misled to believe that stricter NSPS requirements might not apply, and may therefore not have

considered the stricter NSPS requirements when designing their systems.

For this reason, the Administrator has determined that any facility that has commenced substantial component replacement in response to State or local emission standards after the applicability date (the proposal date—December 17, 1980) but prior to the date of promulgation will not be subject to these NSPS requirements by operation of the reconstruction provisions of 40 CFR 60.15. Under § 60.500(c), any component replacement program commenced (as defined in Section 60.2) before today's date, and determined by the Administrator to be necessitated by State or local bulk terminal regulations, will not subject a bulk terminal facility to the NSPS by means of the reconstruction provisions.

It should be noted, however, that 40 CFR 60.15 applies by straightforward application to any existing facility undergoing component replacement. Neither the language nor the purposes of that provision and the definition of "new source" in Section 111 supports exemptions based on the owner's intent in performing construction on the facility.

Because this preamble corrects the misimpression that Section 60.15 does not apply to facilities undergoing SIP component replacement, the Agency is applying that provision to SIP component replacement programs commenced *after* today's date. Of course, owners or operators performing reconstruction for other purposes, or modifications or new construction for *any* purpose, are still governed by the applicability date of December 17, 1980, contained in § 60.500(b).

Commenters also felt that EPA had greatly underestimated the number of existing terminals which would be affected by the modification and reconstruction provisions. At least 30 SIP's will contain bulk terminal vapor recovery requirements, and it was believed that conversion work performed at affected facilities would subject those facilities to the provisions of these standards.

Since most State of local regulation-related construction programs at bulk terminals will have commenced by the promulgation date, the change in the applicability date, in effect, excludes these terminals from the standards. Therefore, EPA's estimate at the time of proposal of 55 new, modified, or reconstructed terminals in 5 years is still considered a reasonable projection. The estimate of 5 new facilities and 50 modified or reconstructed facilities was

based primarily on information obtained from oil companies through responses to Section 114 letter requests. Telephone conversations with several control agencies, oil companies, and terminal construction engineering firms provided supplementary information.

Many of the commenters stated that the interpretation of "reconstruction" is an unwarranted extension of EPA's past procedure in defining this provision and an illegal extension of EPA's authority under Section 111. They felt that the reconstruction provisions were meant to be applied to each capital construction project as it occurs, and not applied on a cumulative basis over an unlimited time period. The commenters felt that under the present interpretation of reconstruction every existing loading rack, including those in attainment areas, would, through ordinary maintenance and replacement of components, become a new source long before the end of its useful life. They concluded that the use of cumulative costs would be a tremendous administrative burden on the industry and EPA.

The Agency promulgated the reconstruction provisions to ensure that essentially new facilities due to reconstruction would be subject to "new source" performance standards. The reconstruction provisions were promulgated in 1975 (40 FR 5846), and EPA has applied these provisions consistently since that time. Further, the Agency's authority to subject reconstructed sources to new source standards of performance has not been questioned in any court decision.

If one considers the 50 percent cost factor which triggers reconstruction strictly on a project-by-project basis, a wide variety of interpretations can arise as to what a "project" entails. For example, a terminal with three top loading racks may convert one rack to bottom loading, and then 6 months later convert a second loading rack to bottom loading. If the two conversions were interpreted as separate projects, neither one would likely exceed the 50 percent replacement cost to trigger reconstruction. If, however, it was the terminal owner's original intent to convert both loading racks, the two conversions would be interpreted as one project and would probably constitute a reconstruction. In many cases, it would not be possible to determine the original intent of the terminal owner or operator. In order to reduce the number of subjective determinations concerning intent in these cases, the reconstruction provisions will be applied on a basis which considers the expenditures made

toward a facility over a fixed time period.

To eliminate the ambiguity in the current wording of § 60.15 and further the intent underlying Section 111 (as described above), the Agency is clarifying the meaning of "proposed" component replacements in § 60.15. Specifically, the Agency is interpreting "proposed" replacement components under § 60.15 to include components which are replaced pursuant to all continuous programs of component replacement which commence (but are not necessarily completed) within the period of time determined by the Agency to be appropriate for the individual NSP involved. The Agency is selecting a 2-year period as the appropriate period for purposes of the bulk gasoline terminal NSPS (§ 60.506(b)). Thus, the Agency will count toward the 50 percent reconstruction threshold the "fixed capital cost" of all depreciable components (except those described below) replaced pursuant to all continuous programs of reconstruction which commence within any 2-year period following proposal of these standards. In the administrator's judgment, the 2-year period provides a reasonable, objective method of determining whether an owner of bulk gasoline terminal facilities is actually "proposing" extensive component replacement, within the Agency's original intent in promulgating § 60.15.

The administrative effort to keep the required records should not be a burden on the industry. The recordkeeping required under this interpretation of reconstruction is the same as the recordkeeping that would be required under a strictly project-by-project interpretation. In either case, the dollar amount of the component replacements taking place at the facility must be determined and recorded. Section 6.15 defines the "fixed capital cost" of replacement components as the capital needed to provide all the "depreciable" components. By excluding nondepreciable components from consideration in calculating component replacement costs, this definition excludes many components that are replaced frequently to keep the plant in proper working order. There may, however, be some depreciable components that are replaced frequently for similar purposes. In the Agency's judgment, maintaining records of the repair or replacement of these items may constitute an unnecessary burden. Moreover, the Agency does not consider the replacement of these items an element of the turnover in the life of the

facility concerning Congress when it enacted Section 111. Therefore, in accordance with 40 CFR 60.15(g), these standards (§ 60.506) will exempt certain frequently replace components, whether depreciable or nondepreciable, from consideration in applying the reconstruction provisions to bulk gasoline terminal facilities. The costs of these components will not be considered in calculating either the "fixed capital cost of the new components" or the "fixed capital costs that would be required to construct a comparable entirely new facility" under § 60.15. In the Agency's judgment, these items are pump seals, loading arm gaskets and swivels, coupler gaskets, overflow sensors, vapor hoses, and grounding cables.

One commenter felt that if the proposed standards further limited allowable total organic compounds emissions from 80 mg/liter to 35 mg/liter of gasoline loaded, then over half of his terminals would experience "immediate operational constraints," since they are equipped with vapor processing units of the compression-refrigeration-absorption (CRA) or lean oil absorption (LOA) type, which EPA data indicate cannot meet the proposed 35 mg/liter limit.

The existing facilities described by the commenter would not be subject to the standards unless modification or reconstruction were commenced after the proposal date of December 17, 1980. For those facilities with existing vapor processing systems which become affected facilities under modification or reconstruction, the Administrator concluded that it was not reasonable for the owner or operator to replace or perform costly upgrading on existing vapor processing systems, in order to achieve the small incremental emission reduction which reflects the change from 80 mg/liter to 35 mg/liter. As an example, emissions from a 950,000 liter/day terminal would decrease about 15 Mg/year in the change from 80 to 35 mg/liter, at a net annualized cost of about \$50,000 for replacement or add-on controls. In the Administrator's judgment, however, it is unreasonably costly to require such a facility to install the add-on technology that will achieve 35 mg/liter *only* if the facility began constructing or substantially rebuilding (i.e., "refurbishing") the control system before receiving notice December 17, 1980, that BDT for those facilities, were they later to come under NSPS, would likely be equipment capable of meeting 35 mg/liter.

By contrast, EPA considers it reasonable to apply the 35 mg/liter limit

to a facility whose owner commenced construction or refurbishment of a control system not capable of meeting 35 mg/liter despite having received this notice. It is reasonable to expect such an owner to avoid the high cost of going from 80 mg/liter to 35 mg/liter simply by constructing or refurbishing the facility's control system with technology that would meet EPA's proposed 35 mg/liter limit and make later retrofit unnecessary. This is reasonable to require even of facilities with existing control systems constructed or refurbished after December 17, 1980, for the purpose of meeting an 80 mg/liter State limit.

For these reasons, EPA has added § 60.502(c), which permits affected facilities with such vapor control equipment to meet 80 mg/liter if construction or substantial rebuilding (i.e., "refurbishment") of that equipment commenced before the proposal date, December 17, 1980. This is based on the Administrator's judgment that BDT for these facilities is no further control, while BDT for facilities with vapor processing systems on which construction or refurbishment commenced after proposal is the technology that would enable the facility to achieve 35 mg/liter.

Definitions for "existing vapor processing system" and "refurbishment" were added to the regulation to indicate that if in any 2-year period following the date the facility becomes an affected facility the fixed capital cost of improvements or changes to an existing vapor processing system exceeds 50 percent of the cost of a comparable entirely new vapor processing system, the altered vapor processing system must then meet the 35 mg/liter limit. Consequently, refurbishment applies only to those systems which become extensively rebuilt over this period.

Several commenters felt that the interpretation of "modification" is overly broad because it may include altered facilities from which the overall emissions have not increased. A clarification was sought so that replacement of needed components that improve loading efficiencies would not be considered modifications unless they resulted in an increase in the average daily emissions. For example, the replacement of worn-out pumps with new higher capacity pumps would allow faster loading, increasing emissions on a kg/hour basis during peak loading periods, but not on a mg/liter basis, which is the measurement of the standard. In fact, the number of tank trucks loaded during a day would not

necessarily increase due to a faster loading rate.

Section 60.14(e)(2) was purposely included in the General Provisions to exclude from consideration under the modification provisions increases in emissions due to relatively small changes. If a change increases production capacity and yet does not result in a "capital expenditure" as defined in the definitions in the General Provisions, the change would not be considered a modification.

#### *Economic Impact*

Some of the commenters stated that many of the costs of compliance to industry presented in BID, Volume I, were seriously underestimated. Two reasons provided were that control systems necessary to achieve the proposed standard of performance would cost more than systems capable of meeting only the less stringent SIP emission limit, and the actual number for affected facilities would be greater than the estimate due to conversions resulting from SIP requirements.

Many control systems being installed under SIP programs are capable of controlling emissions below 35 mg/liter, the limit of the promulgated standards of performance. Test data show that, in their normal operating mode, carbon adsorption (CA) and thermal oxidation (TO) units can consistently operate well below the 35 mg/liter limit. Therefore, for CA and TO units there are no additional costs involved in meeting 35 mg/liter versus the units currently being installed to meet 80 mg/liter.

Test results on current refrigeration (REF) units show that only some of these units meet the 35 mg/liter limit. However, these systems were installed to comply with a limit at or near the 80 mg/liter limit contained in most SIP's. The major manufacturer of these systems has indicated that adjustments to operating parameters can be made which will increase the control efficiency of individual systems (docket item IV-E-32). Such adjustments would be likely to increase electrical costs. Cost increases of up to 50 percent were reported by the manufacturer (docket item IV-F-3). The assumption that costs would not increase in the case of CA and TO units in order to meet 35 mg/liter is still considered valid. However, since data show that state-of-the-art REF technology can meet the standard, at somewhat increased capital and operating cost levels from the average current system, and since a large segment of industry is presently using this form of control (approximately 25 percent of existing units are refrigeration units), the potential cost

impact to industry, if current use patterns are maintained, was examined.

As discussed under the preamble section "Modification and Reconstruction," the vast majority of conversions necessary to comply with State or local regulations will have commenced before the revised applicability date, and, therefore, not be regulated under these standards. Only those few State or local regulation-related conversions which commence after the promulgation date will be affected. Thus, the estimate of 55 facilities affected in 5 years is still believed to represent a reasonable approximation, based on Section 114 letter responses from industry. The updated industry costs were used to recalculate the nationwide cost impact, with the costs of purchasing and operating continuous monitors added to these estimates. By 1986, the terminal and independent tank truck industries will spend about \$12.2 million in capital investment, and the net annualized cost in the fifth year will be \$2.5 million. The capital and annualized cost estimates have decreased since the original evaluation mainly because of re-analysis of loading rack top-to-bottom loading conversion costs and changes in the requirements for existing vapor processing systems. In the previous analysis, presented in the BID, Volume I, the costs for the top-to-bottom loading conversions were attributed to the standards for all affected top loading terminals in the nationwide cost determination. However, in the revised evaluation, the cost of top-to-bottom loading conversions (not as a result of vapor control requirements) which would trigger reconstruction were not included in the costs to comply with the promulgated standards. These costs would be incurred by the terminal owner regardless of the standards since the conversions were performed voluntarily.

One commenter felt that even the small cost per gallon of product necessary to comply with the standards would discourage an owner or operator from investing in conversion work which might make a terminal subject to the standards, and that this could make terminal closures more prevalent. In response to this and similar comments, the economic analysis which supported the proposal was reviewed and many cost estimates were updated. The results of both the original and revised economic analyses showed that for the two smallest model plants the standards could, in the worst case, have a significant negative impact on profitability in the unlikely absence of complete control cost pass-through.

In the original analysis on existing facilities both the 380,000 liter/day and 950,000 liter/day model plants (model plants 1 and 2) would encounter returns-on-investment (ROI's) of less than 11 percent, taken to be the minimum acceptable level. The revised analysis indicates that only a 380,000 liter/day top-loaded facility (projected to be only 2 or 3 affected facilities per year) would experience a significant decrease in profitability, with a post-control ROI range of 7.7 to 8.0 percent. A 950,000 liter/day terminal would still maintain a marginal profitability level with a post-control ROI range of 10.6 to 11.0 percent. However, the preceding impacts are worst-case scenarios and very unlikely to occur. Since the price increase necessary to offset the control costs is less than 0.5 percent, the most likely scenario will involve an impact with most of the control costs passed through and very little cost absorption. Under this scenario no existing terminals are expected to close. Industry profiles do forecast a trend away from new small bulk terminals to larger terminals; however, this is a result of previous technological advances and economies of scale and is not a result expected to be accelerated by the implementation of these standards.

Some commenters questioned the BID, Volume I, cost estimates associated with purchasing, installing, operating, and maintaining vapor control systems. In particular, most CA system costs and some REF system costs were pointed out as being underestimated.

Most carbon adsorption units are currently being produced by two manufacturers. The purchase costs used in the original cost analysis were received from one major manufacturer at the time the analysis was performed. After proposal, estimated costs were updated through contacts with both manufacturers. The average cost of installing a vapor processor was estimated as 85 percent of the initial purchase price of the unit, based on 14 actual installations. Values used to compute the average installation cost ranged from 37 to 147 percent. Since no trend in this percentage as a function of purchase cost or unit type was noted, a single value representing the average was selected. Consequently, some unit installation costs will be higher and some lower than those presented in the analysis. Installation costs submitted by one commenter averaged about 115 percent of the purchase price of the processor, which is consistent with the range of values considered in deriving EPA's 85 percent figure. Another commenter submitted data showing that

the typical installation cost for a REF unit at his terminals was \$90,000, or 55 percent of the \$165,000 purchase price. Again, this percentage falls within the range of values considered previously by the Agency.

Operating costs for all control technologies considered in developing the standards were calculated using electrical consumption data supplied by the system manufacturers. The REF unit purchase cost and electrical consumption figures used to develop impacts of the proposed standards applied to systems used to achieve the SIP limit of 80 mg/liter. The data have subsequently been reassessed using more current costs. The manufacturer of essentially all of the current REF units was contacted to obtain present purchase and operating figures which would be reflected for a system to meet the emission limit of 35 mg/liter. Unit models were selected for application to the four model plants, based on the parameter suggested by the manufacturer, peak hourly product loading. Models were selected with considerable excess capacity, so that cost estimates would be conservative. The power costs for current CA systems were calculated in the same way as those for REF systems, using updated manufacturers' information. The limited available field data on the operating costs of installed units generally correlate well with the calculated figures.

#### *Emission Control Technology*

Several commenters remarked that the technology to achieve the 35 mg/liter emission limit has not been demonstrated, because only a few short-term tests have been performed. These commenters stressed the necessity for data on continuous performance, and on the ability of the considered systems to achieve the emission limit over the long term.

Since the beginning of the standards development, the Agency has sought the most recent results of tests performed by oil companies and State agencies, in order to collect the best possible data base. Since all of the tested systems were installed in response to SIP limitations at or near the 80 mg/liter limit, oil company and system manufacturer technical representatives were consulted to determine the assumed design conditions for the installed systems and the collection potential of the various control technologies. Emission test results on several CA units tested between 1979 and 1981, representing over 30 days of testing, were received after proposal from four State agencies and one control

system manufacturer. Outlet total organic compounds mass emissions measured in these tests ranged from 0.34 to 17.9 mg/liter, with 28 of the daily test values below 10 mg/liter. Three REF units owned by a single oil company in two States were tested in 1980 and 1981. Daily average emissions in these tests were 21.9, 22.6, and 41.8 mg/liter. These results support the observation that current REF units perform at various levels with respect to the 35 mg/liter limit. Since total organic compounds mass emissions are related to the condenser temperature maintained in these units, setting the thermostatic controls at different levels can produce a range of emission levels from the same control equipment. The current generation of REF units can be adjusted to maintain the low temperatures (approximately  $-84^{\circ}\text{C}$ ; or  $-120^{\circ}\text{F}$ ) required to achieve 35 mg/liter consistently. Recent tests of TO systems verify the ability of oxidation units to limit emissions to levels considerably below 35 mg/liter.

Even though the tests did not follow EPA procedures exactly, the recent test data collected since proposal of these standards demonstrate the ability of the best systems to achieve the required level of 35 mg/liter. The continuing ability of these systems to achieve this limit depends on their proper operation and maintenance. The costs of operating and maintaining CA, TO, and REF type vapor processors were considered in assessing the economic impact of the promulgated standards. As discussed earlier, the 80 mg/liter limit applied to facilities with existing vapor processors should be able to be met by any of the control equipment which was installed under SIP requirements.

Some commenters stated that it had not been shown by EPA that the proposed standards would be achievable under all the variable operating conditions that may exist throughout the industry. However, these commenters did not identify any specific variable operating conditions which they felt may affect emission levels, nor was any technical information included with the comments. The typical performance test on bulk terminal control systems does not monitor operating conditions and their possible effect on emissions, because generally all that is required in this test procedure is the measurement of outlet mass emissions over several hours. However, data were collected during the EPA-sponsored test program and variables (gasoline composition, vapor concentration, and peak loading levels) have been identified as having a

possible effect on the mass emission level or control efficiency of the control technologies considered capable of achieving the limit of the standard.

Gasolines with different Reid vapor pressures (RVP) are marketed in different seasons of the year, in order to maintain approximately constant actual vapor pressure as the mean ambient temperature changes. Under winter conditions, therefore, mass emissions may be higher for some systems because of increased light ends in the inlet vapors. If CA and REF units are sized with sufficient collection area to meet the emission limit in winter, emissions in summer will then be well below the limit. TO systems are often designed to handle saturated streams stored in vapor holders, and should not be affected by the variable RVP. Tests of CA to TO units considered by the Agency show that the emission limit was achieved at various times of the year and, therefore, under various gasoline compositions.

Both CA and TO systems have been tested under a range of inlet VOC concentrations returned from tank trucks, and the test results indicate the ability of these technologies to achieve the limit of the standards under high inlet concentrations. Also, theoretical estimations and analyses for CA and REF systems have indicated that these systems will collect efficiently, and exhibit outlet emissions below 35 mg/liter, throughout the range of concentrations which will be experienced at new bulk terminals (docket items IV-A-2, IV-D-36, IV-D-38). Efficiencies, in fact, are likely to increase with increasing inlet concentration. TO systems are easily designed to handle saturated inlet streams.

Most control systems are designed for peak loading hours at a terminal, rather than daily throughput, because of the fluctuation in loading activity throughout the day. Thus, a properly sized unit that can handle peak periods should have improved performance during the remainder of the day.

It was concluded that the operational variables at a terminal are merely design variables which affect the selection and sizing of the vapor processor. No variables have been identified which would prevent these standards from being met on a consistent basis.

Several commenters felt that the proposed emission limit of 35 mg/liter for new vapor processors is too stringent for the current generation of vapor processors in use at bulk terminals. Some of the commenters stated that

certain types of processors would be unable to achieve this limit, while others felt that the limit was unnecessarily stringent for any of the existing technologies. Alternate limits of 55 mg/liter and 80 mg/liter were suggested.

Standards of performance, in the form of numerical emission limits, are intended to reflect the degree of emission limitation achievable through application of the best adequately demonstrated technological system of continuous emission reduction, taking into consideration the cost of achieving such emission reduction, any nonair quality health and environmental impacts, and energy requirements. Carbon adsorption vapor processors manufactured by both of the major suppliers have demonstrated the capability to achieve emission levels below 35 mg/liter on a regular basis. Also, thermal oxidation units have shown the capability to achieve 35 mg/liter, although some TO systems may require a vapor holder to achieve this limit reliably. Compression-oxidation hybrid systems have been found to achieve the same high control efficiencies as the straight TO systems. In addition, test data, computer modeling, and the manufacturer's claims suggest the REF systems can be designed and operated to meet 35 mg/liter.

Based on a number of emission tests, EPA has identified carbon adsorption and thermal oxidation as the best demonstrated technologies (BDT) for controlling vapors from gasoline loading racks. Section 111 requires EPA to set numerical emission limits achievable through application of BDT (considering the statutory factors), even if by doing so the Agency precludes the use of less effective systems. Owners are nonetheless free to use any technology that will achieve the limit.

Some commenters referred to carbon bed temperature excursions at several CA unit installations during the summer of 1980. Due to the resulting extended shutdowns, one commenter felt that doubt had been cast on the ability of currently designed systems to maintain high efficiency consistently. Contacts were made by EPA with system manufacturers and oil industry representatives, to determine the apparent reasons for the six reported occurrences of carbon bed overheating. Discussions indicated that the overheating incidents were primarily the result of improper flow distribution and improper startup procedures resulting in the insufficient preloading of the virgin carbon in some new, larger units.

Precautionary measures to prevent overheating including: (1) Complete conditioning of the virgin carbon to ensure that an adequate heel has been placed on the carbon to minimize subsequent high adsorption heat releases, and (2) sizing the unit to maintain proper vapor velocity and flow distribution through the carbon beds. According to the system manufacturers, overheating should not occur if these precautionary measures are employed (docket item IV-D-36).

Industry representatives have addressed the carbon bed overheating issue by incorporating emergency shutdown measures and bed cooling devices on newer systems. Two additional oil industry representatives indicated that, on any new carbon system ordered (and possibly retrofitted to existing systems), they will specify cooling provisions and additional temperature sensors. Since only 6 temperature excursion occurrences have been identified in the approximately 200 operating carbon systems, the overheating problem does not appear to be widespread. EPA agrees with the manufacturers and with industry representatives that an effort should be made to follow carefully the recommended startup and operational procedures to minimize the conditions which may tend to promote temperature excursions. The added costs of emergency shutdown and bed cooling provisions on the newest CA units have been incorporated in the revised cost analysis in estimating the control cost of the standards to the bulk terminal industry.

Two commenters felt that CA systems have several general operational problems and that this technology is still in the developmental stages. The first carbon adsorption system for bulk terminal vapor recovery was installed in November of 1976, and today the market is shared by two manufacturers with approximately 200 units in operation. Most types of vapor processors can be considered to be under development in the sense that continual design improvements are being made. Some problems with vacuum valve actuators and vacuum pump seals have occurred, as well as problems related to extremely cold weather operation. Many of these problems have been solved (docket item IV-E-53), and EPA has not been made aware of any remaining operational problems which would affect the ability of CA systems to comply with the promulgated standards.

Comments on refrigeration units concerned the ability of this technology to achieve the proposed standard of

performance. Some commenters agreed that REF units could be designed and operated to achieve 35 mg/liter consistently, but felt that the added costs over current units would not be economically practical. The promulgated emission limit of 35 mg/liter was selected to reflect the performance of the best control systems, which test data showed to be the CA and TO technologies. The most current refrigeration systems have generally been installed to meet the 80 mg/liter limit and have achieved 35 mg/liter in only some instances, with emissions from most units slightly above the 35 mg/liter limit. Indications are that these units can be specified and operated to meet 35 mg/liter, at increased capital and operating costs over most current units. The capital costs for most sizes of REF units fall between the costs for TO and CA type units. Electrical costs for REF units are comparable to those for TO and CA units, except for the smaller bulk terminal sizes, where they are slightly higher. Detailed costs are presented in Appendix B of BID, Volume II.

#### *Tank Truck Issues*

Several commenters questioned EPA's legal authority to impose restrictions, i.e., retrofitting and vapor tightness testing, on gasoline tank trucks. They felt that trucks do not fall within the category of a stationary source and, therefore, cannot be regulated under Section 111. The commenters further stated that EPA could not regulate a mobile source directly or indirectly under Section 111. One commenter characterized the regulation of tank truck emissions as constituting "the taking of private property without cause, compensation, or due process."

For purposes of this NSPS, the stationary source, or affected facility, is the total of all bulk terminal loading racks loading liquid product into gasoline tank trucks. Those loading racks are essential to carrying out the activity known as product loading. While product loading involves both the affected facility and mobile equipment, including the tank truck, it is clearly a stationary activity, since it requires no movement from the affected facility site. Among the pollutants created by product loading are vapors forced from the tank truck as a direct result of the pumping of liquid product into the tank truck. Since escape of these vapors is caused by stationary activities at a stationary facility, they are "stationary source" emissions subject to regulation under Section 111—even though the tank trucks from which they escape during

that activity have the capability to move.

As indicated above, the tank truck is not included in the designation of the "affected facility" under these standards. The standards place responsibility on the terminal owner only, requiring the owner to restrict loadings to vapor-tight tank trucks equipped with compatible vapor recovery equipment. The regulation would not directly require either new or old tank trucks to be vapor-tight or equipped with certain types of hardware.

Section 111(a)(2) defines "stationary source" as any "building, structure, facility, or installation which emits or may emit any air pollutant." EPA identifies the "stationary source" as certain specified stationary equipment (termed the "affected facility") that "emits" a pollutant. In the Administrator's view, stationary equipment "emits" a pollutant if it causes that pollutant to enter the atmosphere.<sup>1</sup>

In the Administrator's view, affected facility emissions subject to regulation under Section 111 include *all* pollutants that enter the atmosphere as a result of the stationary industrial activities at the affected facility, even those that enter the atmosphere after contacting equipment with mobility. Stated differently, the test for whether emissions are "stationary source" emissions subject to regulation under Section 111 is whether the emissions are caused by a stationary facility during activities that require no movement from the facility, not whether the emissions escape to the atmosphere without touching equipment having the capability to move.

Interpreting "stationary source" emissions to include emissions resulting from stationary activities in which both the affected facility and some mobile equipment take part serves the intent of the statute. Congress enacted Section 111 for the "overriding purpose" of "prevent(ing) new pollution problems." S. Rep. No. 91-1196, 1970 *Leg. Hist.* at 416. The Senate Report states that Section 111 seeks to attain this goal by requiring control of new commercial and industrial establishments "to the maximum practicable degree regardless of their \* \* \* industrial operations." *Id.* Similarly, the Report states that "maximum use of available means of

preventing and controlling air pollution is essential" to the attainment of the goals of Section 111. *Id.* The legislative history thus indicates that Congress intend Section 111 to address emissions from all stationary operations at industrial establishments when the Agency can identify the maximum practicable degree of control for these emissions. To interpret Section 111(a)(2) so that emissions resulting from certain stationary activities involving the stationary source would not constitute "stationary source" emissions simply because those emissions pass through some equipment with the capability to move would be incompatible with that intent.

The Agency recognizes that promulgation of standards regulating loading racks as "stationary sources" may significantly affect tank truck owners and other segments of the petroleum marketing and transportation industry. The fact that standards within an agency's statutory authority indirectly affect nonregulated entities, however, does not in and of itself diminish the authority to set the standards. Nothing in the statute or its history indicates that, in the case at hand, the indirect impact that regulation of emissions from loading racks will have on certain tank truck owners deprives the Agency of its clear authority to set new source performance standards for this source category.

In fact, it is likely that most new source standards affect to some degree industries other than that to which the standards directly apply. The standards for electric utility steam generators, for instance (40 CFR 60.40a-49a, Subpart Da), significantly affect the coal mining and railroad industries. The impact on tank trucks of a requirement that certain bulk terminals load only into vapor-tight trucks equipped with compatible equipment does not differ in kind from the indirect impacts resulting from Subpart Da and other new source performance standards. Bulk terminals deal extensively with delivery vehicles. As a result, it is to be expected that regulation of bulk terminals would affect delivery vehicles in some manner.

The potential effect of the standards on tank truck owners does not amount to a denial of due process or an unconstitutional taking of property. Because the commenter did not elaborate on the specific bases for these claims of unconstitutionality, the Agency can respond only generally. The Clean Air Act reflects a congressional determination that air pollution has a substantial effect on interstate commerce and therefore may be

regulated by Congress (and, through proper delegation, EPA) under the commerce clause. *District of Columbia v. Train*, 521 F.2d 971, 988 (D.C. Cir. 1975). It is unreasonable to suggest that regulation of emissions forced from the tank truck during loading bears no rational relationship to protection of public health and welfare, and thus violates the due process clause of the Fifth Amendment. There is a rational relationship between escape of these vapors and the public health and welfare, because these emissions contribute to ozone formation. *Sierra Club v. EPA*, 540 F.2d 1114, 1139 (D.C. Cir. 1976). There is also a proper legislative purpose underlying the requirements aimed at controlling these emissions. Moreover, the means the Agency has chosen, as discussed above, are reasonable and appropriate. *Id.*, at 1139 n.80 [citing *Heart of Atlanta Motel, Inc. v. United States*, 379 U.S. 241, 258-59 (1964)].

Nor do these standards transgress the takings prohibition in the Constitution. Given the substantial public interest in preserving clean air, tight restrictions may constitutionally be imposed on private property. *South Terminal Corp. v. EPA*, 504 F.2d 646, 678-80 (1st Cir. 1974). While this NSPS indirectly limits the uses of tank trucks, the limitation is not so extreme as to constitute an appropriation of the vehicles. *Sierra Club v. EPA*, *supra*, at 1140. This regulation affects only one of the tank truck uses available to the truck owner—loading at affected facilities. The right to use nonvapor-tight tank trucks at other facilities is neither extinguished nor transferred to someone else.

Several commenters felt that the terminal owner or operator should not have any responsibility for the vapor-tight status of for-hire tank trucks. The commenters felt that the terminal operator should not be required to police the testing and use of tank trucks which are owned by others.

Fugitive, or leakage, VOC emissions from tank trucks which occur during loading can be a significant emission source. Test data indicate that, on the average, a nonvapor-tight tank could lose 30 percent of the potential vapor transferred through leaks in dome covers and pressure-vacuum vents. The data further show that, by requiring the tanks which handle gasoline to pass an annual vapor tightness test, the average vapor loss due to leakage during the year between tests can be reduced to 10 percent of the potential vapors transferred. Fugitive VOC losses from tank trucks not only increase the

<sup>1</sup>EPA's authority to define the term "emits" in this way derives from Section 301 of the Act, as interpreted in the cases (see, e.g., *Alabama Power v. Costle*, 636 F.2d 323 (D.C. Cir. 1979)). In accordance with this provision, the Agency is interpreting the term "emits" broadly, to serve the broad purposes of Section 111 (described in the text below).

pollution problem but decrease the amount of product that can be reclaimed in vapor recovery equipment. The terminal owner or operator could lose as much as \$2 in recovered product per loading into nonvapor-tight trucks. For a small 380,000 liter/day (100,000 gallon/day) terminal this could represent a daily loss of over \$25. For a large 3,800,000 liter/day (1,000,000 gallon/day) terminal the losses could be over \$250/day. Bulk terminal industry representatives agree that the vapor tightness requirement for tank trucks is a necessary provision of the regulation (docket items IV-E-19, IV-F-3).

The objections from the bulk terminal industry arise regarding the responsibility for assuring loadings are into vapor-tight tanks. The industry feels the responsibility should be on the tank truck operator, who in fact may be the terminal operator or oil company, or an independent who operates for-hire tank trucks. However, in order for the responsibility under new source standards to be on an independent tank truck operator, the tank truck would have to be part of the affected facility. The feasibility of including the tank truck as part of the affected facility was reviewed in the preamble to the proposed standards. It was determined that the best approach to controlling fugitive tank truck leakage was to make the standards applicable only to bulk terminals, with a requirement that affected terminals load only into truck-mounted tanks that have passed a vapor tightness test. Because tank trucks load primarily with equipment owned by the terminal owner, and on the property of the terminal owner, EPA believes it is reasonable to presume, for the purpose of this regulation, that these owners can exercise sufficient control over the source to justify making them responsible for the emissions therefrom.

EPA did not intend for terminal personnel to man the racks 24 hours per day, or actually observe the loading of every tank truck to verify that each truck had passed an annual vapor tightness test. EPA felt that requiring documentation on file that gasoline tank trucks operating out of the terminal had passed a vapor tightness test would provide a sufficient means of promoting loadings into vapor-tight tanks. Industry opposition is centered around the liability on the terminal owner for tank trucks he does not own. At unmanned, automated terminals, the terminal operator is usually not present and cannot determine which trucks are loading. The Agency realizes these limitations but believes that the vapor

tightness requirement is necessary in order for these standards to be effective.

Changes to the vapor tightness requirement have been incorporated into the promulgated regulation to clarify that the standards do not require the terminal operator to monitor each tank truck loading. A requirement to log the tank identification number of all gasoline tank trucks loading at affected facilities has been incorporated into the final regulation. Since the quantity of product which passes through the terminal and its corresponding worth is very large, there is already considerable paperwork involved in tracking the products in and out of the terminal. The truck identification information could be recorded by the truck driver as part of the normal paperwork which already accompanies each loading. If the tank identification number is logged each time the tank is loaded, the owner can periodically cross-check the tank identification number with the vapor tightness documentation on file at the terminal. This cross-checking is required within 2 weeks of the loading. If the terminal discovers that an unauthorized tank truck has received gasoline, the terminal operator notifies the tank owner, and takes steps to assure that the nonvapor-tight truck does not reload at the terminal until proper vapor tightness documentation is obtained. This notification must be documented and kept on file at the terminal. Methods of achieving this are available to the terminal owner or operator and could include revocation of loading privileges or contractual agreements between the terminal owner or operator and the truck owner or operator. However, EPA has not specified any particular method, to allow the terminal owner or operator the flexibility to meet the requirements, with minimum disruption to terminal operations. Section 111(h)(3) of the Clean Air Act provides that if the terminal owner, after notice and opportunity for public hearing, "establishes to the satisfaction of the Administrator that an alternative means of emission limitation will achieve a reduction in emission \* \* \* at least equivalent to the reduction in emissions of such air pollutant" achieved under the tank truck vapor tightness requirement, the Administrator "shall permit the use of such alternatives \* \* \*". Thus, the terminal owner is free, with EPA approval under Section 111(h)(3), to develop a different strategy for controlling fugitive emissions from tank trucks.

One commenter felt that an administrative burden would be created by a requirement to keep vapor

tightness documentation for as many as 400 to 500 transport trucks using a given terminal. Several other commenters generally argued that the tank truck controls would represent an administrative burden, as well as being costly and inequitable.

The testing and maintenance of tank trucks for vapor tightness has been shown to have a significant effect in reducing total emissions during loading. Thus, this procedure has a very important function in bulk terminal VOC emissions limitation. The administrative burden of keeping the documentation on file would be minimal since the information would in most cases be supplied by the owner of for-hire tank trucks and the terminal would simply file the data. Cross-checking these files with tank identification numbers logged during loading should be a simple process and would not be an excessive burden. Furthermore, this filing and cross-checking would represent much less of a burden than the in-person monitoring by terminal personnel of each loading as it occurred.

#### Docket

The docket is an organized and complete file of information submitted, or otherwise considered, in the development of this rulemaking. The docket is a dynamic file, since material is added throughout the rulemaking development. The docketing system is intended to allow members of the public and industries involved to identify and locate documents readily so that they can effectively participate in the rulemaking process. Along with the statement of basis and purpose of the proposed and promulgated standards and EPA responses to significant comments, the contents of the docket, except for certain interagency review materials, will serve as the record in case of judicial review [Section 307(d)(7)(A)].

#### Miscellaneous

The effective date of this regulation is August 18, 1983. Section 111 of the Clean Air Act provides that standards of performance or revisions thereof become effective upon promulgation and apply to affected facilities, construction or modification of which was commenced after the date of proposal (December 17, 1980).

As prescribed by Section 111, the promulgation of these standards 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 these promulgated standards was preceded by consultation with appropriate advisory committees, independent experts, and Federal departments and agencies.

This regulation will be reviewed within 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, and reporting requirements.

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 this regulation and for other regulatory alternatives. All aspects of the assessment were considered in the formulation of the standards to ensure that cost was carefully considered in determining BDT. The economic impact assessment is included in the background information documents for the proposed and promulgated standards (BID, Volumes I and II).

The Paperwork Reduction Act (PRA) of 1980 (Pub. L. 96-511) requires clearance from the Office of Management and Budget (OMB) of reporting and recordkeeping requirements that qualify as an "information collection request" under the PRA. For the purposes of OMB's review, and analysis of the burden associated with the reporting and recordkeeping requirements of this regulation has been made. During the first 2 years of this regulation, the average annual burden of the reporting and recordkeeping requirements would be 4.8 person-years, based on an average of 11 respondents per year. Information collection requirements contained in this regulation (§§ 60.502, 60.503, 60.505) have been approved by the OMB under the provisions of the Paperwork Reduction Act of 1980, 44 U.S.C. 3501 *et seq.* and have been assigned OMB control number 2060-0006.

The Regulatory Flexibility Act of 1980 (RFA) requires that differential impacts on small businesses resulting from all Federal regulations be identified and analyzed. The RFA does not by its terms apply to regulations proposed prior to January 1, 1981. Consequently the RFA does not impose any requirements in the Agency's development of the bulk gasoline terminal NSPS (proposed December 17, 1980). However, the

Agency has considered the economic impact of the standards on relatively small terminals and tank truck firms, and the economic analysis has since been reviewed in reference to the RFA. The definition of a small business in the bulk terminal industry (SIC 5171), according to the criterion to qualify for SBA loans, is a firm with less than \$22 million in annual receipts.

Approximately 50 to 60 percent of the bulk terminal industry can be considered as small businesses according to this criterion. In the for-hire tank truck industry (SICs 4212, 4213, and 4214), a small business is defined as a firm with less than \$6.5 to \$7 million in annual receipts. Approximately 60 percent of the for-hire tank truck industry can be considered as small businesses according to this criterion. The RFA further stipulates that the analysis must be prepared if 20 percent of the small businesses are significantly affected.

Five new terminals are expected to be constructed in the first five years, and approximately 50 facilities will become affected through modification or reconstruction. Of the 55 affected facilities, 15 terminals, a 27 percent share, can be considered small business entities (assuming Model Plant 1 approximates a small business), and so the 20 percent criterion is exceeded. The analysis concluded that significant impact for small business entities would occur only under the worst-case assumption of complete cost absorption. Under a more likely scenario, further analysis revealed no significant impact. Since the impact on small bulk terminal businesses is not expected to be significant, no Regulatory Flexibility Analysis is required for this industry sector.

Thirty-four model firms in the for-hire tank truck industry are expected to be affected by 1985. Twenty-three affected firms are expected to be small business entities, representing a 68 percent share, which exceeds the 20 percent criterion. The potential exists for a significant impact to occur in worst-case scenario if control costs are completely absorbed. The results from the return-on-transportation investment analysis not only suggested as significant worst-case impact, but that the impacts are more severe for the largest model trucking firms. A more likely scenario was analyzed and no significant economic impact was found. This scenario was based on the realistic assumption that most of the control costs will be passed through with very little cost absorption affecting the ROTI. Even under complete cost pass-through the price of gasoline

increases at most by 0.03 percent. Since the impact on small independent tank truck firms is not expected to be significant, no Regulatory Flexibility Analysis is required for this industry sector.

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 this regulation will 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." The net annualized costs through the first 5 years of implementation, including depreciation and interest, are projected to be considerably below the threshold cost for defining a "major rule." Only negligible increases in the price of gasoline attributable to implementation of these standards are expected. The Agency has therefore concluded that this regulation is not a "major rule" under Executive Order 12291. In addition to the economic analysis, the Agency carefully examined the cost of various technical alternatives in terms of the emission reductions achieved. This was done for the range of configurations and facility sizes which are anticipated to be affected by the standard and, as described under the preamble section "Modification and Reconstruction," led to relaxation of the proposed standard for sources with SIP level controls in-place. The incremental cost of the final standard in terms of the incremental emission reduction achieved would range from a savings at certain medium to large size plants to a cost of approximately \$1,100/Mg for a typical small facility. The total cost per unit of VOC emission reduction associated with this regulation is \$440/Mg. This cost is consistent with that of other new source performance standards some of which cost \$1,000/Mg to \$2,000/Mg of VOC emission reduction, or higher.

#### List of Subjects in 40 CFR Part 60

Air pollution control, Aluminum, Ammonium sulfate plants, Asphalt, Cement industry, Coal copper, Electric power plants, Glass and glass products, Grains, Intergovernmental relations, Iron, Lead, Metals, Metallic minerals, Motor vehicles, Nitric acid plants, Paper and paper products industry, Petroleum, Phosphate, Sewage disposal, Steel Sulfuric acid plants, Waste treatment and disposal, Zinc, Tires.

Dated: August 4, 1983.  
William D. Ruckelshaus,  
Administrator.

#### PART 60—[AMENDED]

40 CFR Part 60 is 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 Definitions.  
60.502 Standards for Volatile Organic Compound (VOC) emissions from bulk gasoline terminals.  
60.503 Test methods and procedures.  
60.504 [Reserved.]  
60.505 Reporting and recordkeeping.  
60.506 Reconstruction.

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, the construction or modification of which is commenced after December 17, 1980, is subject to the provisions of this subpart.

(c) For purposes of this subpart, any replacement of components of an existing facility, described in paragraph § 60.500(a), commenced before August 18, 1983 in order to comply with any emission standard adopted by a State or political subdivision thereof will not be considered a reconstruction under the provisions of 40 CFR 60.15.

[Note: The intent of these standards is to minimize the emissions of VOC through the application of best demonstrated technologies (BDT). The numerical emission limits in this standard are expressed in terms of total organic compounds. This emission limit reflects the performance of BDT.]

###### § 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 gasoline facility which receives gasoline by pipeline, ship or barge, and has a gasoline throughput greater than 75,700 liters per day. Gasoline throughput shall be the maximum calculated design throughput as may be limited by compliance with an enforceable

condition under Federal, State or local law and discoverable by the Administrator and any other person.

"Continuous vapor processing system" means a vapor processing system that treats total organic compounds vapors collected from gasoline tank trucks on a demand basis without intermediate accumulation in a vapor holder.

"Existing vapor processing system" means a vapor processing system [capable of achieving emissions to the atmosphere no greater than 80 milligrams of total organic compounds per liter of gasoline loaded], the construction or refurbishment of which was commenced before December 17, 1980, and which was not constructed or refurbished after that date.

"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 vapor processing system that employs an intermediate vapor holder to accumulate total organic compounds vapors collected from gasoline tank trucks, and treats the accumulated vapors only during automatically controlled cycles.

"Loading rack" means the loading arms, pumps, meters, shutoff valves, relief valves, and other piping and valves necessary to fill delivery tank trucks.

"Refurbishment" means, with reference to a vapor processing system, replacement of components of, or addition of components to, the system within any 2-year period such that the fixed capital cost of the new components required for such component replacement or addition exceeds 50 percent of the cost of a comparable entirely new system.

"Total organic compounds" means those compounds measured according to the procedures in § 60.503.

"Vapor collection system" means any equipment used for containing total organic compounds vapors displaced during the loading of gasoline tank trucks.

"Vapor processing system" means all equipment used for recovering or oxidizing total organic compounds vapors displaced from the affected facility.

"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.

###### § 60.502 Standard for Volatile Organic Compound (VOC) emissions from bulk gasoline terminals.

On and after the date on which § 60.8(b) requires a performance test to be completed, the owner or operator of each bulk gasoline terminal containing an affected facility shall comply with the requirements of this section.

(a) Each affected facility shall be equipped with a vapor collection system designed to collect the total organic compounds vapors displaced from tank trucks during product loading.

(b) The emissions to the atmosphere from the vapor collection system due to the loading of liquid product into gasoline tank trucks are not to exceed 35 milligrams of total organic compounds per liter of gasoline loaded, except as noted in paragraph (c) of this section.

(c) For each affected facility equipped with an existing vapor processing system, the emissions to the atmosphere from the vapor collection system due to the loading of liquid product into gasoline tank trucks are not to exceed 80 milligrams of total organic compounds per liter of gasoline loaded.

(d) Each vapor collection system shall be designed to prevent any total organic compounds vapors collected at one loading rack from passing to another loading rack.

(e) Loadings of liquid product into gasoline tank trucks shall be limited to vapor-tight gasoline tank trucks using the following procedures:

(1) The owner or operator shall obtain the vapor tightness documentation described in § 60.505(b) for each gasoline tank truck which is to be loaded at the affected facility.

(2) The owner or operator shall require the tank identification number to be recorded as each gasoline tank truck is loaded at the affected facility.

(3) The owner or operator shall cross-check each tank identification number obtained in (e)(2) of this section with the file of tank vapor tightness documentation within 2 weeks after the corresponding tank is loaded.

(4) The terminal owner or operator shall notify the owner or operator of each nonvapor-tight gasoline tank truck loaded at the affected facility within 3 weeks after the loading has occurred.

(5) The terminal owner or operator shall take steps assuring that the nonvapor-tight gasoline tank truck will not be reloaded at the affected facility until vapor tightness documentation for that tank is obtained.

(6) Alternate procedures to those described in (e)(1) through (5) of this section for limiting gasoline tank truck loadings may be used upon application to, and approval by, the Administrator.

(f) The owner or operator shall act to assure that loadings of gasoline tank trucks at the affected facility are made only into tanks equipped with vapor collection equipment that is compatible with the terminal's vapor collection system.

(g) The owner or operator shall act to assure that the terminal's and the tank truck's vapor collection systems are connected during each loading of a gasoline tank truck at the affected facility. Examples of actions to accomplish this include training drivers in the hookup procedures and posting visible reminder signs at the affected loading racks.

(h) The vapor collection and liquid loading equipment shall be designed and operated to prevent gauge pressure in the delivery tank from exceeding 4,500 pascals (450 mm of water) during product loading. This level is not to be exceeded when measured by the procedures specified in § 60.503(b).

(i) No pressure-vacuum vent in the bulk gasoline terminal's vapor collection system shall begin to open at a system pressure less than 4,500 pascals (450 mm of water).

(j) Each calendar month, the vapor collection system, the vapor processing system, and each loading rack handling gasoline shall be inspected during the loading of gasoline tank trucks for total organic compounds liquid or vapor leaks. For purposes of this paragraph, detection methods incorporating sight, sound, or smell are acceptable. Each detection of a leak shall be recorded and the source of the leak repaired within 15 calendar days after it is detected.

(Approved by the Office of Management and Budget under control number 2060-0006)

#### § 60.503 Test methods and procedures.

(a) Section 60.8(f) does not apply to the performance test procedures required by this subpart.

(b) For the purpose of determining compliance with § 60.502(h), the following procedures shall be used:

(1) Calibrate and install a pressure measurement device (liquid manometer, magnehelic gauge, or equivalent

instrument), capable of measuring up to 500 mm of water gauge pressure with  $\pm 2.5$  mm of water precision.

(2) Connect the pressure measurement device to a pressure tap in the terminal's vapor collection system, located as close as possible to the connection with the gasoline tank truck.

(3) During the performance test, record the pressure every 5 minutes while a gasoline tank truck is being loaded, and record the highest instantaneous pressure that occurs during each loading. Every loading position must be tested at least once during the

(c) For the purpose of determining compliance with the mass emission limitations of § 60.502(b) and (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 total organic compounds concentration at the exhaust vent, Method 25A or 25B. The calibration gas shall be either propane or butane.

(d) Immediately prior to a performance test required for determination of compliance with § 60.502(b), (c), and (h), all potential sources of vapor leakage in the terminal's vapor collection system equipment shall be monitored for leaks using Method 21. The monitoring shall be conducted only while a gasoline tank truck is being loaded. A reading of 10,000 ppmv or greater as methane shall be considered a leak. All leaks shall be repaired prior to conducting the performance test.

(e) The test procedure for determining compliance with § 60.502(b) and (c) is as follows:

(1) All testing equipment shall be prepared and installed as specified in the appropriate test methods.

(2) The time period for a performance test shall be not less than 6 hours, during which at least 300,000 liters of gasoline are loaded. If the throughput criterion is not met during the initial 6 hours, the test may be either continued until the throughput criterion is met, or resumed the next day with another complete 6 hours of testing. As much as possible, testing should be conducted during the 6-hour period in which the highest throughput normally occurs.

(3) For intermittent vapor processing systems:

(i) The vapor holder level shall be recorded at the start of the performance test. The end of the performance test shall coincide with a time when the vapor holder is at its original level.

(ii) At least two startups and shutdowns of the vapor processor shall occur during the performance test. If this does not occur under automatically controlled operation, the system shall be manually controlled.

(4) The volume of gasoline dispensed during the performance test period at all loading racks whose vapor emissions are controlled by the processing system being tested shall be determined. This volume may be determined from terminal records or from gasoline dispensing meters at each loading rack.

(5) An emission testing interval shall consist of each 5-minute period during the performance test. For each interval:

(i) The reading from each measurement instrument shall be recorded, and

(ii) The volume exhausted and the average total organic compounds concentration in the exhaust vent shall be determined, as specified in the appropriate test method. The average total organic compounds concentration shall correspond to the volume measurement by taking into account the sampling system response time.

(6) The mass emitted during each testing interval shall be calculated as follows:

$$M_{ei} = 10^{-6} K V_{es} C_e$$

where:

$M_{ei}$  = mass of total organic compounds emitted during testing interval  $i$ , mg.

$V_{es}$  = volume of air-vapor mixture exhausted,  $m^3$ , at standard conditions.

$C_e$  = total organic compounds concentration (as measured) at the exhaust vent, ppmv.

$K$  = density of calibration gas,  $mg/m^3$ , at standard conditions =  $1.83 \times 10^6$  for propane =  $2.41 \times 10^6$  for butane.

$s$  = standard conditions, 20°C and 760 mm Hg.

(7) The total organic compounds mass emissions shall be calculated as follows:

$$E = \frac{\sum_i M_{ei}}{L}$$

where:

$E$  = mass of total organic compounds emitted per volume of gasoline loaded, mg/liter.

$M_{ei}$  = mass of total organic compounds emitted during testing interval  $i$ , mg.

$L$  = total volume of gasoline loaded, liters.

$n$  = number of testing intervals.

(f) The owner or operator may adjust the emission results to exclude the methane and ethane content in the exhaust vent by any method approved by the Administrator.

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

(Approved by the Office of Management and Budget under control number 2060-0006.)

§ 60.504 [Reserved].

§ 60.505 Reporting and recordkeeping.

(a) The tank truck vapor tightness documentation required under 160.502(e)(1) shall be kept on file at the terminal in a permanent form available for inspection.

(b) The documentation file for each gasoline tank truck shall be updated at least once per year to reflect current test results as determined by Method 27. This documentation shall include, as a minimum, the following information:

(1) Test Title: Gasoline Delivery Tank Pressure Test—EPA Reference Method 27.

(2) Tank Owner and Address.

(3) Tank Identification Number.

(4) Testing Location.

(5) Date of Test.

(6) Tester Name and Signature.

(7) Witnessing Inspector, if any: Name, Signature, and Affiliation.

(8) Test Results: Actual Pressure Change in 5 minutes, mm of water (average for 2 runs).

(c) A record of each monthly leak inspection required under § 60.502(j) shall be kept on file at the terminal for at least 2 years. Inspection records shall include, as a minimum, the following information:

(1) Date of Inspection.

(2) Findings (may indicate no leaks discovered; or location, nature, and severity of each leak).

(3) Leak determination method.

(4) Corrective Action (date each leak repaired; reasons for any repair interval in excess of 15 days).

(5) Inspector Name and Signature.

(d) The terminal owner or operator shall keep documentation of all notifications required under § 60.502(e)(4) on file at the terminal for at least 2 years.

(e) [Reserved].

(f) The owner or operator of an affected facility shall keep records of all replacements or additions of components performed on an existing vapor processing system for at least 3 years.

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

(Approved by the Office of Management and Budget under control number 2060-0006.)

§ 60.506 Reconstruction.

For purposes of this subpart:

(a) The cost of the following frequently replaced components of the affected facility shall not be considered in calculating either the "fixed capital cost of the new components" or the "fixed capital costs that would be required to construct a comparable entirely new facility" under § 60.15: pump seals, loading arm gaskets and swivels, coupler gaskets, overflow sensor couplers and cables, flexible vapor hoses, and grounding cables and connectors.

(b) Under § 60.15, the "fixed capital cost of the new components" includes the fixed capital cost of all depreciable components [except components specified in § 60.506(a)] which are or will be replaced pursuant to all continuous programs of component replacement which are commenced within any 2-year period following December 17, 1980. For purposes of this paragraph, "commenced" means that an owner or operator has undertaken a continuous program of component replacement or that an owner or operator has entered into a contractual obligation to undertake and complete, within a reasonable time, a continuous program of component replacement. [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 measure gas volume directly. 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 ( $\pm$  percent of the minimum absolute temperature) and a pressure gauge ( $\pm 2.5$  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.

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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.

Alternately, a calibrated, standard pitot may be used as the reference meter in conjunction with a wind tunnel assembly. Attach the test meter to the wind tunnel so that the total flow passes through the test meter. For each calibration run, conduct a 4-point traverse along one stack diameter at a position at least eight diameters of straight tunnel downstream and two diameters upstream of any bend, inlet, or air mover. Determine the traverse point locations as specified in Method 1. Calculate the reference volume using the velocity values following the procedure in Method 2, the wind tunnel cross-sectional area, and the run time.

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.

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 test 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:

$$Y_m = \frac{(V_r - V_i)(t_r + 273)}{(V_m - V_i)(t_m + 273)} \frac{P_b}{(P_b + P_s)}$$

Eq. 2A-1

$Y_m$  = 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.

$P_s$  = 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 it 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 from runs meeting the specifications to obtain an average meter calibration coefficient,  $Y_m$ .

The procedure above shall be performed at least once for each volume meter. Thereafter, an abbreviated calibration check shall be completed following 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 American Society for Testing and Materials (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.

$P_s$  = 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,  $m^3$ .

$Y_m$  = Average meter calibration coefficient, dimensionless.

$f$  = Final reading for test period.

$i$  = Initial reading for test period.

$s$  = Standard conditions, 20° C and 760 mm Hg.

$\Theta$  = Elapsed test period time, min.

5.2 Volume.

$$V_m = 0.3853 Y_m (V_m - V_i) \frac{(P_b + P_s)}{T_m}$$

Eq. 2A-2

5.3 Gas Flow Rate.

$$Q_s = \frac{V_m}{\Theta}$$

Eq. 2A-3

6. Bibliography.

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6.2 Wortman, Martin, R. Vollaro, and P.R. Westlin. Dry Gas Volume Meter Calibrations. Source Evaluation Society Newsletter. Vol. 2, No. 2. May 1977.

6.3 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

Applicability and Principle

1.1 Applicability. This method applies to the measurement of exhaust volume flow rate from incinerators that process gasoline vapors consisting primarily of 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 incinerator 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 Analyzer (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 with comparable specifications as CO analyzer 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. 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 sample analyzers are required for the incinerator exhaust:  $CO_2$ , CO, and organic analyzers. A sample manifold with a single sample probe may be used. Install a sample probe as described Method 25A. 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.

**3.4 Preparation.** Prepare and calibrate all equipment and analyzers according to the procedures in the respective methods. For the CO<sub>2</sub> analyzer, follow the procedures described in Method 10 for CO analysis substituting CO<sub>2</sub> calibration gas where the method calls for CO calibration gas. The span value for the CO<sub>2</sub> analyzer shall be 15 percent by volume. 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<sub>2</sub>, 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 an analyzer output does not meet the specifications of the method, invalidate the test data for the 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 or 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<sub>e</sub> = Mean carbon monoxide concentration in system exhaust, ppmv.
- CO<sub>2e</sub> = Mean carbon dioxide concentration in system exhaust, ppmv.
- HC<sub>e</sub> = Mean organic concentration in system exhaust as defined by the calibration gas, ppmv.
- HC<sub>i</sub> = 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.  
= Appropriate response factor for other calibration gas.
- V<sub>es</sub> = Exhaust gas volume, M<sup>3</sup>.
- V<sub>is</sub> = Inlet gas volume, M<sup>3</sup>.
- Q<sub>es</sub> = Exhaust gas volume flow rate, m<sup>3</sup>/min.
- Q<sub>is</sub> = Inlet gas volume flow rate, m<sup>3</sup>/min.
- e = Sample run time, min.
- s = Standard Conditions: 20°C, 760 mm Hg.
- 300 = Estimated concentration of ambient

CO<sub>2</sub>, ppmv. (CO<sub>2</sub> 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 concentration of inlet organics, outlet CO<sub>2</sub>, outlet 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:

$$V_{es} = V_{is} \frac{K(HC_i)}{K(HC_e) + CO_{2e} \cdot 300}$$

Eq. 2B-1

**4.4 Exhaust Gas Volume Flow Rate.** Calculate the exhaust gas volume flow rate as follows:

$$Q_{es} = \frac{V_{es}}{\theta}$$

Eq. 2B-2

**5. Bibliography.**

**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.

**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 primarily of alkanes, alkenes, and/or arenes (aromatic hydrocarbons). The concentration is expressed in terms of propane (or other appropriate organic calibration gas) or in terms of 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 volume concentration equivalents of the calibration gas or as carbon equivalents.

**2. Definitions.**

**2.1 Measurement System.** The total

equipment required for the determination of the gas concentration. The system consists of the following major subsystems:

**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. 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 expected concentration. 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 response to a zero level calibration gas before and after a stated period of operation during which no unscheduled maintenance, repair, or adjustment took place.

**2.5 Calibration Drift.** The difference in the measurement system response to a mid-level calibration gas before and after a stated period of operation during which no unscheduled maintenance, repair or adjustment took place.

**2.6 Response Time.** The time interval from a step change in pollutant concentration at the inlet to the emission measurement system to the time at which 95 percent of the corresponding final value is reached as displayed on the recorder.

**2.7 Calibration Error.** The difference between the gas concentration indicated by the measurement system and the known concentration of the calibration gas.

**3. Apparatus.**

A schematic of an acceptable measurement system is shown in Figure 25A-1. The essential components of the measurement system are described below:

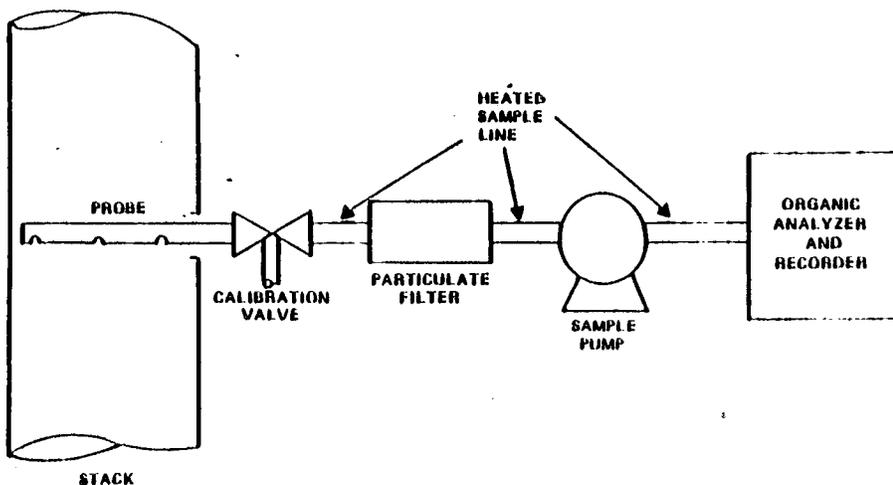


Figure 25A-1. Organic Concentration Measurement System.

**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. Alternatively, a single opening probe may be used so that a gas sample is collected from the centrally located 10 percent area of the stack cross-section.

**3.3 Sample Line.** Stainless steel or Teflon<sup>\*</sup> 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. Preparation of calibration gases shall be done according to the procedure in Protocol No. 1, listed in Reference 9.2. Additionally, the manufacturer of the cylinder should provide a recommended shelf life for each calibration gas cylinder over which the concentration does not change more than #2 percent from the certified value. For calibration gas values not generally available (i.e., organics between 1 and 10 percent by volume), alternative methods for preparing calibration gas mixtures, such as dilution systems, may be used with prior approval of the Administrator.

Calibration gases usually consist of propane in air or nitrogen and are determined in terms of the span value. Organic compounds other than propane can be used following the above guidelines and making the appropriate corrections for response factor.

**4.1 Fuel.** A 40 percent H<sub>2</sub>/60 percent He or 40 percent H<sub>2</sub>/60 percent N<sub>2</sub> 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 (ppmv) of organic material (propane or carbon

equivalent) or less than 0.1 percent of the span value, whichever is greater.

**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 ±3 percent of the span value.

**5.2 Calibration Drift.** Less than ±3 percent of span value.

**5.3 Calibration Error.** Less than ±5 percent of the calibration gas 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 be located at least 1.5 meters or 2 equivalent diameters (whichever is less) upstream 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 Error Test.** Immediately prior to the test series, (within 2 hours of the start of the test) introduce zero gas and high-level calibration gas at the calibration valve assembly. Adjust the analyzer output to the appropriate levels, if necessary. Calculate the predicted response for the low-level and mid-level gases based on a linear response line between the zero and high-level responses. Then introduce low-level and mid-level calibration gases successively to the measurement system. Record the analyzer responses for low-level and mid-level calibration gases and determine the differences between the measurement system responses and the predicted responses. These differences must be less than 5 percent of the respective calibration gas value. If not, the measurement system is not acceptable and must be replaced or repaired prior to testing. No adjustments to the measurement system shall be conducted after the calibration and

before the drift 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.

**6.5 Response Time Test.** Introduce zero gas into the measurement system at the calibration valve assembly. When the system output has stabilized, switch quickly to the high-level calibration gas. Record the time from the concentration change to the measurement system response equivalent to 95 percent of the step change. Repeat the test three times and average the results.

#### 7. Emission Measurement Test

**7.1 Organic Measurement.** Begin sampling at the start of the test period, recording time 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 and hourly during the test period, 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 both the zero and calibration drift checks are made.) Record the analyzer response. If the drift values exceed the specified limits, invalidate the test results preceding the check and repeat the test following corrections to the measurement system. Alternatively, recalibrate the test measurement system as in Section 6.4 and report the results using both sets of calibration data (i.e., data determined prior to the test period and data determined following the test period).

#### 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.

$$C_c = K C_{\text{meas}}$$

Eq. 25A-1

Where:

$C_c$  = Organic concentration as carbon, ppmv.

$C_{\text{meas}}$  = Organic concentration as measured, ppmv.

$K$  = Carbon equivalent correction factor,

$K = 2$  for ethane.

$K = 3$  for propane.

$K = 4$  for butane.

$K$  = Appropriate response factor for other organic calibration gases.

#### 9. Bibliography.

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

\* Mention of trade names or specific products does not constitute endorsement by the Environmental Protection Agency.

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.

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. EMB Report No. 75-CAS-6. August 1975.

#### 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 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 appropriate organic calibration gas) or in terms of 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 nondispersive infrared analyzer (NDIR). Results are reported as volume concentration 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 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  $\pm 3$  percent of the span value.

5.2 *Calibration Drift.* Less than  $\pm 3$  percent of the span value.

5.3 *Calibration Error.* Less than  $\pm 5$  percent of the calibration gas valve.

##### 6. Pretest Preparations.

6.1 *Selection of Sampling Site.* Same as in Method 25A, Section 6.1.

6.2 *Location of Sampling 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 Error Test.* Same as in Method 25A, Section 6.4.

6.5 *Response Time Test Procedure.* 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. Bibliography.

The bibliography is 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, trailer, 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 or vacuum is monitored, in minutes.

2.6 *Initial pressure (P<sub>i</sub>).* The pressure applied to the delivery tank at the beginning of the static pressure test, as specified in the appropriate regulation, in mm H<sub>2</sub>O.

2.7 *Initial vacuum (V<sub>i</sub>).* The vacuum applied to the delivery tank at the beginning of the static vacuum test, as specified in the appropriate regulation, in mm H<sub>2</sub>O.

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<sub>2</sub>O.

2.9 *Allowable vacuum change (Δv).* The allowable amount of decrease in vacuum during the static vacuum test, within the time period t, as specified in the appropriate regulation, in mm H<sub>2</sub>O.

##### 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<sub>2</sub>O 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<sub>2</sub>O 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<sub>2</sub>O gauge pressure with  $\pm 2.5$  mm H<sub>2</sub>O 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<sub>2</sub>O above atmospheric pressure or 250 mm H<sub>2</sub>O 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 *Summary.* Testing problems may occur due to the presence of volatile vapors and/or temperature fluctuations inside the delivery tank. Under these conditions, it is often difficult to obtain a stable initial pressure at the beginning of a test, and erroneous test results may occur. To help prevent this, it is recommended that, prior to testing, volatile vapors be removed from the tank and the temperature inside the tank be allowed to stabilize. Because it is not always possible to attain completely these pretest conditions a provision to ensure reproducible results is included. The difference in results for two consecutive runs must meet the criterion in Sections 5.2.5 and 5.3.5.

4.2 *Emptying of tank.* The delivery tank shall be emptied of all liquid.

4.3 *Purging of vapor.* As much as possible, 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.

4.4 *Temperature stabilization.* As much as possible, the test shall be conducted under isothermal conditions. The temperature of the delivery tank should be allowed to equilibrate in the test environment. During the test, the tank should be protected from extreme environmental and temperature variability, such as 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.

(Note.—The purpose of testing the liquid delivery hoses is to detect tears or holes that would allow liquid leakage during a delivery. Liquid delivery hoses are not considered to be possible sources of vapor leakage, and thus, do not have to be attached for a vapor leakage test. Instead, a liquid delivery hose

could be either visually inspected, or filled with water to detect any liquid leakage.)

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.

5.2.1 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  $P_1$ , the initial pressure specified in the regulation.

5.2.3 Close the shut-off valve and allow the pressure in the tank to stabilize, adjusting the pressure if necessary to maintain pressure of  $P_1$ . When the pressure stabilizes, record the time and initial pressure.

5.2.4 At the end of  $t$  minutes, record the time and final pressure.

5.2.5 Repeat steps 5.2.2 through 5.2.4 until the change in pressure for two consecutive runs agrees within  $\pm 12.5$  mm H<sub>2</sub>O. Calculate the arithmetic average of the two results.

5.2.6 Compare the average measured change in pressure to the allowable pressure change,  $\Delta p$ , 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  $V_1$ , 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  $V_1$ . 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  $\nabla 12.5$  mm H<sub>2</sub>O. Calculate the arithmetic average of the two results.

5.3.6 Compare the average measured change in vacuum to the allowable vacuum change,  $\Delta v$ , 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.

6.1 The pumping of water into the bottom of a delivery tank is an acceptable

alternative to the pressure source described above. Likewise, the draining of water out of the bottom of a delivery tank may be substituted for the vacuum source. Note that some of the specific step-by-step procedures in the method must be altered slightly to accommodate these different pressure and vacuum sources.

6.2. 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. 83-22380 Filed 8-17-83; 8:45 am]

BILLING CODE 6560-50-M

## 40 CFR Part 60

[AD-FRL-2241-6a]

### Addition of Reference Method 21 to Appendix A

**AGENCY:** Environmental Protection Agency (EPA).

**ACTION:** Final rule.

**SUMMARY:** This action establishes a new reference method to be added to Appendix A of 40 CFR Part 60, standards of performance for new stationary sources. Reference Method 21 will be used to determine volatile organic compound (VOC) leaks from process equipment such as valves, flanges and other connections, pump and compressor seals, pressure relief devices, process drains, open-ended valves, pump and compressor seal system degassing vents, accumulator vessel vents, agitator seals, and access door seals. This reference method will be used in several air pollution regulations for the limitation of fugitive VOC emissions which are being developed for proposal and promulgation.

**EFFECTIVE DATE:** August 18, 1983.

**ADDRESSES:** *Docket.* A docket, number A-79-32, containing information considered by EPA in development of standards of performance for fugitive emission sources in the synthetic organic chemical manufacturing industry, and which also contains information considered in development of the promulgated reference method, 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 (A-130), West Tower Lobby, Gallery 1, 401, M Street, SW., Washington, D.C. 20460. A reasonable fee may be charged for copying.

**FOR FURTHER INFORMATION CONTACT:** Mr. Winton Kelly, Emission Measurement Branch, Emission Standards and Engineering Division

(MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone (919) 541-5543.

#### SUPPLEMENTARY INFORMATION:

##### Summary of the Reference Method

Reference Method 21, "Determination of Volatile Organic Compound Leaks" is used to detect VOC leaks from individual sources of fugitive emissions. This procedure is used to identify and classify leaks only, and is not to be used as a direct measure of mass emission rates from individual sources. A portable instrument is used to measure the local organics concentration at the surface of a potential leak source. If a meter reading equal to or greater than a limit specified in an applicable regulation is obtained, a VOC emission (leak) exists. The procedure can also be used to confirm that "no detectable emissions" are present. If the measured difference between the local ambient concentration and the concentration present at the surface of the potential leak source is less than a concentration specified in an applicable regulation, then there are no detectable emissions.

##### Background

On January 5, 1981, as an appendix to the proposed standards of performance for fugitive emission sources in the synthetic organic chemical manufacturing industry, EPA proposed Reference Method 21. This method would normally be promulgated with those standards. However, the method is being promulgated earlier because several additional regulations are being developed for promulgation in the near future that specify that Reference Method 21 be used. This early promulgation will ensure that the reference procedure will be promulgated prior to being specified in promulgated standards of performance.

Under Executive Order 12291, EPA must judge whether a regulation is "major" and, therefore, subject to the requirement of a regulatory impact analysis. This regulation is not major because it will not have an annual effect on the economy of \$100 million or more; it will not result in a major increase in costs or prices; and there will be no significant adverse effects on competition, employment, investment, productivity, innovation, or on the ability of U.S.-based enterprise to compete with foreign-based enterprises in domestic or export markets.

Pursuant to the provisions of 5 U.S.C. 605(b), I hereby certify that the attached rule will not have a significant economic

impact on a substantial number of small entities.

#### Public Participation

During the development of the test method, trade and professional associations and individual companies supplied comments on the methods. After proposal on January 5, 1981, comments were received from various sources. A public hearing was held on March 3, 1981, to receive additional formal comments. The formal comment period was extended from April 6, 1981, to July 31, 1981.

#### Public Comments and Changes Made to the Proposed Reference Method

Numerous comments were received in response to proposal of the standards of performance for fugitive emissions from synthetic organic chemical industry. Most of the comments concerning the test method were specifically related to the selection of the definition of a leak, and not to the procedure alone. These comments have been carefully considered and, where determined to be appropriate, changes have been made in the proposed test method. A detailed discussion of the comments and full responses will be included in Docket No. A-79-32.

The following discussion summarizes the changes made to the reference method based on additional review and in response to public comment.

The promulgated reference method has been reorganized to improve the clarity of the description of the procedures. A "Definitions" section has been added to place all the definitions in one section.

A change in the requirements for instrument performance evaluation was also made to improve the quality control of the procedure. Instead of requiring a calibration precision test consisting of nine repetitions at 6-month intervals, the new requirements specify a test consisting of three repetitions at 3-month intervals. This change will provide a quality control result every quarter and will require less effort.

The definition of "no detectable emissions" has been changed to be consistent with the instrument specification of scale readability. The proposed procedure defined "no detectable emissions" as 2 percent of the leak definition concentration, with a minimum scale readability of 5 percent of the leak definition. The definition of "no detectable emissions" has been changed to correspond to the minimum readability specification and will be specified in applicable regulations.

Several commenters noted that the instruments used during screening

studies responded differently for different chemicals. One commenter stated that the actual response factor was poorly related to the theoretical response factor and cited inconsistent responses for nonane and decane, as well as no response for some chemicals, to support his claims. Another commenter suggested that the leak concentration for the standards should vary according to the process unit since a wide variability (0 to 571) in response factors has been determined for the industry. And, another commenter stated that aromatic compounds such as benzene, toluene, and xylene demonstrate a nonlinear response close to 10,000 ppmv. In response to these comments, Reference Method 21 gives specifications for the instrument to be used in monitoring fugitive VOC emission sources. The technique is intended to classify leaks only, not to provide a rigorous analytical concentration or mass emission rate of VOC. A specific statement has been added to Method 21 to clarify the intention to classify leaks only. The variation in response factor due to compound or instrument is not expected to affect significantly the number of leaks determined through screening because screening values are usually much greater than the leak definition for leaks and much less than the leak definition for nonleaks. Two industry commenters concur with EPA in this position. However, to remove some of the wide variability, a definition, specification, and test procedure for response factors have been added to Method 21. This specification will assure that the analyzer used will respond to the compounds to be measured.

Another commenter suggested that the gas specification section be amended to include a turnover of calibration gas standards every 3 months since calibration gases can deteriorate significantly over time. A provision has been added to the promulgated Reference Method 21 to require a shelf-life specification on calibration gases and procedures to follow to ensure that calibration gas concentrations are accurate.

Two comments concerned the instrumentation requirements of Reference Method 21. The commenter stated that only two instruments on the market today could be considered, and neither one would meet the specifications of the reference method entirely: the first instrument fails the calibration accuracy, and the second instrument does not meet the response time requirement. In response, although there are only two instruments which

have been used to any great extent, the technical literature and product information suggest that there are others which could be used for detecting leaks. The specifications included in the proposed reference method are achievable based on performance during EPA studies.

One comment letter expressed concern that no provision was made for the use of new instruments or calibration procedures which would provide equivalent or more accurate results. They asked that equivalency provisions be added for test methods and procedures. In response, Reference Method 21 gives specifications for the monitoring instrument that are general enough so as not to preclude new analytical developments. In addition, the General Provisions (40 CFR Part 60, Subpart A) allow for equivalent methods and procedures to be used for performance testing and monitoring when the results of the equivalent method have been demonstrated to be at least as accurate as results obtained by the required methods.

One commenter suggested that use of a windscreen upwind of the component being screened would prevent meteorological effects on the instrument readings. During EPA studies, the selection of a measurement location at the surface of the source was made to minimize meteorological effects. During the data collection efforts, no further provisions were found necessary to obtain repeatable screening values. Therefore, all of the field data were collected without a windscreen. In view of these facts, it seems unnecessary to require that a windscreen be used.

An alternative screening procedure has been added for those sources that can be tested with a soap solution. These sources are restricted to those with non-moving seals, moderate surface temperatures, without large openings to atmosphere, and without evidence of liquid leakage. The soap solution is sprayed on all applicable sources and the potential leak sites are observed to determine if bubbles are formed. If no bubbles are formed, then no detectable emissions or leaks exist. If any bubbles are formed, then the instrument measurement techniques must be used to determine if a leak exists, or if no detectable emissions exist, as applicable.

The alternative soap solution procedure does not apply to pump seals, sources with surface temperatures greater than the boiling point or less than the freezing point of the soap solution, sources such as open-ended lines or valves, pressure relief valve

horns, vents with large openings to atmosphere, and any source where liquid leakage is present. The instrument technique in the method must be used for these sources.

The alternative of establishing a soap scoring leak definition equivalent to a concentration-based leak definition is not included in the method and is not recommended for inclusion in an applicable regulation because of the difficulty of calibrating and normalizing a scoring technique based on bubble formation rates. A scoring technique would be based on estimated ranges of volumetric leak rates. These estimates depend on the bubble size and formation rate, which are subjective judgments of an observer. These subjective judgments could only be calibrated or normalized by requiring that the observers correctly identify and score a standard series of test bubbles. It has been reported that trained observers can correctly and repeatably classify ranges of volumetric leak rates. However, because soap scoring requires subjective observations and since an objective concentration measurement procedure is available, a soap scoring equivalent leak definition is not recommended for the applicable regulation. The alternate procedure that has been included will allow more rapid identification of potential leaks for more rigorous instrumental concentration measurement.

#### Miscellaneous

This final 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 7691(a)].

#### List of Subjects in 40 CFR Part 60

Air pollution control, Aluminum, Ammonium sulfate plants, Asphalt, Cement industry, Coal copper, Electric power plants, Glass and glass products, Grains, Intergovernmental relations, Iron, Lead, Metals, Metallic minerals, Motor vehicles, Nitric acid plants, Paper and paper products industry, Petroleum, Phosphate, Sewage disposal, Steel, Sulfuric acid plants, Waste treatment and disposal, Zinc, Tires.

Dated: August 4, 1983.

William D. Ruckelshaus,  
Administrator.

Appendix A of 40 CFR Part 60 is amended by adding Reference Method 21 as follows:

#### Appendix A—Reference Methods

\* \* \* \* \*

#### Method 21. Determination of Volatile Organic Compounds Leaks

##### 1. Applicability and Principle.

**1.1 Applicability.** This method applies to the determination of volatile organic compound (VOC) leaks from 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, agitator seals, and access door seals.

**1.2 Principle.** A portable instrument is used to detect VOC leaks from individual sources. The instrument detector type is not specified, but it must meet the specifications and performance criteria contained in Section 3. A leak definition concentration based on a reference compound is specified in each applicable regulation. This procedure is intended to locate and classify leaks only, and is not to be used as a direct measure of mass emission rates from individual sources.

##### 2. Definitions.

**2.1 Leak Definition Concentration.** The local VOC concentration at the surface of a leak source that indicates that a VOC emission (leak) is present. The leak definition is an instrument meter reading based on a reference compound.

**2.2 Reference Compound.** The VOC species selected as an instrument calibration basis for specification of the leak definition concentration. (For example: If a leak definition concentration is 10,000 ppmv as methane, then any source emission that results in a local concentration that yields a meter reading of 10,000 on an instrument calibrated with methane would be classified as a leak. In this example, the leak definition is 10,000 ppmv, and the reference compound is methane.)

**2.3 Calibration Gas.** The VOC compound used to adjust the instrument meter reading to a known value. The calibration gas is usually the reference compound at a concentration approximately equal to the leak definition concentration.

**2.4 No Detectable Emission.** The local VOC concentration at the surface of a leak source that indicates that a VOC emission (leak) is not present. Since background VOC concentrations may exist, and to account for instrument drift and imperfect reproducibility, a difference between the source surface concentration and the local ambient concentration is determined. A difference based on meter readings of less than a concentration corresponding to the minimum readability specification indicates that a VOC emission (leak) is not present. (For example, if the leak definition in a regulation is 10,000 ppmv, then the allowable increase in surface concentration versus local ambient concentration would be 500 ppmv based on the instrument meter readings.)

**2.5 Response Factor.** The ratio of the known concentration of a VOC compound to the observed meter reading when measured using an instrument calibrated with the reference compound specified in the application regulation.

**2.6 Calibration Precision.** The degree of agreement between measurements of the same known value, expressed as the relative percentage of the average difference between the meter readings and the known concentration to the known concentration.

**2.7 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.

#### 3. Apparatus.

##### 3.1 Monitoring Instrument.

##### 3.1.1 Specifications.

a. The VOC instrument detector shall respond to the compounds being processed. Detector types which may meet this requirement include, but are not limited to, catalytic oxidation, flame ionization, infrared absorption, and photoionization.

b. The instrument shall be capable of measuring the leak definition concentration specified in the regulation.

c. The scale of the instrument meter shall be readable to 5 percent of the specified leak definition concentration.

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 ½ to 3 liters per minute.

e. 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).

##### 3.1.2 Performance Criteria.

a. The instrument response factors for the individual compounds to be measured must be less than 10.

b. The instrument response time must be equal to or less than 30 seconds. The response time must be determined for the instrument configuration to be used during testing.

c. The calibration precision must be equal to or less than 10 percent of the calibration gas value.

d. The evaluation procedure for each parameter is given in Section 4.4.

##### 3.1.3 Performance Evaluation Requirements.

a. A response factor must be determined for each compound that is to be measured, either by testing or from reference sources. The response factor tests are required before placing the analyzer into service, but do not have to be repeated as subsequent intervals.

b. The calibration precision test must be completed prior to placing the analyzer into service, and at subsequent 3-month intervals or at the next use whichever is later.

c. The response time test is required prior to placing the instrument into service. If a modification to the sample pumping system or flow configuration is made that would change the response time, a new test is required prior to further use.

**3.2 Calibration Gases.** The monitoring instrument is calibrated in terms of parts per million by volume (ppmv) of the reference compound specified in the applicable regulation. The calibration gases required for monitoring and instrument performance evaluation are a zero gas (air, less than 10 ppmv VOC) and a calibration gas in air mixture approximately equal to the leak definition specified in the regulation. If cylinder calibration as mixture are used, they must be analyzed and certified by the manufacturer to be within  $\pm 2$  percent

accuracy, and a shelf life must be specified. Cylinder standards must be either reanalyzed or replaced at the end of the specified shelf life. Alternately, calibration gases may be prepared by the user according to any accepted gaseous standards preparation procedure that will yield a mixture accurate to within  $\pm 2$  percent. Prepared standards must be replaced each day of use unless it can be demonstrated that degradation does not occur during storage.

Calibrations may be performed using a compound other than the reference compound if a conversion factor is determined for that alternative compound so that the resulting meter readings during source surveys can be converted to reference compound results.

#### 4. Procedures.

4.1 *Pretest Preparations.* Perform the instrument evaluation procedures given in Section 4.4 if the evaluation requirements of Section 3.1.3 have not been met.

4.2 *Calibration Procedures.* Assemble and start up the VOC analyzer according to the manufacturer's instructions. After the appropriate warmup period and zero internal calibration procedure, introduce the calibration gas into the instrument sample probe. Adjust the instrument meter readout to correspond to the calibration gas value.

**Note.**—If the meter readout cannot be adjusted to the proper value, a malfunction of the analyzer is indicated and corrective actions are necessary before use.

#### 4.3 Individual Source Surveys.

4.3.1 *Type I—Leak Definition Based on Concentration.* 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 sample the interface where leakage is indicated until the maximum meter reading is obtained. Leave the probe inlet at this maximum reading location for approximately two times the instrument response time. If the maximum observed meter reading is greater than the leak definition in the applicable regulation, record and report the results 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 leak could occur.

b. *Flanges and Other Connections*—For welded flanges, place the probe at the outer edge of the flange-gasket interface and sample 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 1 cm 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 could 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.

e. *Process Drains*—For open drains, place the probe inlet at approximately the center of the area open to the atmosphere. 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.

g. *Seal System Degassing Vents and Accumulator Vents*—Place the probe inlet at approximately the center of the opening to the atmosphere.

h. *Access Door Seals*—Place the probe inlet at the surface of the door seal interface and conduct a peripheral traverse.

#### 4.3.2 Type II—"No Detectable Emission".

Determine the local ambient concentration around the source by moving the probe inlet randomly upwind and downwind at a 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. Then move the probe inlet to the surface of the source and determine the concentration described in 4.3.1. The difference between these concentrations determines whether there are no detectable emissions. Record and report the results as specified by the regulation.

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:

(a) *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 above.

(b) *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 where the emissions could be vented to the atmosphere prior to the control device, then it is presumed that no detectable emissions are present. If there are sources in the ducting or piping where emissions could be vented or sources where leaks could occur, the sampling surveys described in this

paragraph shall be used to determine if detectable emissions exist.

4.3.3 *Alternative Screening Procedure.* A screening procedure based on the formation of bubbles in a soap solution that is sprayed on a potential leak source may be used for those sources that do not have continuously moving parts, that do not have surface temperatures greater than the boiling point or less than the freezing point of the soap solution, that do not have open areas to the atmosphere that the soap solution cannot bridge, or that do not exhibit evidence of liquid leakage. Sources that have these conditions present must be surveyed using the instrument techniques of 4.3.1 or 4.3.2.

Spray a soap solution over all potential leak sources. The soap solution may be a commercially available leak detection solution or may be prepared using concentrated detergent and water. A pressure sprayer or a squeeze bottle may be used to dispense the solution. Observe the potential leak sites to determine if any bubbles are formed. If no bubbles are observed, the source is presumed to have no detectable emissions or leaks as applicable. If any bubbles are observed, the instrument techniques of 4.3.1 or 4.3.2 shall be used to determine if a leak exists, or if the source has detectable emissions, as applicable.

4.4 *Instrument 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.

4.4.1 *Response Factor.* Calibrate the instrument with the reference compound as specified in the applicable regulation. For each organic species that is to be measured during individual source surveys, obtain or prepare a known standard in air at a concentration of approximately 80 percent of the applicable leak definition unless limited by volatility or explosivity. In these cases, prepare a standard at 90 percent of the saturation concentration, or 70 percent of the lower explosive limit, respectively. Introduce this mixture to the analyzer and record the observed meter reading. Introduce zero air until a stable reading is obtained. Make a total of three measurements by alternating between the known mixture and zero air. Calculate the response factor for each repetition and the average response factor.

Alternatively, if response factors have been published for the compounds of interest for the instrument or detector type, the response factor determination is not required, and existing results may be referenced. Examples of published response factors for flame ionization and catalytic oxidation detectors are included in Section 5.

4.4.2 *Calibration Precision.* Make a total of three measurements by alternately using zero gas and the specified calibration gas. Record the meter readings. Calculate the average algebraic difference between the meter readings and the known value. Divide this average difference by the known calibration value and multiply by 100 to express the resulting calibration precision as a percentage.

4.4.3 *Response Time.* 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 switching to when 90 percent of the final stable reading is attained. Perform this test sequence three times and record the results. Calculate the average response time.

5. *Bibliography.*

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5.2 *Brown, C.E., et al.* Response Factors of VOC Analyzers Calibrated with Methane for Selected Organic Compounds. U.S. Environmental Protection Agency, Research Triangle Park, N.C. Publication No. EPA 600/2-81-022. May 1981.

5.3 *DuBose, D.A., et al.* Response of Portable VOC Analyzers to Chemical Mixtures. U.S. Environmental Protection Agency, Research Triangle Park, N.C. Publication No. EPA 600/2-81-110. September 1981.

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