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

EPA-453/R-94-002b
November 1994

Air

EPA

Gasoline Distribution Industry (Stage I) - Background Information for Promulgated Standards

Final
EIS

NESHAP

ENVIRONMENTAL PROTECTION AGENCY

Background Information
and Final
Environmental Impact Statement
for Gasoline Distribution Facilities

Prepared by:

_______________________________ _______________

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1. The final national emission standards for hazardous air pollutants (HAP) will limit HAP emissions from existing and new major source bulk gasoline terminals and pipeline breakout stations, under section 112(d) of the 1990 Clean Air Act.

2. Copies of this document have been sent to the following Federal Departments: Labor, Health and Human Services, Defense, Transportation, Agriculture, Commerce, Interior, and Energy; the National Science Foundation; the Council on Environmental Quality; members of the State and Territorial Air Pollution Program Administrators; the Association of Local Air Pollution Control Officials; EPA Regional Administrators; and other interested parties.

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EPA-453/R-94-002b

Gasoline Distribution Industry (Stage I) -

Background Information for

Promulgated Standards

Emission Standards Division

U.S. ENVIRONMENTAL PROTECTION AGENCY

Office of Air and Radiation

Office of Air Quality Planning and Standards

Research Triangle Park, North Carolina 27711

November 1994

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1.0 SUMMARY

On February 8, 1994, the U.S. Environmental Protection Agency (EPA) proposed national emission standards for hazardous air pollutant (HAP) emissions from bulk gasoline terminals and pipeline breakout stations that are major sources of HAP's or are collocated at plant sites that are major sources (59 FR 5868). On August 19, 1994, EPA announced in the Federal Register the availability of supplemental information regarding the level of control and test procedures for gasoline cargo tanks and reopened the public comment period (59 FR 42788). These proposed standards implemented section 112(d) of the Clean Air Act as amended in 1990 (the Act). Public comments on the proposal and the supplemental FR notice were requested at the time the standards were proposed in the Federal Register. There were 48 comment letters (see Table 1-1) submitted by facility owners and operators, trade associations, and State and local air pollution control agencies. In addition, comments were received from a control equipment supplier, a private environmental organization, and one U.S. Government agency. Summaries of the comments that were submitted, along with EPA's responses to these comments, are presented in this document. This comment summary and the Agency's responses served as the basis for the revisions made to the standards between proposal and promulgation. This document is volume II of "Gasoline Distribution Industry (Stage I) - Background Information for Proposed Standards," EPA-453/R-94-002a, January 1994 (later referred to as BID, Volume I) (docket item III-B-1). This report also includes a discussion of the changes made to the regulatory analysis presented in BID, Volume I.

TABLE 1-1. LIST OF COMMENTERS ON THE PROPOSED NESHAP FOR THE GASOLINE DISTRIBUTION (STAGE I) INDUSTRY

Item Number in Docket A-92-38	Commenter and Affiliation
IV-D-1	R.L. Mikkelsen Manager, Environmental Permits Alyeska Pipeline 1835 South Bragaw Street Anchorage, AK 99512
IV-D-2	Mr. Michael J. Hansel Director, Environmental Strategic Planning KOCH Industries, Inc. PO Box 64596 Saint Paul, MN 55184
IV-D-3	Mr. Dewey Mark Executive Director Independent Refiner/Marketers Association 9901 IH 10 West, Suite 800 San Antonio, TX 78230
IV-D-4	Ms. Barbara J. Price Vice President Health, Environment and Safety Phillips Petroleum Company Bartlesville, OK 74004
IV-D-5	Ms. Melanie S. Kelley V.P., Env., Safety & Public Affairs Total Petroleum, Inc. PO Box 500 Denver, CO 80201-0500
IV-D-6, IV-D-32	Mr. David S. Kircher Manager, Engineering Puget Sound Air Poll. Control Agency 110 Union Street, Suite 500 Seattle, WA 98101-2038
IV-D-7	J.W. Casey Manager, Environmental Support Shell Oil Company PO Box 4320 Houston, TX 77210-4320
IV-D-8	Sarosh J. H. Manekshaw Director, Env. Safety & Health Pennzoil Company PO Box 2967 Houston, TX 77252-2967
IV-D-9	Mr. Harold L. Dinsmore V.P., Vapor Control Systems John Zink Company PO Box 21220 Tulsa, OK 74121-1220
IV-D-10	Kelly A. Sakir Demetriou, Del Guercio, Springer & Moyer 801 South Grand Avenue

Los Angeles, CA 90017-4613
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TABLE 1-1. (Continued)

Item Number in Docket A-92-38	Commenter and Affiliation
IV-D-11	Ms. Sara Hutson, P.E. WAID and Associates 14205 Burnet Road, Suite 500 Austin, TX 78728
IV-D-12	O. Horton Cunningham Vice President, Operations TE Products Pipeline Company PO Box 2521 Houston, TX 77252-2521
IV-D-13	Ms. Deborah W. Gates Vice President Environment and Health Ashland Petroleum Company PO Box 391 Ashland, KY 41114
IV-D-14	Mr. Walter Roy Quanstrom, V.P. Env., Health & Safety Dept. Amoco Corporation PO Box 87703 Chicago, IL 60680-0703
IV-D-15	B.R. Baker, V.P. U.S. Supply & Logistics Mobil Oil Corporation 3225 Gallows Road Fairfax, VA 22037-0001
IV-D-16	Mr. Paul C. Bailey, Jr., Director, Health & Environmental Affairs American Petroleum Institute 1220 L Street, Northwest Washington, DC 20005 (summarizes comments in IV-D-22)
IV-D-17	Norbert Dee Director, Environ. Affairs National Petroleum Refiners Assoc. 1899 L Street NW, Suite 1000 Washington, DC 20036
IV-D-18	Mr. George A. Walker V.P., Health, Environment & Safety Unocal Corporation 1201 West 5th St., PO Box 7600 Los Angeles, CA 90051
IV-D-19	Mr. John Prokop President and Counsel Ind. Liquid Terminals Assoc. 1133 15th Street, N.W., Suite 650 Washington, DC 20005
IV-D-20	Ms. Andrea Grant, Counsel Independent Fuel Terminal Operators Association 901 15th Street, N.W.,

Suite 700
Washington, DC 20005-2301

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TABLE 1-1. (Continued)

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Item Number in Docket A-92-38	Commenter and Affiliation
IV-D-21	Robert H. Colby and Donald F. Theiler STAPPA/ALAPCO 444 North Capitol St. N.W. Washington, DC 20001
IV-D-22	Robert P. Strieter and Ellen Siegler American Petroleum Institute 1220 L Street, N.W. Washington, DC 20005
IV-D-23	Mr. Clifford J. Harvison President National Tank Truck Carriers 2200 Mill Road Alexandria, VA 22314-4677
IV-D-24	Mr. Charles L. Murphy Senior Consultant Conoco Inc. PO Box 1267 Ponca City, OK 74602-1267
IV-D-25	Mr. John W. Walton, Tech. Sec. Tennessee APCB, Dept. of Env. Conservation 401 Church Street Nashville, TN 37243-1531
IV-D-26	Mr. Jerry Langley Director of Health, Environment & Safety Williams Pipe Line Company PO Box 3448 Tulsa, OK 74101
IV-D-27	Mr. David Driesen Natural Resources Defense Council 1350 New York Avenue, N.W. Washington, DC 20005
IV-D-28	Mr. Kenneth M. Kunaniec, Eng. Mgr. 939 Ellis Street San Francisco, CA 94109
IV-D-29	Ms. Ann Farner Director, Government Relations Tosco Refining Company 2300 Clayton Road, Suite 1100 Concord, CA 94520-2100
IV-D-30	Mr. Jeffrey L. Leiter & Mr. Gregory M. Scott Collier, Shannon, Rill & Scott 3050 K Street, N.W., Suite 400 Washington, DC 20007

IV-D-31	Mr. Allen R. Ellet Environmental Consultant BP Oil Company 200 Public Square Cleveland, OH 44114-2375
IV-D-32	(same as IV-D-6)

TABLE 1-1. (Continued)

Item Number in Docket A-92-38	Commenter and Affiliation
IV-D-33	Mr. John J. Huber Government Affairs Counsel Petroleum Marketers Association of America 1901 N. Ft Meyer Drive, Suite 1200 Arlington, VA 22209
IV-D-34	R.T. Richards General Mgr., Env. and Product Safety Texaco Inc. PO Box 509 Beacon, NY 12508
IV-D-35	Mr. William J. Doyle Manager, Environmental Affairs Marathon Oil Company 539 South Main Street Findlay, OH 45840-3295
IV-D-36	Mr. David A. Buff, P.E. KBN Engineering and Applied Sciences, Inc. 1034 N.W. 57th Street Gainesville, FL 32605
IV-D-37	Terri Thomas Supervisor, Air Toxics Section Ventura County Air Pollution Control District 702 County Square Drive Ventura, CA 93003
IV-D-38	Mr. Brian Bateman Manager, Toxics Evaluation Section Bay Area Air Quality Mgmt. District 939 Ellis Street San Francisco, CA 94109
IV-D-39	Anthony R. O'Neill V.P., Government Affairs National Fire Protection Association P.O. Box 9101 Quincy, MA 02269-9101
IV-D-40	Susan F. Tierney, Assistant Secretary Office of Policy, Planning & Program Evaluation Department of Energy Washington, DC 20585

TABLE 1-1. (Concluded)

Item Number in Docket A-92-38	Commenter and Affiliation
Additional comments on the notice of supplementary information:	
IV-D-47	Mr. John W. Walton, Tech. Sec. Tennessee APCB, Dept. of Env. Conservation 401 Church Street Nashville, TN 37243-1531
IV-D-48	Mr. Brent Tracy Senior Environmental Engineer Total Petroleum, Inc. PO Box 500 Denver, CO 80201-0500
IV-D-49	Mr. Paul Bailey Director, Health & Environmental Affairs American Petroleum Institute 1220 L Street, Northwest Washington, DC 20005
IV-D-50	Mr. John Prokop President and Counsel Ind. Liquid Terminals Assoc. 1133 15th Street, N.W., Suite 650 Washington, DC 20005
IV-D-51	Mr. B. R. Baker, V.P. Mobil Oil Corporation 3225 Gallows Road Fairfax, VA 22037-0001
IV-D-52	Mr. William J. Doyle Mgr., HES Policy & Analysis Marathon Oil Company 539 South Main Street Findlay, OH 45840-3295
IV-D-53	Mr. Arthur Lee Texaco Inc. PO Box 509 Beacon, NY 12508
IV-D-54	Ms. Deborah W. Gates V.P., Environment & Health Ashland Petroleum Company PO Box 391 Ashland, KY 41114
IV-D-55	Mr. Jerry Langley Director Health, Env. & Safety Williams Pipe Line Company PO Box 3448 Tulsa, OK 74101

1.1 SUMMARY OF CHANGES SINCE PROPOSAL

Several changes of varying importance have been made to the standards since proposal. The majority of the changes were made in response to the public comments, but some were made to improve clarity or consistency. Table 1-2 provides a summary of the major changes made in developing the final standards.

1.2 SUMMARY OF REANALYSIS OF IMPACTS OF FINAL STANDARDS

1.2.1 Alternatives

The regulatory alternatives are discussed in Section 5 of BID, Volume I. These regulatory alternatives reflect the different levels of emission control from which is selected the approach that represents the best technology for continuous emission reduction, considering cost, nonair quality health, and environmental and economic impacts for gasoline distribution facilities.

As discussed in Section 1.1, several major changes have been made to the standards since proposal: 1) leak detection and repair (LDAR) using a monitor has been deleted from the rule and replaced with a sight, sound, and smell inspection program to control equipment leaks; 2) vacuum assist vapor collection at new bulk terminals has been deleted and replaced with an annual 1-inch vapor tightness test to control cargo tank leakage, a year-round cargo tank performance standard, and an internal vapor valve test; and 3) the annual 3-inch vapor tightness test has been replaced with the aforementioned 1-inch vapor tightness test, year-round performance standard, and internal vapor valve test to control cargo tank leakage at existing bulk terminals.

1.2.2 Environmental Impacts

The estimated environmental impacts of the proposed standards were discussed in Section 6 of BID, Volume I. Changes to these estimates have been made since proposal for several reasons: 1) the equipment leakage emission factors have been lowered significantly, 2) the controlled cargo tank leakage emission factors have been lowered significantly, and 3) the estimated national average Reid vapor pressure of gasoline has been lowered from 11.4 psia to 10.4 psia. Nationwide HAP and

TABLE 1-2. SUMMARY OF MAJOR CHANGES MADE TO THE STANDARDS SINCE PROPOSAL

Rule Section and Title	Rule Change (BID Section Reference)
§63.420 Applicability	° Screening equations revised (Sec. 3.2) ° Potential to emit - operating limits incorporated and reporting for large nonmajor sources (Sec. 3.6) ° Use of SIC codes in regulating refinery terminals (Sec. 3.7) ° Coverage of terminals at pipeline breakout stations (Sec. 3.8)
§63.421 Definitions	° "In VHAP service" deleted (Sec. 4.6) ° "Gasoline tank truck" changed to "Gasoline cargo tank" (Sec. 4.3)
§63.422 Loading racks	° Vacuum assist requirement deleted (Sec. 5.3) ° Reduced emission factors for cargo tank leakage (Sec. 7.1) ° New floor determination for cargo tanks (Sec. 7.2, App. A)
§63.423 Storage vessels	° New storage vessel floor determination (Sec. 8.1, App. B)
§63.424 Equipment leaks	° Reduced emission factors for equipment leaks (Sec. 9.1, App. C) ° LDAR deleted, monthly visual inspection added (Sec. 9.2) ° Revised miscellaneous sources (housekeeping) provision (Sec. 2.1)
§63.425 Test methods and procedures	° New procedures for testing cargo tanks (Sec. 7.3)
§63.426 Alternative means of emission limitation	° No change
§63.427 Continuous monitoring	° Eliminated 6-hour average values (Sec. 6.2) ° Changed procedures for establishing parameter values (Sec. 6.2)
§63.428 Reporting and recordkeeping	° Allowing 1 year for initial notifications (Sec. 12.2) ° Added records and reports for visual inspection program (Sec. 9.2)

§63.429 Delegation of authority	° No change

VOC emissions from affected bulk terminals and pipeline breakout stations are estimated to decrease by approximately 2,100 Mg of HAP and 36,000 Mg of VOC per year, respectively. This emissions decrease will result in a reduction in the ambient air concentrations of HAP and VOC in the vicinity of approximately 240 new and existing bulk terminals and 20 new and existing pipeline breakout stations. The nationwide emission reductions are discussed further in Appendix D.

1.2.3 Water Pollution Impacts

The overall impact of the final rule on water resources will be negligible. None of the emission control technologies creates a significant water discharge. As discussed in Section 6.2 of BID, Volume I, only refrigeration condenser systems, which cool and condense the vapors from the loading operation for liquid recovery, when used for bulk terminal control, would create a potential water pollution impact.

1.2.4 Solid Waste Impacts

As discussed at proposal, solid waste (spent carbon) may be generated by bulk terminals which use a carbon adsorption system to control loading rack emissions. As shown in Table 6-5 of BID, Volume I, it is estimated that approximately 200 megagrams (Mg) of solid waste per year would be generated from carbon disposal at bulk gasoline terminals.

In addition, sludge (tank bottoms) will be generated from storage vessels at breakout stations and bulk terminals that must comply with the floor level of control (floating deck rim seal requirements in 40 CFR part 60, subpart Kb). The EPA estimates that at breakout stations, 95 external floating roof tanks (EFRT's) with a mechanical primary seal only, 15 internal floating roof tanks (IFRT's) with a vapor-mounted primary seal only, and 28 fixed-roof tanks will have to be cleaned and degassed earlier than their normal cleaning schedule to meet the final rule. It is estimated that the amount of solid waste generated from the cleaning of these tanks will be 3,985 Mg.

Similarly, it is estimated that at bulk terminals 416 EFRT's with a mechanical primary seal only, 154 IFRT's with a vapor-mounted primary seal only, and 184 fixed-roof tanks will have to be cleaned and degassed earlier than their normal cleaning schedule to meet the final rule. The volume of solid waste generated from these cleaning activities is estimated to total approximately 9,750 Mg.

1.2.5 Energy Impacts

Energy impacts of the final rule have been estimated in the form of gallons of gasoline saved. Energy savings were derived by determining the liquid gasoline equivalent of the emission reductions and assuming a gasoline density of 0.67 kg per liter. Liquid gasoline is saved by controlling equipment leaks, storage vessels, and cargo tanks since less product is allowed to evaporate and escape. Gasoline is recovered at terminals when carbon adsorption or refrigeration condenser systems are used to control emissions from loading operations and from storage vessels piped to vapor processors. For bulk terminals, it was assumed that 25 percent of the emission reductions would be processed using recovery devices (carbon adsorption, refrigeration condenser). The remaining 75 percent of the emission reductions would be achieved by vapor destruction devices and would not provide an energy savings. The total gasoline savings due to implementing the final rule is estimated at 10.5 million gallons per year.

1.2.6 Other Environmental Impacts

As discussed in Section 6.5 of BID, Volume I, other potential environmental impacts include noise impacts resulting from the use of vapor processors at bulk terminals. As discussed at proposal, the noise impacts of the promulgated action are expected to be insignificant.

1.2.7 Cost and Economic Impacts

The estimated costs and economic impacts of the proposed standards were discussed in Sections 7 and 8 of BID, Volume I.

Changes in these impacts have occurred since proposal for several reasons: 1) vacuum assist is no longer required at new facility loading racks, and has been replaced with new cargo tank certification and testing requirements; 2) the degassing/cleaning cost for storage tanks has been reevaluated and estimated to be significantly higher than proposed; 3) the costs of fitting controls have been reevaluated and estimated to be significantly higher than proposed; and 4) the LDAR program has been replaced with a visual inspection program. The nationwide capital cost of this regulatory action is estimated at approximately $117 million. The nationwide annual cost of this regulatory action is estimated at approximately $15.5 million per year (including reporting and recordkeeping costs). The nationwide environmental and cost impacts are discussed further in Appendix D.

1.3 REFERENCES

III-B-1 Gasoline Distribution Industry (Stage I) - Background Information for Proposed Standards. U.S. Environmental Protection Agency, Research Triangle Park, NC. EPA-453/R-94-002a. January 1994.

2.0 GENERAL ISSUES RAISED IN PUBLIC COMMENTS

2.1 SPILL PREVENTION

Comment: Several commenters stated that the proposed requirement in §63.424(d) constituted a prohibition on spills that would be impossible to comply with because, even with a preventive maintenance plan, all spills cannot be eliminated. The necessary steps required to clean up a spill would be impossible to carry out without violating the current rule, thus invalidating the current Spill Prevention Control and Countermeasures (SPCC) plans already approved by EPA (e.g., open-air oil/water separators). In addition, EPA has presented no evidence that leaks or spills contribute significantly to HAP emissions. As a result, the feasibility and cost of such a requirement has not been demonstrated. Many terminals are unmanned a majority of the time. It would be grossly unfair to hold terminal owners or operators accountable for the action of tank truck drivers that may cause gasoline to be spilled. The spill prevention requirement should be deleted or at least reworded to instruct facilities to take reasonable precautions to prevent spills (IV-D-2, p. 10; IV-D-3, p. 2; IV-D-5, p. 2; IV-D-13, p. 3; V-D-14, p. 10; IV-D-17, p. 8; IV-D-18, p. 8; IV-D-20, p. 8; IV-D-22, p. 26; IV-D-29, p. 5; IV-D-34, p. 17; IV-D-35, p. 3; IV-D-36, p. 3).

Response: The EPA's proposed provision was worded:

> "Owners or operators of bulk gasoline terminals and pipeline breakout stations subject to the provisions of this subpart shall not cause or allow gasoline to be spilled, discarded in sewers, stored in open containers, or handled in any other manner that would

result in vapor release to the atmosphere."

This provision is similar to EPA's "model rule" language that has been offered to States for use in developing State implementation plan rules for VOC sources. In State rules, the provision typically prohibits discarding gasoline in sewers, storing it in open containers, and handling it in any manner that would result in evaporation (and loss). The proposed provision was not intended to constitute a ban on spills, but rather a housekeeping and good practices requirement that would address the smaller potential HAP releases at a facility (which may be overlooked by the SPCC or DOT plans). The EPA agrees that, in its proposed form, the provision could be construed as a prohibition on any form of accidental release or spill. While such a prohibition may not be reasonable, the Agency maintains its intent to hold owners and operators accountable for deliberate or careless practices that could lead to emissions.

The commenters supplied recommended language for this provision that they believe would create a workable requirement. This suggested wording was consistent among the commenters, and reads as follows:

> "Owners or operators of bulk gasoline terminals and pipeline breakout stations subject to the provisions of this subpart shall not allow gasoline to be intentionally handled in a manner that would result in vapor releases to the atmosphere for extended periods of time. This prohibition would not preclude the following activities: (1) the use of passive devices (i.e., dikes, troughs, pans, etc.) to contain accidental gasoline spills or leaks; (2) the use of on-site sewer systems to collect and transport gasoline to reclamation/recycling devices such as oil/water separators; (3) small volume open containers which are used in routine maintenance and sampling activities; and (4) maintenance/tank cleaning activities."

The EPA has considered these comments and, while agreeing in principle that the proposed wording needed improvement, finds that the term "intentionally" may lead to enforcement difficulties in determining intent. Also, the Agency does not wish to provide the encompassing exclusions suggested by the commenters, but instead to emphasize the positive measures that should be taken to minimize miscellaneous vapor releases. Therefore, the language in §63.424(g) of the final rule reads as follows:

> "Owners or operators shall not allow gasoline to be handled in a manner that would result in vapor releases to the atmosphere for extended periods of time. Measures to be taken include, but are not limited to, the following:
>
> (1) Minimize gasoline spills;
>
> (2) Clean up spills as expeditiously as practicable;
>
> (3) Cover all open gasoline containers with a gasketed seal when not in use;
>
> (4) Minimize gasoline sent to open waste collection systems that collect and transport gasoline to reclamation and recycling devices, such as oil/water separators."

2.2 EMISSIONS AVERAGING

Comment: Three commenters believed emissions averaging to be a reasonable approach to cost-effective control and also to be acceptable under the Clean Air Act, and urged EPA to allow sources to average emissions when determining compliance. The Hazardous Organic NESHAP (HON) for the chemical production industry is cited as allowing emissions averaging for facilities regulated under the HON; also, the Administrator emphasized the need for market-based regulatory approaches in her confirmation hearings (IV-D-7, p. 10; IV-D-22, p. 74; IV-D-34, p. 21). One of the commenters supported an averaging program that would allow emissions trading within a facility (such as between storage tanks and loading racks) and among different source categories (i.e., terminals/breakout stations and refineries) (IV-D-22, p. 77). This commenter submitted a memorandum intended to demonstrate that EPA has the legal authority to implement MACT standards as a "bubble" program (IV-D-22, App. J).

Response: In the proposal preamble, at 59 FR 5880, EPA stated that it had considered including an emissions averaging approach but was not able to identify any viable alternatives. It was further stated that any alternative, to be acceptable, would have to be protective of the environment and should lower the cost of achieving a particular level of emission reduction. The EPA requested data and comments that could be used to develop an emissions averaging alternative in the final rule.

One of the commenters said that they were currently conducting research on more effective ways to reduce emission losses from storage tanks. The commenter further said that, should this research lead to more effective control techniques at reasonable cost, facilities would be able to provide additional control for their storage tanks while retaining existing, less efficient rack vapor recovery systems at a great cost savings.

While EPA is interested in learning more about effective approaches that retain emission control and are enforceable, these comments have not included any data or information ("viable alternatives") that could serve as the object of EPA's analysis. Any such information would have to include verifiable emissions reduction data and comply with the legal limitations imposed upon emissions averaging by the Act (as discussed, for example, in the preamble to the final HON regulation at 59 FR 19425 ff., April 22, 1994). Since no specific information on the technological or administrative aspects of a potential emissions averaging program for this source category has been supplied, EPA has not included provisions for such an approach in the final rule.

2.3 CONTROL LEVEL

Comment: Comments were received by the Agency on the reopening for comment of the issue of calculation of the MACT "floor" level of control for all major sources under a separate notice (59 FR 11018, March 9, 1994). These comments are included here for completeness. Two commenters stated that, to be consistent with the intent of the Clean Air Act amendments of 1990 (CAAA), the floor emission limitation should be based on the 88th percentile or the average emission limitation achieved by all members of the best performing 12 percent. Basing the floor on the average of the top performing 12 percent, they felt, is a misinterpretation of the CAAA (IV-D-22, p. 20, App. F; IV-D-34, p. 21). In contrast to these comments, another commenter said that EPA is mandated by the CAAA to establish the floor at the average emission limitation achieved by the best performing 12 percent of the existing sources, and is required to establish the floor at this level regardless of cost considerations. An alternative method in which EPA would ignore the top 11 percent of the existing sources and focus only on the source at the 88th percentile would be an erroneous interpretation of the floor (IV-D-27, p. 1).

Response: This issue affects all HAP source categories generally, and EPA has issued its decision and provided a complete discussion of its arguments in a Federal Register notice (59 FR 29196, June 6, 1994).

Comment: One commenter noted that control measures proposed for loading racks and gasoline tank trucks had cost effectiveness values in excess of $20,000 per Mg, which they felt was a figure warranted only in extreme nonattainment areas. The commenter believes that the interpretation of section 112(d)(3) of the Act regarding "best controlled" and "best performing" could allow for cost effectiveness considerations if the HAP's being controlled are of low toxicity. The commenter requested that EPA consider whether the term "best" allows for cost effectiveness considerations and reconsider whether the loading rack and tank truck portions of the proposal represent "best performing" controls (IV-D-40, p. 1).

Response: Section 112(d)(3) of the Act requires that at least the "floor" level of control, the average emission limitation achieved by the best performing 12 percent of the existing sources, must be applied to existing major sources. The EPA's interpretation of the Act is that more stringent, or "above the floor" controls, may be applied after "taking into consideration the cost of achieving such emission reduction, and any nonair quality health and environmental impacts and energy requirements" [section 112(d)(2) of the Act]. The Agency has intentionally avoided establishing a specific "bright line" threshold for acceptable cost effectiveness, due to the many other variables that must be considered in selecting among regulatory alternatives, and the differences among the various source categories. The impacts of the final rule provisions were revised and are summarized in Section 1.2.

Comment: One commenter felt that many of the proposed requirements are not warranted based on emission reductions and that unreasonably stringent controls are being required in non-problem areas. Extending current NSPS requirements to all facilities is more appropriate (IV-D-26, p. 1).

Response: Section 112(d)(3) of the Act provides specific direction, as discussed earlier in this section, to be used by EPA in regulating major sources of HAP's. These include determining the floor control level for existing facilities in all areas of the country. In cases where NSPS standards were applicable and constituted the floor, such requirements (e.g., storage vessels and some parts of vapor collection and testing at loading racks) were adapted for use in this MACT regulation.

2.4 OTHER

Comment: Section 63.429(b) of the proposed rule states: "The authority conferred in §63.426 and §63.427(a)(5) will not be delegated to any State." (These two provisions concern approval of alternative control and monitoring methods.) One commenter said that this provision may unnecessarily restrict EPA's delegation of authority and should be removed from the rule (IV-D-38, p. 6).

Response: The commenter (a local air quality control agency) did not specify why this provision might pose a problem. The EPA believes that the authority to approve alternative means of emission limitation and monitoring approaches should be retained by the Administrator to ensure that the alternatives achieve the control level requirements of the Act and are consistent in all areas of the country. Section 112(h)(3) of the Act is also clear in granting this authority to the Administrator.

Comment: One commenter stated that EPA should not use the term "Stage I" for cargo tank loading at bulk distribution facilities. This terminology has created confusion among both agencies and industry. Stage I should be reserved for the filling of stationary storage tanks at service stations (IV-D-28, p. 2).

Response: The EPA has traditionally used the term "Stage I" to apply to controls on processes at terminals, bulk plants, and service station storage tanks that do not include vehicle refueling, or Stage II, controls. The term is used here to distinguish the control measures considered in this rule from the Stage II controls under development in response to other parts of the Act [sections 182(b)(3) and 202(a)(6)]. Since no other comments opposing this nomenclature were received, and in order to maintain consistency with the proposal documentation, EPA has retained the same terminology in publishing the final rule.

Comment: One commenter felt that EPA is inconsistent in allowing the use of methyl tert-butyl ether (MTBE), a HAP, as a gasoline oxygenate while attempting to control HAP's with MACT standards. The EPA should recommend a phase-out period for the use of any HAP currently used to satisfy the Federal oxygenated fuel program (IV-D-28, p. 2).

Response: In 1985, MTBE was placed on the Toxic Substances Control Act's (TOSCA) list because it was the most largely produced chemical in the U.S. In 1990, MTBE was placed on the

HAP list primarily for two reasons: 1) the health effects testing being performed at that time provided inconclusive results and 2) the majority of the population was exposed to MTBE due to its presence in gasoline.

Section 211(m) of the Act specifies a minimum oxygen content of 2.7 weight percent for oxygenated gasolines, while section 211(k) specifies a minimum oxygen content of 2.0 weight percent for reformulated gasolines. The Federal oxygenated fuels program is designed to reduce tailpipe carbon monoxide (CO) emissions occurring from motor vehicles in the wintertime. The Federal reformulated fuels program is designed to reduce motor vehicle emissions of toxic and tropospheric ozone-forming compounds occurring throughout the year. MTBE is the most prominent gasoline additive used to satisfy the Act's oxygenate requirements.

Preliminary air quality monitoring data from November 1, 1992 through January 31, 1993 in 20 areas implementing the oxygenated fuels program for the first time show a 95 percent reduction in the number of days exceeding the CO standard (IV-J-12). In addition, adding MTBE to gasoline reduces the ratio of other toxic pollutants in gasoline (e.g., benzene, a proven human carcinogen) which reduces consumer exposure to those pollutants (IV-J-11).

Although it is outside the scope of this MACT rule to restrict the use of MTBE as an acceptable gasoline oxygenate, EPA is continuing to research the overall environmental impacts of its various programs to create the best results achievable within the constraints of current technology and the marketplace. Also, recent health effects testing has not determined whether MTBE presents a significant health threat beyond that of other HAP's found in gasoline (e.g., benzene). Consequently, in this rulemaking EPA is not recommending a phase-out period for the use of any HAP currently used to satisfy the Act's gasoline oxygenate requirements.

Comment: One commenter felt that EPA should delay implementation of this rule to at least 270 days and preferably 1 year after promulgation. Independent gasoline marketers are facing numerous other environmental compliance costs over the next several years, including the RFG program and the financial responsibility mandates for underground storage tanks (IV-D-30, p. 2, 9). Another suggested that EPA change the wording in the proposed rule [at §63.422(b) and §63.423] to indicate that existing facilities must comply within 3 years after promulgation of the final rule (as was stated in the proposal preamble) rather than February 8, 1997 (IV-D-36, p. 2). A third commenter stated that EPA has illegally required subject facilities to comply with the proposed equipment leak detection and repair (LDAR) standards prior to promulgation. This commenter and one other suggested that all facilities be given at least 1 year from promulgation to comply with the equipment leak standards (IV-D-5, p. 1; IV-D-18, p. 6).

Response: Section 112(i)(3) of the CAAA requires sources to be in compliance as expeditiously as practicable but in no event later than 3 years from the effective date (promulgation) of the standards. An extension of up to 1 additional year may be granted if necessary for the installation of controls. As discussed in Section 12.2, the initial applicability notification has been extended to be within 1 year of the effective date, and equipment leak standards have been changed to a visual program that for most terminals and stations is already in place. The EPA feels it is reasonable to require equipment leak provisions in advance of the general compliance schedule since it is a simple program with insignificant costs. Therefore, the final rule requires the leak standards to be implemented within 1 year of promulgation.

Notwithstanding these considerations, several compliance dates were incorrectly printed in the proposed rule. In §63.422(b) and §63.423, the date for compliance to be achieved with the loading rack emission limit and storage vessel standards was shown as February 8, 1997 (3 years after proposal). This date should have been shown as 3 years after the date of publication of the final rule in the Federal Register. Similarly, in §63.424(b)(2) the date for compliance with the LDAR requirements was given as August 8, 1994 (180 days after proposal), instead of 180 days after publication of the final rule. Editorial corrections to these dates were provided in a correction notice published at 59 FR 10461 on March 4, 1994.

Comment: One commenter expressed concern that the implementation of the requirements in the proposal could pose a fire safety risk at the regulated facilities. For example, vapor collection pipelines can serve as conduits for flame travel from one point to another (e.g., between connecting tanks) (IV-D-39, p. 1).

Response: The control technologies proposed in this rule, including vapor collection and processing systems, leak detection and repair, and storage tank emission control are similar to control requirements that have been in place at bulk distribution facilities for many years. The safety record of these techniques has, to the Agency's knowledge, been very good. The commenter did not supply any additional information identifying specific concerns. However, EPA is concerned about safety issues expressed by commenters. Several other commenters expressed concerns about the safety aspects of the proposed vacuum assist system, and these comments are discussed in Section 5.3.

2.5 REFERENCES

IV-J-11 Oxygenated Gasoline in Alaska. Information Bulletin. U.S. Environmental Protection Agency and Alaska Department of Environmental Conservation. December 29, 1992.

IV-J-12 U.S. EPA Press Release. John Kasper, Director, Press Services Division. March 11, 1993.

3.0 APPLICABILITY ISSUES

3.1 GENERAL

Comment: One commenter objected to the use of equations to assess the rule's applicability to a source and thought that the proposed equations should be removed from the rule. The commenter stated that section 112(a) of the Act and §63.2 of the General Provisions are very clear in stating what does and does not constitute a major source, and that sources should be allowed to use any credible method to satisfy the requirement for an applicability determination. The commenter also stated that the equations were derived from a worst-case scenario and overstated HAP emissions (IV-D-7, p. 1).

Response: The applicability equations are screening tools and are intended to provide facilities with a quick and easy method to determine their potential major source status. The EPA's intention was that a small area source could determine its nonapplicability status through the use of the appropriate equation and would not have to perform an emissions inventory. The equations were intentionally designed to overstate HAP emissions so that all potential major sources would be determined to be major. The screening equations cannot provide an accurate estimation of HAP emissions for all facilities. The EPA will retain these equations in the final rule as a screening tool to identify area sources. However, the equations can only be used by a particular facility if that facility (entire plant site) emits HAP's only from the emission points identified in the equation. As discussed in Section 3.2, EPA has modified and refined the equations per some of the commenters' recommendations. These refinements will, in general, lower the estimation of HAP's and allow more area source facilities to be determined as non-major in the initial screening process.

Comment: One commenter requested that EPA clarify whether a bulk terminal is a major source if it meets only one of the applicability tests in §63.420, or whether it must meet both tests (IV-D-20, p. 2).

Response: The EPA's intention is that all facilities use the equations as an initial screening tool to determine their potential major source applicability if HAP's at the plant site are only from the emission points covered in the appropriate equation. Any facility that uses the appropriate equation correctly and finds itself not subject to the rule, does not have to perform an emissions inventory as further documentation. Any source which the screening equation determines to be a potential major source may, if they choose, perform an emissions inventory for a more precise estimation of HAP emissions. If the results of the inventory show that in fact the facility (entire plant site) is not a major source, the facility is not subject to the rule. The results of the emissions inventory would therefore supersede the results of the screening equations. If the results of the inventory determine that the facility is a major source, then the rule will be applicable to that facility.

3.2 SCREENING EQUATIONS

Comment: Several commenters felt that the development of the applicability screening equations was not supported or explained by EPA. As a result, the equations appear to be entirely arbitrary (IV-D-14, p. 4; IV-D-15, p. 4; IV-D-36, p. 1). Another commenter who has experience preparing emissions inventories for bulk gasoline terminals in Texas said that, for several terminals that do not exceed the 10/25 tons of HAP's per year threshold, the applicability equation incorrectly indicates that many of these terminals are major sources (IV-D-11, p. 1).

Response: The development of the applicability screening equations was discussed in the preamble to the proposed standards, on page 5877, and was explained in more detail in a memorandum that was included in the rulemaking docket (item II-B-23). These equations were not arbitrary, but were developed specifically to identify facilities that have the potential to emit less than 10/25 tons per year of HAP and to reduce the amount of effort needed to perform applicability determinations. However, if a facility has other HAP emission sources not considered in the equation, the equation will under-predict emissions and cannot be used to determine if the facility is a major source. In response to the comments, the equations have been retained in the rule but have been revised to accommodate the concerns of commenters and to make them more accurate in their function as a screening tool. These modifications and the new equations are discussed in detail in the responses to the following comments and in a memorandum in the docket (item IV-B-1).

Comment: Many commenters expressed support for the use of screening equations as an aid in determining major source applicability, but suggested the following modifications (shown as numbered comments) to make the equations more representative:

1) Instead of using "worst-case" HAP-emitting gasolines to derive the constants in the equations, use average parameters to promote consistency between the equations and the rule (IV-D-7, p. 2).

2) Include an adjustment factor for facilities that do not handle gasoline oxygenated with methyl tert-butyl ether (MTBE) or provide an additional set of equations based on the HAP content of conventional gasolines (IV-D-7, p. 2; IV-D-15, p. 8; IV-D-18, p. 4; IV-D-22, p. 53; IV-D-34, p. 7; IV-D-35, p. 1; IV-F-1, p. 13).

Response: At proposal, EPA developed the screening equations based on a HAP to VOC ratio that was determined to represent the average MTBE content in reformulated and oxygenated gasolines (see Table 3-2 of BID, Volume I). The HAP content used to derive the equations does not represent the "worst-case" HAP to VOC ratio. As seen in Test ID# G11 through G14 of Table C-3 of BID, Volume I, the MTBE content in gasoline ranged from 11.8 to 16.3 percent. Based on these data, EPA made an assumption that the average MTBE content of reformulated and oxygenated gasolines was 11.9 percent, which is slightly higher than the lowest percentage found in the data. In addition, EPA assumed that most facilities that handle higher MTBE content oxygenated gasolines would also handle the lower MTBE content reformulated gasolines. This approach is consistent with the Agency's intent to avoid underestimating emissions in this screening process, which could allow a major source to be deemed an area source and thus improperly escape applicability of this rule. Facilities in any case will have the opportunity to perform a full emissions inventory in order to make a more accurate determination of their status.

The EPA agrees that the proposed emission factors overestimate HAP emissions from facilities handling gasoline without MTBE. As a result, EPA has included an adjustment factor in the screening equations for facilities in this situation. Facilities that handle, or anticipate handling, <u>any</u> oxygenated or reformulated gasoline containing MTBE as a component will not use the adjustment factor in performing the calculations.

3) The EPA's assumption that annually certified and tested cargo tanks with vapor control lose 10 percent of the displaced vapors through leakage while loading is too high. This value should be reevaluated when API completes its study (IV-D-7, p. 2; IV-D-14, p. 6; IV-D-15, p. 8; IV-D-18, p. 4, IV-D-22, p. 55; IV-D-34, p. 7, IV-D-35, p. 1; IV-F-1, p. 13).

<u>Response</u>: As discussed in Section 7 and Appendix A, the assumption that cargo tanks in an annual test program leak 10

percent has been reevaluated. The EPA has calculated a new leakage rate that is much lower than the proposed figure, and the revised calculations are shown in Appendix A and the value is reflected in the revised equation in §63.420(a)(1).

4) Fixed-roof tanks connected to vapor recovery systems, which may or may not contain internal pans, emit virtually no HAP's and should either be excluded from the equations or a term should be added to represent and quantify the low emissions occurring from such tanks (IV-D-14, p. 6; IV-D-15, p. 8; IV-D-18, p. 3; IV-D-28, p. 2; IV-D-34, p. 7, IV-D-35, p. 1; IV-D-35, p. 1; IV-F-1, p. 13).

Response: The EPA agrees with the commenters and has added a new expression, (1 - CE), to both screening equations. The term "CE" represents the control efficiency of the control device used to process vapors from the fixed-roof tank. The value of CE must be documented by the facility as meeting the definition of federally enforceable in subpart A of 40 CFR part 63 (General Provisions). If the facility is not controlling emissions from its fixed-roof tanks using a vapor control device, a value of zero will be entered for the term "CE."

5) The factor T_{es} should be redefined to include only those external floating roof tanks with seals that handle gasoline (IV-D-7, p. 2 and IV-D-18, p. 3).

Response: The EPA agrees with this comment. The factor T_{es} has been restated to include only those external floating roof tanks with secondary seals that handle gasoline. This qualification was inadvertently left out of the definition of T_{es} at proposal.

6) The emission factors for pump seals and valves are too high based on recent data collected at marketing facilities (IV-

D-14, p. 6; IV-D-15, p. 8; IV-D-18, p. 4; IV-D-22, p. 53, IV-D-35, p. 1).

Response: The EPA has evaluated the new data and agrees with this comment. The emission factors for pump seals and valves have been revised as discussed in Section 9 and Appendix C.

7) The equations should provide credits for facilities that use LDAR programs, vacuum assist, or handle only conventional or normal gasoline (IV-D-11, p. 2; IV-D-20, p. 3).

Response: As discussed in Section 9 and Appendix C, data provided by industry show that the use of visual inspection programs is just as effective as the use of instrument LDAR in identifying equipment leaks at marketing terminals and breakout stations. As a result, EPA will not grant credits to facilities that currently use an LDAR program. The EPA has decided to not require vacuum assist as explained in Section 5.3, due to Agency concerns about the control effectiveness of vacuum assist technology at bulk terminal loading racks. As a result, EPA also will not provide emission credits for any facility using vacuum assist technology.

8) Emission standards more stringent than the Federal NSPS (40 CFR part 60, subpart XX) limit (35 mg/liter) should be recognized (IV-D-18, p. 3; IV-D-28, p. 2, IV-D-34, p. 7; IV-D-38, p. 2).

Response: The term "EF" in the screening equation for bulk terminals applies to any federally enforceable emission standard in effect for the vapor processor. The concept of "federally enforceable," defined in the General Provisions (§63.2), allows emission standards or limitations more stringent than the NSPS limit (see Section 6.2).

9) The screening equations should be modified beyond API's recommendations to include tanks that store MTBE for infrequent periods and durations (IV-D-12, p. 1).

Response: The EPA does not intend to regulate under this rule storage vessels that store only MTBE or any other gasoline component or additive. All the other non-gasoline liquids such as MTBE will be studied under the forthcoming NESHAP source category of "Non-Gasoline Liquid Distribution" under section 112 of the Act.

10) The equations do not provide a mechanism for calculating emissions from "swing" tanks (tanks which store gasoline only half the time). Guidance is requested on how to estimate emissions from these tanks (IV-D-20, p. 3).

Response: In keeping with the intent of these equations as an emission estimation screening tool, EPA has made the simplifying assumption that vessels storing gasoline for any period or periods during a year will be assumed to store gasoline year round. As a result, the emissions from "swing" tanks will be estimated in the same way as for tanks that store gasoline on a continuous basis. Owners and operators should use the emissions inventory approach, as specified in §63.420(a)(2) and (b)(2), if these assumptions lead to a significant overestimation of HAP emissions at their facility.

11) One commenter asked why the fugitive emission factors and storage tank emission factors are different in the equations for pipeline breakout stations and bulk terminals (IV-D-31, p. 4).

Response: The emission factors for equipment components in gasoline service at the two types of facilities are the same; however, the amount of time the components are presumed to be handling gasoline is different. As discussed in Chapter 5 of BID, Volume I (III-B-1), products other than gasoline are sent through pipelines and stored at breakout stations. As a result, many tanks, pumps, and valves are not in constant gasoline service. The factors in the proposed screening equations were adjusted on the basis of "equivalency factors" to reflect the number of equipment components in gasoline service. Additionally, the storage tank emission factors are different because the size and turnover rates are not the same at the two facility types. The development of these "equivalency factors" is discussed in a memorandum prepared at proposal (II-B-23).

3.3 EMISSIONS INVENTORY

Comment: As a supplement to the emissions estimation screening equations, §63.420(a)(2) and (b)(2) of the proposed rule exempted those facilities "for which the owner or operator has documented to the Administrator's satisfaction that the facility is not a major source as defined in section 112(a)(1) of the Clean Air Act." The proposal preamble on page 5877 indicated that an "emissions audit" would have to be performed to satisfy these provisions. One commenter felt that the rule provisions should specifically state that the estimation of emissions for the applicability determination is to be accomplished by means of an emissions audit, as was stated in the preamble (IV-D-41, p. 3). Several other commenters found the term "emissions audit" confusing, and questioned what EPA would consider acceptable for demonstrating applicability. Some suggested that the familiar term "emission inventory" be substituted because emission inventories are common requirements and procedures are in place under many State programs. Others requested that EPA define or provide an approved methodology for conducting the emissions audit. One commenter said that the public should have an opportunity to comment on this guidance prior to EPA finalizing the rule (IV-D-6, p. 1; IV-D-7, p. 3; IV-D-14, p. 6; IV-D-15, p. 4; IV-D-18, p. 4; IV-D-22, p. 62).

One commenter thought that EPA should eliminate the requirement that a source determine its applicability status by means of an emissions audit. They felt such a requirement is unnecessary and contrary to prohibitions in Executive Order 12866 since major sources, which are subject to Part 70 permitting, are already required to determine their applicable regulatory requirements and identify them in their permit applications (IV-D-7, p. 3).

Response: In describing the formal means of documenting a facility's major or area source status as an "emissions audit" on pages 5870 and 5877 of the preamble, EPA was referring to the calculation of a facility's potential to emit HAP's considering federally enforceable controls. Such calculations are similar to those already being prepared under many existing Federal and State control programs. Therefore, the intent of the Agency was in accord with the thoughts of the commenters. The discussion in the preamble and the requirements in the final rule are intended to clarify and simplify compliance with the rule and are not known to be contrary to provisions of the part 70 permitting requirements. The EPA feels that guidance on performing HAP emissions inventories is not needed since the preparation of such inventories is standard practice. The activities undertaken in response to part 70 requirements are applicable and may relieve the majority of the burden of fulfilling this inventory.

3.4 CHANGE OF FACILITY STATUS

Comment: Two commenters were concerned that the proposed rule did not address the issue of a facility changing its applicability status. A provision should be added allowing a facility to be reclassified as an area source for reasons such as reduced throughput and changes in handling oxygenated gasoline. In that case, the facility should be relieved of the MACT requirements (e.g., recordkeeping). Conversely, if a facility that was once an area source is redesignated as a major source, that facility should have 3 years to comply (IV-D-15, p. 11; IV-D-22, p. 69).

Response: If the situation occurs that a source currently complying with MACT becomes an area source due to conditions such as reduced throughput, changes in type of gasoline handled, etc., the source must continue to follow all the MACT requirements to ensure that the control equipment is maintained and working properly and that emissions are being reduced. Facilities would already have equipment installed and permits issued; therefore, it is not logical that a possibly short-term situation should allow the facility to disband control equipment and permit conditions. However, the Agency is currently reviewing its broad policy on all MACT standards related to changes in status from major to area source as expressed by commenters. Agency decisions on this issue will be provided in the near future.

3.5 SMALL SOURCE COVERAGE

Comment: Several commenters expressed support for EPA's decision to not regulate area sources under the MACT proposal. They pointed out that area sources do not pose a significant threat to human health and therefore do not warrant regulation (IV-D-2, p. 4; IV-D-3, p. 2; IV-D-8, p. 1; IV-D-14, p. 1; IV-D-15, p. 11; IV-D-16, p. 3; IV-D-22, p. 47; IV-D-30, p. 3; IV-D-35, p. 2; IV-F-1, p. 13). However, one commenter disagreed with EPA's decision to not regulate area sources, stating that Stage I vapor balance control at service stations is necessary to close the loop on emissions from gasoline marketing sources. They cited a report by the Northeast States for Coordinated Air Use Management (NESCAUM) on exposure and health risk from service station emissions as providing the necessary justification for these controls (IV-D-21, p. 1).

Response: The EPA agrees with the first group of commenters that area sources in the gasoline distribution source category do not, based on the present data base, present a sufficient risk of adverse effects to human health or the environment to warrant regulation under these MACT standards. These sources are being investigated, however, as part of the study of area sources in urban areas under section 112(k) of the 1990 amendments. The NESCAUM report is being reviewed as part of that study.

Comment: One commenter said that some large bulk plants exceed the 10/25 tpy major source threshold and should be regulated (IV-D-38, p. 6).

Response: Since this commenter did not provide specific data on the numbers, locations, or operational characteristics of these facilities, EPA cannot respond directly. However, any facilities of this nature would likely be regulated under the case-by-case MACT requirements in section 112(j)(5) of the Act.

Comment: One commenter felt that EPA has not met its statutory requirement to "promulgate regulations establishing emission standards for each category or subcategory of major sources and area sources of hazardous air pollutants..." [CAAA section 112(d)(1)]. The EPA's proposed rule regulates only 23 percent of all bulk terminals and pipeline breakout stations. In order to comply with the CAAA of 1990, EPA should cover at least 50 percent of the emissions from the category. The EPA does not discuss what portion of the total emissions are represented by this 23 percent. If the rule does not cover at least 50 percent of the facilities/emissions by bringing in smaller sources, smaller bulk terminals will be at an advantage since they can avoid the major capital investments that the larger terminals will incur. Since smaller terminals can avoid regulation and the capital investments for environmental compliance, an increasing number of small uncontrolled terminals will be built and larger terminals will go out of business, increasing emissions as a consequence (IV-D-2, p. 4).

Response: In accordance with the requirements of the Clean Air Act, these MACT standards regulate all existing and new major source gasoline distribution facilities. The Administrator is required under section 112(c)(3) to list "each category or subcategory of area sources which the Administrator finds presents a threat of adverse effects to human health or the environment (by such sources individually or in the aggregate) warranting regulation ..." As indicated in a previous response, area sources have not been determined to present a threat of adverse effects under the requirements of section 112. Also, EPA does not agree with the commenter that the Clean Air Act requires 50 percent of the total emissions to be addressed by these standards. In any case, it would be difficult to construct an equitable applicability approach (population of facilities to be regulated) that would ensure that 50 percent of the emissions were covered. Such an approach would necessarily have to include some portion of the area sources and exclude the rest.

According to Agency calculations, even the smallest terminals (by definition, gasoline throughput greater than 75,700 liters per day) would be major HAP sources if they did not utilize at least some of the controls that are required by the NESHAP. Many existing small terminals may, in fact, be exempt from the requirements of the rule, but only because they already have federally enforceable controls in place. However, these terminals may not currently, and may not in the future, enjoy a competitive advantage since there are economies of scale in terminal operations. Furthermore, terminals, regardless of size, are to some extent insulated from highly intense competition because terminal distribution markets tend to be local. Finally, new major source terminals are subject to the same requirements regardless of size. These requirements, due to economies of scale, are likely to have a greater impact on new small terminals than large terminals.

Another point is that the overall cost of this NESHAP is not a substantial percentage of the total cost to build and operate a terminal. Therefore, the cost incentive, if one indeed exists, is likely to be too small to create a widespread conversion of large terminals to small terminals.

3.6 POTENTIAL TO EMIT

Comment: One commenter felt that the rule was not clear in explaining whether a facility's major source applicability is determined from "potential to emit" (PTE) or actual emissions and asked for clarification (IV-D-6, p. 1). Several commenters who interpreted the rule to indicate that PTE should be used expressed disagreement with EPA, and believed that basing major source applicability on a source's PTE would draw into the regulation many more sources than EPA has anticipated. They said EPA should recognize that there are inherent limits in the operational parameters (throughput, etc.) of gasoline distribution facilities, and should base major source determination on a source's actual emissions or at least a more reasonable gasoline loading potential (IV-D-4, p. 2; IV-D-7, p. 3; IV-D-15, p. 4; IV-D-16, p. 2; IV-D-22, p. 63; IV-D-34, p. 21). The American Petroleum Institute (API) recommended a scheme for categorizing facilities based on actual emission rates that they felt would alleviate the "potentially drastic consequences" of applying the PTE definition. These categories are: I - actual emissions exceed the major source threshold (10/25 tpy), so the source is subject to all the provisions of the rule; II - actual emissions are greater than 80 percent but less than 100 percent of the major source amounts. The facility would have to certify its area source status by obtaining a permit with enforceable limits, submit annual certification of emission rates, and notify of any change that could increase HAP emissions; III - actual emissions are greater than 50 percent but less than or equal to 80 percent of the major source definition. The facility would have to submit annual certification and provide notification of any change; IV - actual emissions are 50 percent or less of the major source cutoffs. This facility would only have to provide notification of any changes affecting emissions (IV-D-16, p. 2; IV-D-22, p. 66). Another commenter suggested that applicability should be based on a combination of the potential to emit of the vapor recovery system and the actual emissions of the storage tanks and fittings using EPA's TANKS software (IV-D-6, p. 1).

Response: At proposal, EPA did not use the term "potential to emit" in the preamble discussion or in the proposed rule. However, the proposed rule and discussion in the preamble did reference the General Provisions (40 CFR part 63, subpart A), which includes a definition for PTE. This definition of PTE is as follows:

> "Potential to emit means the maximum capacity of a stationary source to emit a pollutant under its physical and operational design. Any physical or operational limitation on capacity of the stationary source to emit a pollutant, including air pollution control equipment and restrictions on hours of operation or the type or amount of material combusted, stored, or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is federally enforceable."

Terminals and breakout stations have many limitations that affect emissions and some of these can vary according to gasoline demand. Industry provided data showing many methods to calculate maximum capacity, including total tank capacity, loading rack pumping capacity, feeder pipeline pumping rate, etc. (IV-E-2). Each of those methods of calculating capacity results in different and conflicting PTE results. The EPA has decided to provide an approach in the final rule that provides the facility an opportunity to set some operational and physical limitations that best fit its own operation only if all the HAP's emitted are from affected gasoline operations. The EPA considered allowing gasoline terminals and pipeline breakout stations with additional HAP emissions from non-gasoline sources at the plant site to use this approach. However, EPA believes that covering all situations and other source categories under this rule would be too complex and uncertain. Therefore, those sources would have to obtain enforceable conditions and limitations outside the provisions of this rule.

Under this approach for plant sites emitting HAP's only from affected gasoline operations, the bulk terminal or pipeline breakout station facility can establish its potential to emit through a combination of operational and physical limitations that are otherwise federally enforceable outside the context of this rule or that are made enforceable through compliance with parameters included in the screening equation in this rule. Examples of allowable federally enforceable limitations and conditions are provided in the definitions section of the General Provisions (§63.2). An example of limitations at bulk terminals and breakout stations that are required to meet the definition of federally enforceable outside the context of this rule are emission limits on vapor processors that process emissions from storage vessels and cargo tanks. Recordkeeping and reporting requirements will be used to monitor compliance with all limitations. Thus, the final rule allows the facility to limit PTE by complying with the approved values of the physical or operational parameters contained in the emission screening equations, such as maximum throughput. This provides the facility the most flexibility in operations without overestimating PTE.

The proposed rule required facilities to either use a specific emission estimation screening equation or prepare an inventory of emissions for determination of their major or area source status. The proposal further allowed area source facilities to report their applicability findings and calculations in their initial notifications to the Agency [required under §63.9(b)]. After review and acceptance by the Agency, the facility would have been considered an area source and would not be subject to the control requirements of the rule. Changes to the final rule establish certain facility parameters used in the emission screening equation as new "physical or operational limitation(s) on the capacity of the stationary source to emit a pollutant." Upon request, the owner or operator of the bulk gasoline terminal or pipeline breakout station will be responsible for demonstrating compliance with the facility's applicability determination, including all assumptions, limitations, and parameters used to calculate potential to emit HAP's.

To monitor these limitations, certain facilities are required in the final rule to annually certify that these facility parameters are not being exceeded. It would be burdensome and unnecessary for all facilities below the emissions threshold for major sources to provide detailed reports and records, and annually certify that changes have not occurred. As suggested in the API comments, only facilities within 50 percent of the emissions threshold for major sources will be required to submit a detailed report of these calculations and assumptions used in the calculations in an initial report, and then provide annual certification that the established facility parameters are not being exceeded. The remaining facilities will need to retain a record at the facility of these calculations and notify the Administrator of the use and results of the emission screening equation. These records would remain at the facility for inspection by the Administrator. If the PTE "limitations" are exceeded or if the facility fails to keep records or report as required, the facility will be in violation of this rule and may in some cases be considered a major source and be subject to the emission standards of the rule.

The final rule also requires the reports submitted containing those limitations and certifications to be approved by the Administrator and made available for public inspection. The notifications and reports documenting those limitations must be submitted to the Administrator within 1 year of the effective date. The final rule allows facilities to change these parameters after submittal of the revised calculations and approval by the Administrator.

If the facility becomes an area (nonmajor) source by complying with the PTE enforceable limitations and conditions established under the final rule, then the emission control requirements of this rule would not apply. Furthermore, for purposes of section 112 of the Act, it would not be a regulated area source that would be required to have an operating permit under 40 CFR part 70. In other words, being subject to the PTE limitations in this rule does not in and of itself make the facility subject to 40 CFR part 70. However, there may be other reasons that the stationary source is required to comply with 40 CFR part 70.

The EPA believes the mechanisms provided in the final rule for limiting PTE provide adequate safeguards for this source category. However, EPA is still evaluating whether the general approach taken in this rule will be appropriate for other source categories.

3.7 REFINERY BULK TERMINALS

Comment: One commenter requested that, for bulk terminals contiguous to refineries, EPA clearly define the separation between terminal storage tanks and refinery storage tanks. These terminals are usually fed from tanks located within the refinery itself, often thousands of feet from the terminal. Refinery tanks will be regulated by the NESHAP for petroleum refineries. The commenter felt that tanks not located at the terminal itself should be considered part of the refinery for the purposes of regulation (IV-D-5, p. 4).

Several commenters were of the opinion that EPA should distinguish the association and applicability of the gasoline distribution MACT rule from the refinery MACT rule. Many commenters believe that only cargo tank loading racks and cargo tank leakage should be regulated at terminals that are "contiguous to" refineries, whereas tankage and equipment leakage emissions should be regulated under the refinery MACT rule. One suggested method to distinguish whether facilities are subject to the refinery MACT rule or the gasoline distribution MACT rule is to consult the applicable Standard Industrial Classification (SIC) codes already assigned to these facilities (IV-D-2, p. 5; IV-D-3, p. 2; IV-D-4, p. 2; IV-D-7, p. 3; IV-D-8, p. 2; IV-D-15, p. 8; IV-D-17, p. 4; IV-D-22, p. 60).

Response: Terminals and pipeline facilities contiguous to refineries are of two types. First, there are terminals and pipeline facilities that are located within a contiguous area and under common control, but are managed by the "marketing" or "distribution" departments, though they are located on the same property as a refinery. The other type are terminals and pipeline facilities located among the refinery process units and storage tanks and managed by the "refinery" management departments. SIC codes are assigned and are currently being used by these facilities to distinguish between equipment. Industry commenters expressed a need to retain this separation because they often have separate management for maintenance, capital improvements, personnel, and operation of the assigned equipment. This separation would keep the management of the air pollution equipment under the same management structure as the surrounding process equipment. The Agency agrees with the commenters that maintaining this structure would be beneficial, because it will increase the management of proper operation and maintenance of the control equipment, decrease compliance costs, and improve the reporting and recordkeeping and enforcement of this rule.

Since a final rule cannot refer to another standard that has not been promulgated as a final rule, this change is not incorporated into the final gasoline distribution rule. The Agency, however, plans to carry out this change by modifying this rule at the promulgation of the refinery MACT standards. The refinery MACT standards (proposed at 59 FR 36130, July 15, 1994) contain different requirements for equipment leaks and compliance schedules for storage tanks. The Agency will assess the differences between these two rules after it considers public comments on the refinery MACT proposal and develops the final refinery MACT standards. Meanwhile, all provisions of the gasoline distribution rule will be implemented as they are being promulgated, since there are no requirements in the gasoline distribution rule that must be implemented before the scheduled promulgation of the refinery MACT standards. Independent of the SIC code designation decision discussed above, EPA will make a decision in the refinery MACT rule on the use of emissions trading or averaging between the collocated gasoline distribution and refinery sources.

Comment: Several commenters disagreed with the provision that all bulk terminals contiguous to or under common control of a major source petroleum refinery, regardless of the size of the terminal, would be subject to the regulation. They felt that such a provision is unfair and would put refinery terminals at a competitive disadvantage with respect to bulk plants and non-refinery terminals. They said that terminals should be regulated according to their impact on the environment, not on their location or ownership as proposed (IV-D-2, p. 4; IV-D-4, p. 2; IV-D-5, p. 5; IV-D-17, p. 3; IV-D-29, p. 2; IV-D-34, p. 7). One commenter requested that EPA not regulate small loading racks that have a throughput of less than 20,000 gallons per day. Such racks exist at refineries and are used infrequently, and continuous emission monitoring at such racks would not be cost effective (IV-D-8, p. 2). Another requested that the proposed regulation apply only to storage operations not associated with refineries, because refineries are not the major areas for gasoline storage and distribution. Also, refinery operations are already going to be covered by the refinery MACT rule (IV-D-10, p. 1).

Response: The Act requires the Agency to set standards for major source categories of HAP emissions. Gasoline distribution facilities collocated with other HAP emission sources, such as refineries, are considered part of a major source operation. Refinery terminals with physical and operating characteristics equal to non-refinery terminals may be non-uniformly impacted as a result. However, the overall cost of the NESHAP is not a substantial percentage of the total cost to build and operate a terminal. Therefore, the cost advantage to unaffected non-refinery terminals is likely to be too small to create widespread demand shifts from refinery terminals to non-refinery terminals.

3.8 OTHER

Comment: Section 63.420(d) of the proposed rule stated the following:

> "The owner or operator of a bulk gasoline terminal or pipeline breakout station subject to the provisions of this subpart that is also subject to applicable provisions of 40 CFR part 60, subparts K, Ka, Kb, VV, XX, and GGG of this chapter, or 40 CFR part 61, subparts J and V of this chapter, shall comply only with the provisions in each subpart that contain the most stringent control requirements for that facility."

One commenter suggested that this section could cause some confusion, and that the section should be modified to clarify that facilities also subject to other Federal air standards shall comply with the most stringent control requirements in each of those subparts for facilities located within extreme, severe, or serious ozone nonattainment areas (IV-D-36, p. 1).

Response: Proposed section 63.420(d) was included because this MACT rule cross-references specific portions of these other Federal standards. Facilities already required to comply with all portions of those standards are not allowed to comply with (in some cases) less stringent MACT standards. MACT standards may be less stringent: compliance timing on tanks, the size of affected facilities (terminals), etc. Since this standard does not cross-reference State regulations, it is inappropriate to cite State or local regulations.

Comment: One commenter said that loading losses may occur at pipeline breakout stations and should be included in the NESHAP. Additionally, underground and pressure tanks have the potential to emit HAP's and should not be neglected by this regulation. Factors for such tanks should be included in the applicability equation (IV-D-38, p. 6).

Response: The EPA agrees with the commenter and has clarified the final rule to include gasoline loading operations that occur at facilities that include both a breakout station and bulk terminal. Due to the complexity of such facilities, the "simple" applicability screening equations could not be reworked to include this situation and still retain the desired simplicity. The final rule is modified such that any facility that contains both a pipeline breakout station and gasoline loading racks is not allowed to determine the applicability of the rule using the equations in §63.420(a)(1) and (b)(1), but is required to determine applicability based on the results of an emissions inventory approved by the Administrator.

Subpart Kb does not exclude underground storage tanks (UST). Under this rulemaking, UST's are viewed as fixed-roof tanks. As required in subpart Kb, fixed-roof tanks have the option of being controlled with rim seal controls/fitting controls or a closed vent system and control device. For the purposes of this rulemaking, major source terminals having UST's with a capacity greater than or equal to 75 cubic meters must control such tanks with a closed vent system and control device. As stated in §60.110b(d)(2), pressure vessels are excluded from regulation if the vessel is designed to operate in excess of 204.9 kPa and without emissions to the atmosphere. Thus, any pressure vessel storing gasoline or mixtures that contain gasoline is excluded from the regulation provided the vessel meets the requirements stated in §60.110b(d)(2).

The EPA believes that few underground storage tanks and pressure vessels are used to store gasoline at bulk terminals. In order to keep the applicability screening equations simple, EPA has not included factors to account for emissions occurring from UST's or pressure vessels at the affected facilities.

3.9 REFERENCES

II-B-23 Memorandum from Johnson, T., PES, Inc., to Shedd, S., Chemicals and Petroleum Branch, U.S. Environmental Protection Agency, Research Triangle Park, NC. October 29, 1993. Development of applicability equations.

III-B-1 Gasoline Distribution Industry (Stage I) - Background Information for Proposed Standards. EPA-453/R-94-002a. U.S. Environmental Protection Agency, Research Triangle Park, NC. January 1994.

IV-B-1 Memorandum from Johnson, T., PES, Inc., to Shedd, S., Chemicals and Petroleum Branch, U.S. Environmental Protection Agency, Research Triangle Park, NC. August 31, 1994. Revised applicability equations.

IV-E-2 Memorandum from LaFlam, G., PES, Inc., to Shedd, S., Chemicals and Petroleum Branch, U.S. Environmental Protection Agency, Research Triangle Park, NC. June 8, 1994. EPA meeting with the American Petroleum Institute.

4.0 DEFINITIONS

4.1 LEAK

Comment: Several commenters stated that EPA has provided no justification for the leak definition of 500 ppm above background indicated in §63.425(a) of the proposed rule. They felt that the concentration defining a leak should be the same as the NSPS leak definition of 10,000 ppm (IV-D-5, p. 3; IV-D-17, p. 3; IV-D-18, p. 9; IV-D-20, p. 9; IV-D-22, p. 81; IV-D-29, p. 4; IV-D-34, p. 18).

Response: The 500 ppm instrument reading referred to by the commenters applies during the performance test of the vapor collection and processing systems. The selection of 500 ppm as the instrument reading defining a leak was based on §61.242-11, the standard for closed vent systems and control devices in 40 CFR 61, subpart V, the NESHAP for equipment leaks (fugitive emission sources). This regulation defines "closed-vent system" as "a system that is not open to atmosphere and that is composed of piping, connections, and, if necessary, flow-inducing devices that transport gas or vapor from a piece or pieces of equipment to a control device." Both the proposed standards and §61.245(c) prescribe Reference Method 21 as the accepted method for performing the leak testing and determining compliance with the 500 ppm requirement. At the time 40 CFR 60, subpart XX, the NSPS for bulk terminals, was promulgated, the equipment leak standard was 10,000 ppm and in order to be consistent, the same value was selected for §60.503(b) of subpart XX. However, the equipment leak definition was subsequently lowered to 500 ppm. Therefore, EPA feels that the leak threshold applicable to equipment leaks in subpart V should also be applied to closed vent systems under this MACT standard.

The EPA believes that the number of components in the vapor collection system is small, performance tests should only be performed under leak-free conditions, and the difference in costs to repair leaks would be minimal under the 500 ppm definition, while the maximum reduction of HAP emissions would be accomplished. Therefore, the 500 ppm leak definition has been retained in the final rule for use during the emission testing of the vapor collection and processing systems.

4.2 GASOLINE

Comment: Two commenters felt that aviation and reference (research) fuels should be excluded from the rule, by defining "gasoline" to specifically refer to road-use motor gasoline (IV-D-4, p. 2; IV-D-22, p. 60). The EPA should also clarify that gasoline blend components are not, by themselves, "gasoline." Another commenter said that EPA should provide a definition for gasoline that would clarify the rule's applicability to storage vessels storing interface mix material at pipeline breakout stations (IV-D-26, p. 2).

Response: The definition incorporated by reference at proposal was the same as the definition promulgated in the NSPS (40 CFR part 60, subpart XX) for bulk gasoline terminals on August 8, 1983 (48 FR 37590). From §60.501 of this NSPS, the definition of "gasoline" is "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" (27.6 kilopascals = 4 psia). This NESHAP is intended to cover transfer and storage of gasoline and of mixtures that contain gasoline. Some aviation fuels are considered gasolines; however, jet fuels such as jet naphtha (JP-4) or jet kerosene have RVP's well below the cutoff of 4 psia. However, blend components that are stored separately from "gasoline" are not intended to be covered if they do not meet the use criterion as a "fuel for internal combustion engines." For tanks at pipeline breakout stations that handle intermix material (the combined product mix at the interface between different products conveyed in the pipeline), it would not be feasible to specify in advance the percentage of gasoline that may be stored in a particular tank. Therefore, any storage vessel of sufficient size that is expected to contain gasoline (even as one of possibly several components) is considered to be a gasoline storage vessel and is subject to the control requirements of §63.423.

Due to these considerations, EPA has retained the same definition for gasoline in the final rule.

4.3 GASOLINE TANK TRUCK

Comment: The proposed rule included the following definition for "gasoline tank truck":

> "Gasoline tank truck means a delivery tank truck or railcar used at bulk gasoline terminals which is loading gasoline or which has loaded gasoline on the immediately previous load."

One commenter felt that EPA should delete the phrase, "or which has loaded gasoline on the immediately previous load," from this definition. Terminal owners have no way of knowing what product a tank truck carried on the previous load, especially trucks owned by independent haulers who are filling at the terminal (IV-D-20, p. 3).

Response: The definition (with the added phrase "or railcar") is the same as the definition contained in 40 CFR 60, subpart XX. The purpose of the phrase referred to by the commenter is to ensure that all displaced gasoline (HAP) vapors are collected and routed to a vapor control system. If a driver "switch loads" (loads a nonvolatile product, such as diesel fuel, into a tank truck that carried gasoline on the previous load), residual gasoline vapors would be expelled by the incoming product. In order to ensure that all gasoline vapors are collected, many terminals outfit all of their loading positions with vapor collection and require every truck loading to hook up to the system. Another option is to restrict a certain rack or racks to the loading of nonvolatiles, and to limit their use to tank trucks dedicated to this type of product.

Due to these considerations, the same definition has been retained in the final rule. However, the defined term has been changed to "gasoline cargo tank," which is more general than "tank truck" and is appropriate because of the inclusion of railcars in the definition. The new term is also consistent with the terminology utilized in the test procedures adapted from the California cargo tank certification program (see Section 7.2).

4.4 NEW/EXISTING FACILITY

Comment: The EPA should define "new facility" and "existing facility" in the rule itself rather than incorporating the definitions by reference from the General Provisions. Additionally, EPA should make clear that new facility requirements do not apply to an existing facility unless the modifications or improvements exceed 50 percent of the total cost to build a terminal or pipeline breakout station (IV-D-19, p. 3; IV-D-20, p. 6; IV-D-26, p. 2).

Response: In referring to subpart A of part 63 in proposed §63.421 of the MACT regulation, EPA was incorporating the definitions provided in §63.2 of the General Provisions [promulgated in the Federal Register on March 16, 1994 (59 FR 12408)]. The EPA's approach of incorporating the substantial requirements of the General Provisions (as well as other requirements) into new regulations prevents duplication, provides for consistency, and is considered practical and necessary. A table has been added to the final rule to clarify the applicability of the General Provisions under this regulation.

The definition provided for "new source" in §63.2 is "any affected source the construction or reconstruction of which is commenced after the Administrator first proposes a relevant emission standard under this part." "Existing source" means all affected sources that are not new sources. The pertinent term "reconstruction" consists essentially of the 50 percent expenditure criterion cited by the commenter. In addition, it must be technologically and economically feasible for the reconstructed source to meet the relevant standards. The EPA believes that these definitions make it clear that new facility requirements apply only to newly constructed or reconstructed facilities as defined in the General Provisions.

4.5 CONTIGUOUS AREA

Comment: Section 63.420(c) of the proposed rule provided that the methods to determine applicability (equations and emissions audit) do not apply to " ... bulk gasoline terminals or pipeline breakout stations located within a contiguous area and under common control of a petroleum refinery if the petroleum refinery is a major source under section 112(a)(1) of the Act." Two commenters suggested that EPA include a concise definition for "contiguous" or "contiguous area" (IV-D-28, p. 3; IV-D-38, p. 7). One of the commenters suggested that "contiguous" be defined as "being located on, or adjacent to, the property upon which the refinery is located and is not separated by any road, street, or highway maintained by the local government."

Response: The EPA believes that the definition offered by the commenter, while certainly conveying the essence of the term "contiguous," may not be applicable for all cases of interest. Also, the Agency is unclear as to the critical distinction presented by the presence of a road "maintained by the local government." In essence, the EPA feels that developing a definition could unnecessarily restrict the applicability determinations made for this and other source categories. Therefore, a specific definition for "contiguous" has not been made part of this rule.

The issue of applicability for bulk terminals that are associated with major source refineries was discussed in detail in Section 3.7.

4.6 IN VHAP SERVICE

Comment: The EPA should delete the definition of "in VHAP service" because it does not apply to gasoline facilities. Also, VHAP service is not mentioned anywhere in the rule (IV-D-29, p. 6).

Response: The proposed rule provided a definition for "in VHAP service" and "in VOC service" which equated these terms to "in gasoline service." This was done to clarify that the referenced equipment leak rules (40 CFR 60, subpart VV and 40 CFR 61, subpart V) should be interpreted to apply only to equipment handling gasoline vapors. Therefore, the definition was included to make the referenced rules applicable to gasoline distribution facilities. As discussed in Section 9.2, equipment leak detection and repair requirements that rely on subparts V and VV are not being promulgated in the final MACT standards. Therefore, the two definitions referred to above are not necessary and have been deleted in developing the final rule.

5.0 LOADING RACK STANDARDS

5.1 EMISSION LIMIT

Comment: Several commenters disagreed with the proposed requirement that vapor control systems on loading racks at existing facilities meet an emission limit of 10 mg/liter of gasoline loaded. Many argued that the requirement was formulated based on initial performance tests and not continuous performance data and therefore does not represent the "floor." For this reason, EPA has not demonstrated that existing systems continuously meet 10 mg/liter. One commenter supplied terminal test data on systems designed to meet an 80 mg/liter limit that show the variability in vapor recovery unit operations. This commenter pointed out that the floor level of control for existing sources must be based on the "emission limitation" achieved by the best performers, as directed by section 112(d)(3) of the Act. The commenter felt that this language indicates it is the regulatory limit, or at least the average performance of controls over the life of operation, that should dictate the proper floor level of control. Others suggested that it is too expensive to replace existing units to meet 10 mg/liter considering the small emissions savings. Several recommended that existing processors be regulated at the current NSPS standard of 35 mg/liter, because the NSPS limit is more representative of the average emission performance of loading rack control systems (IV-D-3, p. 2; IV-D-4, p. 3; IV-D-5, p. 2; IV-D-7, p. 5; IV-D-8, p. 2; IV-D-12, p. 1; IV-D-13, p. 3; IV-D-14, p. 6; IV-D-17, p. 7; IV-D-18, p. 3; IV-D-20, p. 5; IV-D-22,

p. 73, App. I; IV-D-34, p. 15; IV-D-35, p. 4). Several commenters expressed support for EPA's decision to regulate existing loading racks to meet 10 mg/liter (IV-D-21, p. 2; IV-D-28, p. 3; IV-D-38, p. 3).

Response: Section 112(d)(3) of the Act requires HAP emission standards for existing sources that are no less stringent, and may be more stringent than the average emission limitation that is achieved in practice by the best performing 12 percent of the existing sources. This minimum control level required for existing sources is termed the "floor." In order to support setting this floor level, the Agency collected test information on facilities in several areas throughout the country, subject to various regulatory emission limits (80, 35, and 10 mg per liter of gasoline loaded). These data were summarized in Table 4-1 of BID, Volume I. The data showed that all of the vapor processors at terminals regulated by the 10 mg/liter standard met the 10 mg/liter limit; however, EPA estimates that less than 3 percent of terminals are subject to a 10 mg/liter emission limitation (BID Volume I, Table 3-11). In addition to these terminals, the majority (about 70 percent) of control systems at terminals regulated by the 35 mg/liter NSPS standard achieved less than 10 mg/liter. Additional data collected in Table 3-11 of the proposal BID show that approximately 40 percent of the terminals are subject to the 35 mg/liter standard. Based on this information, EPA concluded that nearly 30 percent of the vapor processors are capable of achieving the 10 mg/liter limit. Therefore, the average emission limitation achieved by the best performing 12 percent of the existing sources is a 10 mg/liter standard, so 10 mg/liter was selected as the floor control level for existing bulk gasoline terminals.

The EPA believes the data show that the 10 mg/liter emission level is achievable and can be maintained over the life of a vapor control system. Commenters did not provide any data to demonstrate that the systems could not be maintained to meet this limit over extended periods of time. Also, the available data do not indicate any consistent degradation in performance with time. The test data provided by one commenter (for systems installed to meet 80 mg/liter) do indeed reflect a variability in performance over a 13-year period (test results were between 7 and 54 mg/liter at two bulk terminals). However, the test results improve with time for one of the terminals (average for the first 7 years = 43 mg/liter, average for the last 6 years = 26 mg/liter).

Based on the above discussion, the regulatory limits are not a reliable predictor of the actual performance of these systems. Systems are currently, and have been for some time, manufactured, installed, warranted, and operated to achieve 10 mg/liter. In addition, the majority of the systems designed for the NSPS level (35 mg/liter) are achieving 10 mg/liter or lower. Therefore, the NSPS limit of 35 mg/liter cannot be presumed to be the floor control level. The EPA is obligated by the Clean Air Act to set standards no less stringent than the floor level of control for existing sources.

Comment: One commenter said that existing control devices already do a good job of controlling HAP's, because HAP's found in gasoline are larger, heavier molecules and are preferentially captured by both carbon adsorption and refrigeration systems. As a result, HAP's are removed to very low levels regardless of the VOC limit of the vapor recovery unit. The commenter said that sampling results at a number of their terminals support this assertion, and said that they would provide the results from this sampling to the docket as soon as possible (IV-D-31, p. 2).

Response: The results of a sampling program conducted by the commenter at one bulk terminal were received by EPA following the close of the public comment period on the proposal (IV-D-46). Two sets of 1-hour sample data were collected at the inlet and outlet of the vapor processor using passivated Summa canisters.

Analysis of the vapor samples for HAP's was by gas chromatograph/mass spectrometry utilizing direct cryogenic concentration. A liquid gasoline sample was also collected from one of the gasoline storage tanks at the facility, for gas chromatographic analysis of the liquid and headspace vapor HAP content.

The data in this report demonstrate very good control efficiencies (>99 percent) for MTBE, benzene, toluene, ethylbenzene, xylenes, hexane, isooctane, cumene, and naphthalene. However, the data were not collected for a number of terminals (which would allow comparisons among different types of control systems with different emission levels), but apply to the control system at a single facility. Thus, it is impossible to verify the commenter's assertion that HAP's are removed to very low levels "regardless of the VOC emission limit of the recovery unit." Also, there is no indication in the report of the type of vapor processor in use at the facility or its overall VOC control efficiency. The Agency upon examining these data finds that they are insufficient to draw the type of conclusion indicated in this comment.

The EPA has determined the new source MACT and existing source MACT floor control levels on the basis of data reflecting the best performing control systems. The Agency presumes that these best performing systems will achieve maximum control of all VOC, including those which are designated as HAP's. The data show that new control systems and many older systems can achieve an emission level of 10 mg of total organic compounds per liter of gasoline loaded and, therefore, the standard for new and existing sources has been set at this level.

Comment: Two commenters were concerned with secondary emissions resulting from combustion units (IV-D-28, p. 3; IV-D-38, p. 4). One of the commenters suggested the following revisions to the 10 mg/liter standard: 1) for non-destructive control technologies, the total emissions of VOC (or POC) shall not exceed 10 mg/liter loaded; and 2) for incineration devices, the combined emissions of VOC (or POC), NO_x, and CO shall not exceed 10 mg/liter. Such a provision would not make incinerators the system of choice and would not increase the generation of secondary pollution (NO_x and CO).

Response: The EPA agrees with the concept of reducing all pollutant emissions. However, under section 112 regulatory control is to be placed on HAP's and not on criteria pollutants. Even if such an approach could be considered, the Agency does not have the data that would be needed to set an appropriate emission limit or limits. Finally, it is not clear how these suggested limits would discourage the use of incineration (unless the limit were not achievable by these systems).

Comment: One commenter said that §63.422(b) of the proposed rule is not clear as to whether the 10 mg/liter limit for loading racks includes fugitive emissions. The EPA should indicate in the rule that the emission limit applies only to the process stream outlet of the control device (IV-D-7, p. 6).

Response: The proposed rule in §63.422(b) applied the 10 mg/liter emission limit to "emissions to the atmosphere from the loading racks and the vapor collection and processing system." This provision was intended to have the same applicability as current State and Federal new source regulations (processor outlet emissions as measured in the performance test). However, in reconsidering this provision in light of this comment, the Agency agrees that the provision as worded may be subject to misinterpretation. Therefore, the provision has been reworded in the final rule to apply to "emissions to the atmosphere from the vapor collection and processing systems." The EPA believes that this clarifies the intent of the provision. It should be recognized that, prior to each performance test, the vapor collection and processing systems must be monitored for fugitive leakage and the leaks repaired, but any leakage found in this survey need not be included in the total "loading rack emissions" that are to be compared to the regulatory emission limit.

Regarding fugitive or leakage emissions in general, Section 9.2 discusses the new monthly visual inspection program that will be used to detect equipment leaks at gasoline marketing facilities.

Comment: A few commenters stated that methane and ethane, which are not ozone precursors, should be excluded from the total organic emissions measured to determine compliance. Carbon adsorbers and refrigeration units (which do not control methane) would have difficulty meeting the proposed emission limit stated in terms of total organic compounds (TOC). One of the commenters pointed out that in the past the standard has been in terms of volatile organic compounds (VOC). Another stated that a limit based on TOC would require that monitoring/testing and laboratory equipment, as well as established test methods, be changed. This commenter suggested that a limit on VOHAP and/or VOC might be appropriate, while another commenter felt that TOC should be replaced with VOC or POC (IV-D-9, p. 11; IV-D-28, p. 3; IV-D-38, p. 4; IV-F-1, p. 26).

Response: The selection of TOC as a surrogate parameter for the VOC content in the emission stream was explained in the BID for the promulgated NSPS for bulk gasoline terminals (IV-A-1). Briefly, it was stated in that document that the control technologies in use at bulk terminals do not selectively control VOC (photochemically reactive compounds), but rather all of the organic compounds making up gasoline vapors. Furthermore, the NSPS and NESHAP emission limits are based on test data and test procedures that measure TOC, and the test methods specified in both types of Federal standards measure TOC. Therefore, to reflect accurately the performance of the control technologies selected as MACT and to be consistent with the data base and test methods on which the emission limit is based, the emission limit is expressed in terms of total organic compounds, rather than

VOC. Only two non-VOC (and non-HAP) constituents, methane and ethane, occur in any appreciable quantity in gasoline vapors (approximately 2 percent). Section 60.503(c)(6) of subpart XX allows an owner or operator to subtract these two compounds in calculating the emission rate for comparison to the emission limit.

Comment: One commenter felt that the loading rack emission standard should be stated in terms of mass emissions (mg) per unit volume (liter) of all the products loaded rather than only liters of gasoline loaded. Non-gasoline products are also loaded at bulk terminals and their displaced organic vapors are piped to the same control device. Also, switch loading (i.e., loading a nonvolatile product into a tank truck that has just carried gasoline) may occur and will contribute to the mass measured at the outlet (IV-D-9, p. 12; IV-F-1, p. 26).

Response: Units for a bulk terminal standard were first specified by EPA in the 1977 bulk terminal CTG (II-A-4). The recommended RACT emission limit was 80 mg hydrocarbon per liter of gasoline loaded. Similar units were used for the bulk terminals NSPS, promulgated on August 8, 1983 (48 FR 37578). The NSPS emission limit is 35 mg TOC per liter of gasoline loaded. The rationale for considering only the volume of gasoline loaded was explained in the preamble to the proposed bulk terminal NSPS, at 45 FR 83140 (December 17, 1980).

To summarize that discussion, the selection of gasoline volume loaded is tied to the practice of "switch loading" at many bulk terminals, and its possible effect on emission test results. There are two principal types of switch loading of concern with regard to testing during tank truck loading. First, gasoline may be loaded into a tank that has carried a nonvolatile product, such as diesel fuel, on the previous load. The tank would contain essentially no organic vapors, so the emissions during loading of that tank would be negligible. Second, a product such as diesel fuel may be loaded into a tank which has carried gasoline on the previous load. The VOC vapors from the previous load of gasoline would be displaced by the incoming product.

If it is assumed that the frequency of each of these two switch loading cases would be about equal, the quantity of emissions could be accounted for by considering only the volume of gasoline dispensed during a given time period. This approach to determining emissions at a terminal would simplify the test procedure. If the liquid volume of all products dispensed into gasoline tank trucks during the performance test were considered, then the liquid volume not displacing gasoline vapors would have to be subtracted from the total volume loaded in order to correlate the TOC mass emitted with the corresponding liquid volume. This procedure would require that each driver loading during the test be asked which product was carried on the previous load. Based on the information obtained, only the loadings displacing gasoline vapors would be added together to obtain the total volume to be used in the calculations. However, since the accuracy of this information could be subject to question, and it may require extra test personnel to question the drivers, this procedure is not considered to be the most practical method of conducting the performance test.

The procedure in which only the volume of gasoline loaded during the test is considered relies on a known quantity which can be obtained directly from dispensing meters, instead of relying on uncertain data. The two cases of switch loading essentially cancel each other in terms of their effects on the test results. Therefore, the standards have been developed to require that emissions be calculated in terms of the total volume of gasoline dispensed during the performance test, and they also specify an emission limit in terms of total gasoline loaded. Since excessive instances of switch loading have the potential to affect the test results by increasing the apparent emission level, especially if there are extra unbalanced cases of nonvolatile product loadings into tanks containing gasoline vapors, switch loading should be minimized during the performance test.

Comment: One commenter recommended that, due to the stringency of the 10 mg/liter standard, existing facilities be "grandfathered" in accordance with the federally enforceable emission standard applicable at the time the vapor control system was installed (similar to 40 CFR 60, subparts K, Ka, and Kb tank construction provisions). The commenter also recommended that any existing facility that undergoes reconstruction or modification be given 5 years to comply (IV-D-36, p. 2).

Response: As noted earlier, under the Clean Air Act EPA is obligated to set a floor level for existing sources and so may not "grandfather" such facilities that are subject to MACT standards. Also, as discussed in Section 2.4, section 112(i)(3) of the Act requires compliance within 3 years after promulgation (with an extension of an additional 1 year possible).

5.2 SELECTION OF VAPOR PROCESSOR

Comment: One commenter, while agreeing that carbon adsorption and enclosed flame combustion systems are capable of achieving the proposed 10 mg/liter emission limit for tank truck loading, recommended that EPA not consider open-flame flares to be an acceptable control technology to meet the 10 mg/liter emission limit. First, such flares cannot be tested for compliance; and second, these flares may not be efficient enough to meet the standard under various loading rates and VOC inlet concentrations. In contrast, thermally controlled vapor combustion units would be appropriate for meeting the 10 mg/liter limit. The commenter stated as an example that an open-flame flare with 98 percent destruction efficiency at an inlet hydrocarbon concentration of 60 percent will yield a 33 mg/liter emission rate. In addition, open-flame flares which were enclosed in a stack so that they could be tested averaged about 19 mg/liter (IV-D-9, p. 2; IV-F-1, p. 20, 31). Another commenter suggested that open-top flares be regulated by equipment design standards rather than a mass loading standard (IV-D-36, p. 1).

Response: The EPA's selection of the floor level of control for existing sources was based on test data collected for carbon adsorption, thermal incineration, and refrigeration condenser type vapor processors. The thermal incineration devices in the data base consisted of systems with enclosed combustion areas, which allowed samples of the exhaust gases to be collected and analyzed for hydrocarbon content. The open-flare type of combustion device referred to by the commenter does not have an exhaust stack to allow for the collection and analysis of the emitted gases. As a result, the test methods applicable to bulk terminal control systems (Methods 25A and 25B) cannot be utilized, and a direct compliance determination relative to the applicable emission limit cannot be made.

The use of open-flame flares at bulk terminals, and the need to specify design/performance requirements for these devices, was recognized by the Agency when these MACT standards were proposed. In the preamble, page 5872, it was stated:

> "Due to the inherent inability to measure mass emissions from elevated flares (elevated flare's flame is open to atmosphere and therefore the emissions cannot be routed through stacks), these test methods are not applicable. Therefore, the Agency has established performance requirements for flares. These performance requirements, including a limitation on visible emissions, are provided in §63.11 of the proposed General Provisions, which specifies Method 22 for determining visible emissions from this hard to test type of flare."

Since this preamble was prepared, the final General Provisions have been promulgated (59 FR 12408, March 16, 1994). Section 63.11(b) provides requirements for flares, which include: (1) monitoring to assure that they are operated and maintained in conformance with their designs; (2) flares shall be steam-assisted, air-assisted, or non-assisted; (3) flares shall be operated at all times when emissions may be vented to them;

(4) no visible emissions, except for periods not to exceed a total of 5 minutes during any 2 consecutive hours; (5) presence of a flame at all times and shall be monitored using a thermocouple or equivalent device to detect the presence of a pilot flame; (6) net heating value of the gas being combusted at 300 Btu/scf or greater if the flare is steam-assisted or air-assisted, or with a net heating value of 200 Btu/scf or greater if the flare is non-assisted; and (7) a maximum gas exit velocity that depends on the net heating value.

The EPA has analyzed these criteria in light of the emission limit in these standards and the conditions occurring at bulk terminals, and has attempted to answer two questions. First, do the loading conditions at bulk terminals allow the §63.11(b) criteria to be satisfied? Second, are open-flame flares that comply with the criteria in §63.11(b) capable of achieving the 10 mg/liter emission limit?

The net heating value of the entering gas stream is a variable that depends on the degree of saturation of hydrocarbons in air that occurs in individual tank trucks. This concentration can typically vary from 10 to 60 volume percent. Assuming that butane is characteristic of the entering air-vapor mixture, the heating value would vary from approximately 450 to over 2,000 Btu/scf. These values are well in excess of the minimum values prescribed in §63.11(b). Finally, for a typical vapor displacement rate of 600 gal/min (80 cfm), the exit velocity would be under 60 ft/sec (the maximum allowable value) for any flare tip cross-sectional area greater than 3.2 square inches: [(80 ft^3/min)/(60 ft/sec)/(60 sec/min) x 144 in^2/ft^2 = 3.2 in^2]. Therefore, it appears that open-flame flares can be designed to satisfy or exceed the criteria in the General Provisions under the conditions existing at bulk terminals.

With regard to the second point, the first commenter stated that, at EPA's assumed 98 percent VOC destruction efficiency, open-flame flares will not meet the 10 mg/liter limit. The critical point is the commenter's assumption that EPA assumes a 98 percent efficiency for these flares. In fact, the average efficiency of flares that meet the provisions of §63.11(b) is well over 99 percent. The 98 percent figure is considered to be a minimum efficiency for a well-designed flare. Additional test data supplied by this commenter showed the results of enclosing a flare burner in a refractory lined cylinder so that test measurements could be made. The VOC emissions were determined to range from 10.2 to 31.5 mg/liter. The EPA believes that these test results may not necessarily be representative of the performance of all enclosed-flame flares because locating the burner within a stack may create a situation in which the combustion process is deprived of the oxygen needed for complete combustion, thereby reducing the control efficiency and increasing the emission rate.

In summary, data are not available to quantify the control performance of open-flame flares used at bulk terminals. However, EPA believes that such devices can be designed and operated to achieve the emission limit in this rule by complying with the control device requirements of §63.11(b). It should be noted that EPA is not, in stating this conclusion, necessarily advancing open-flame flares as the preferred choice for this application.

Comment: One commenter said that a loading rack vapor recovery system exists which may comply with the proposed emission standard but cannot demonstrate compliance using the test methods and procedures in proposed §63.425. In this system, vapors are collected during loading and routed to a vapor holding tank equipped with a diaphragm (bladder). The vapors are routed off site to the fuel gas system of a nearby oil and gas production facility and piped to numerous combustion devices associated with the production facility to produce useful energy. The commenter said that such a system cannot be tested using the methods in §63.245 and suggested that an alternative compliance demonstration method be included for such a system (IV-D-37, p. 1).

Response: The proposal discussed and analyzed several of the most prominent types of vapor control systems in use at bulk terminals. The EPA acknowledges that variations of these basic systems are possible that may achieve good control of gasoline vapor emissions. Such "alternative" systems that satisfy the requirements of the standards would be approvable. For example, the systems must be leak-free and must create a backpressure less than 18 inches of water column in the cargo tank vapor space during loading. Further, combustion devices must be testable using approved methods or must meet the minimum requirements in §63.11(b) of the General Provisions (flare requirements). Each such device receiving vapors from the loading racks would have to meet these criteria, or one device could be dedicated for this purpose and that device would have to be tested or must meet the requirements of the General Provisions.

The promulgated standards cannot include detailed compliance information for all alternative systems, but EPA will evaluate and, if warranted, approve such systems on a case-by-case basis.

Comment: A few commenters said that certain features of the proposed rule contradict EPA's policy of favoring the use of product recovery techniques and pollution prevention. Setting a monitored operating parameter value that effectively lowers the emission limit and requiring continuous monitoring of exhaust vent TOC are serious disincentives for sources to install carbon units. As a result, combustion type processors will become the system of choice, and this will lead to an increase in NO_x and CO emissions (IV-D-14, p. 14). One commenter said that all six Bay Area (California) terminals that use incineration have also installed a recovery unit upstream from the incinerator, and recommended that EPA mandate product recovery devices at all loading racks, including those using incineration. The commenter believes that, at the very least, an abatement system which incorporates product recovery should be MACT for new sources (IV-D-38, p. 5).

Response: The floor for existing sources was established using test data from carbon adsorption, combustion, and refrigeration condenser type systems. There is no provision in the Act that allows the exclusion of a particular control technology in setting the floor.

The EPA expects that, as in the past, facilities will select specific vapor control systems on the basis of a number of considerations, in addition to simply the initial installed cost of the system. Continuous monitoring (discussed in Section 6) is required for any type of processor selected, and may consist of an outlet VOC concentration monitor or an operating parameter monitor. Also, due to the value of product recovered, recovery type devices may often show a lower net annualized cost than the combustion type. Therefore, EPA believes that facilities will continue to select both recovery and non-recovery systems on the basis of several factors including, but not limited to, those cited by the commenter.

5.3 VACUUM ASSIST VAPOR COLLECTION

Comment: Many commenters expressed opposition to the proposal to require use of "vacuum assist" technology at new bulk terminal loading racks. Most of the commenters believe that annual vapor tightness testing and repair is adequate to control cargo tank leakage emissions. The following concerns were expressed:

1) Some commenters expressed safety concerns; e.g., concerning the potential for fires and cargo tank implosion. One of them said that internal tank vacuums can (and already do) damage the internal compartment heads of cargo tanks by reversing those heads and weakening the tank's outer shell, which compromises product retention capability (IV-D-5, p. 3; IV-D-7, p. 6; IV-D-20, p. 6; IV-D-22, p. 44; IV-D-23, p. 4; IV-D-26, p.

2; IV-D-28, p. 4; IV-D-30, p. 7; IV-D-35, p. 6; IV-D-49, p. 3; IV-D-54, p. 2).

2) Several do not believe that vacuum assist technology has been demonstrated as "achievable in practice." The technology has been used in only one State (Texas) and has not been tested under various climatic conditions, such as combined low temperatures and high humidity levels (IV-D-7, p. 6; IV-D-22, p. 44; IV-D-26, p. 2; IV-D-34, p. 16; IV-D-49, p. 3; IV-D-53, p. 2).

3) The complexity of the loading system will increase. Also, due to rapid fluctuations in gasoline flow rates and the requirement to maintain a vacuum at all times during loading, nuisance shutdowns of the loading operation could be a problem (IV-D-26, p. 2; IV-D-36, p. 2; IV-F-1, p. 23; IV-D-55, p. 1).

4) One commenter said that such a system may adversely affect the efficiency of the vapor control device because air can leak into the vapor collection system and dilute the inlet VOC concentration (IV-D-9, p. 7). Another felt that volatilization of fuel in the cargo tank would be increased due to the vacuum, sending more vapors to the control device. This would require a larger device which may have greater emissions, and more solid waste impact for the case of a carbon system (IV-D-48, p. 2).

5) Vacuum assist systems will increase electrical power consumption 15 to 400 percent depending on the type of emission control device used (IV-D-9, p. 5; IV-F-1, p. 23).

6) Vacuum assist is unnecessary, because cargo tanks do not leak enough during loading to justify vacuum assist as a means of reducing the losses. Recent API data show that cargo tank leakage has been significantly reduced since the EPA study performed in 1978 (IV-D-2, p. 9; IV-D-3, p. 2; IV-D-15, p. 4; IV-D-17, p. 9; IV-D-26, p. 2; IV-D-28, p. 4; IV-D-35, p. 6; IV-D-49, p. 2; IV-D-54, p. 2).

7) The system will control losses from the cargo tank only during the loading operation, and will not address losses from the cargo tank in transit and while operating at bulk plants and

service stations. Therefore, a rigorous testing and inspection program will have overall increased emission reduction benefits (IV-D-28, p. 5; IV-D-38, p. 2; IV-D-49, p. 3).

8) Vacuum assist is very expensive and not cost effective (IV-D-7, p. 6; IV-D-22, p. 44; IV-D-35, p. 6; IV-D-49, p. 2).

9) If EPA decides to mandate a cargo tank vapor tightness program similar to the one in California, vapor leakage from cargo tanks will decrease and there will be even less reason to require vacuum assist systems at new bulk terminals (Williams). The EPA should certainly not combine the California standards and the vacuum assist requirement, because this would be an option above the floor (IV-D-48, p. 1).

Response: The vacuum assisted vapor collection system was proposed for new source bulk terminal loading racks to control HAP emissions due to vapor leaks from cargo tanks (tank trucks and railcars) during gasoline loading operations. This system creates a negative pressure in the vapor collection system during loading to ensure that vapors will not be forced out into the air through any leakage points. Following proposal and the receipt of public comments, EPA published supplemental information and reopened the public comment period on this new information in a Federal Register (FR) notice dated August 19, 1994 (59 FR 42788). In that notice, EPA referred to the proposed requirement for vacuum assist and stated that, in the Agency's consideration of the vacuum assist system for new sources, California's test requirements for vapor tightness would also be considered. The California program, along with specific comments and EPA responses on the details of that program, is discussed in Sections 7.2, 7.3, and 7.4 of this document.

The proposal rationale was based on the following information. Vacuum assist systems are in use at a few bulk gasoline terminals (in addition to the annual vapor tightness test for cargo tanks) in Texas, so it meets the Act requirement to consider the best controlled similar source in establishing the floor level of control for new terminals. Since less than 1 percent of terminals use this vacuum assist system, it is not considered the floor for tank truck leakage at existing terminals. Annual vapor tightness testing of the cargo tanks was considered at proposal to be the floor for existing terminals (this floor determination has been modified on the basis of information received in the public comments, as discussed in the supplemental FR notice and in Section 7.2). Based on field tests in the late 1970's, an annual vapor tightness testing program was estimated to reduce the leakage rate from baseline levels at 30 percent leakage to about 10 percent leakage. The vacuum assist system was estimated to reduce that 10 percent leakage rate under the annual vapor tightness test program by nearly 100 percent.

Industry sources had expressed concerns before proposal regarding the operational reliability of a vacuum assist system, especially under extreme cold weather conditions. Those commenters also believed that the system could present a safety hazard if excess negative pressures were developed within a tank truck fuel compartment. To the Agency's knowledge, the systems in operation have not experienced any significant problems, and one of the systems has been operating for over 3 years. These systems contain safety pressure relief devices in combination with the pressure-vacuum vents already installed on each tank truck compartment. However, safety concerns are important to the Agency. The EPA specifically requested comment at proposal, including technical documentation and data where available, on the reliability, effectiveness, safety aspects, and any other issue concerning vacuum producing equipment for bulk terminal vapor collection systems. No technical documentation or data on installed systems was provided during the comment period.

As discussed in Appendix A, the leakage emission factor for controlled cargo tanks under an annual vapor tightness program was adjusted to reflect current data on the frequency with which tank trucks pass the test on the first attempt. Emissions lost from cargo tanks under test programs with a pressure decay limit of 3 inches H_2O are now estimated to be 1.3 percent of total vapor displaced during loading operations (just under 99 percent collection efficiency). The leakage emission rate from these cargo tanks is calculated to average 0.7 and 2 milligrams of HAP per liter of gasoline loaded for normal and oxygenated gasolines, respectively. In California, where an annual pressure decay limit of 1 inch H_2O is in effect, the emission losses during loading are estimated at 0.8 percent (slightly over 99 percent collection). The corresponding HAP emission factors are 0.4 and 1.3 mg/liter of HAP for normal and oxygenated gasolines, respectively. At proposal, the leakage emission rate was estimated to be a 10 percent loss (90 percent collection efficiency). Thus, while vacuum assist systems were previously thought to have the potential to capture an additional 10 percent of the loading emissions, they now appear to have the potential to capture about 1 percent.

The EPA shares commenters' concerns that the emission control achieved with the vacuum assist system is uncertain. The Agency's uncertainty centers on the system's effectiveness in accurately maintaining a slight vacuum to collect a small leak (1 percent of the volume displaced to the collection system) while handling the variability of flows and pressures and limiting the ingestion of air into the system to a degree where it does not affect the control effectiveness of the processor. The vapor volume collected by the system and internal pressures within the vapor collection system vary widely throughout the day. Each cargo tank loading and displacing vapors influences the pressures and flows in the system. Terminals operate on demand, just like gasoline service stations. The number of tanks loading at any given time varies from none, to a few, to 10 or more tanks. Additionally, vapor processor control efficiency may be adversely influenced by increased amounts of air sent to the control system. A vacuum assist system draws additional air into the system. Even small malfunctions in the system would be likely to increase emissions above the 1 percent control target. Finally, the Agency agrees that it lacks sufficient information to determine whether conditions prevailing outside of Texas may affect the control performance of vacuum assist methods.

The proposal of vacuum assist was based on the minimum baseline (floor) at which standards may be set. Under section 112(d)(3) of the Act, the floor for new sources "shall not be less stringent than the emission control that is achieved in practice by the best controlled similar source, as determined by the Administrator." The Administrator has determined that emission control is not being achieved in practice given the technical uncertainties about achieving emission reduction from this source as discussed in the previous paragraph. Consequently, the proposed vacuum assist requirement for new bulk terminals has been deleted from the final rule.

5.4 OTHER

Comment: One commenter questioned whether a performance test of a controlled loading rack conducted prior to promulgation of the standards could be used to satisfy the loading rack testing requirements. It was suggested that any existing performance tests that were conducted in accordance with 40 CFR part 60, subpart XX and that demonstrated compliance with the 10 mg/liter standard should be deemed to satisfy the new loading rack requirements. Such a provision could be limited to performance tests conducted within the past 5 years, or to vapor recovery systems equipped with a monitoring device that meets the requirements of the rule and demonstrates that performance has not degraded since the test (IV-D-6, p. 1). Another commenter felt that EPA should waive the performance test requirements for all California terminals because California State law requires a certification test on each bulk terminal. One District also conducts two 24-hour tests annually at each facility (IV-D-28, p. 9).

Response: The final rule incorporates the performance testing requirements of the General Provisions. In summary, §63.7 requires that a performance test be conducted within 180 days after the date the standard first becomes effective for a new source and 180 days after the compliance date for existing sources. This testing allows the facility to establish an operating parameter value for the vapor processing system in response to §63.427, as well as to demonstrate compliance with the loading rack emission limit in §63.422. Testing will follow the development of a site-specific test plan and a performance evaluation test plan for the continuous monitoring system (CMS) which must be approved by EPA before the performance testing is carried out. Due to these specific requirements associated with the initial performance test, the results of previous tests would not be adequate to fulfill the MACT requirements. For the same reasons, the routine tests performed in California would not satisfy the initial test requirements under this MACT rule. However, subsequent tests performed according to EPA approved methods and procedures may be able to be used to fulfill multiple regulatory requirements.

5.5 REFERENCES

II-A-4 Control of Hydrocarbons from Tank Truck Gasoline Loading Terminals. U.S. Environmental Protection Agency, Research Triangle Park, NC. EPA-450/2-77-026. October 1977.

IV-A-1 Bulk Gasoline Terminals - Background Information for Promulgated Standards. U.S. Environmental Protection Agency, Research Triangle Park, NC. EPA-450/3-80-038b. August 1983.

IV-D-46 Letter from Ellett, A.R., BP Oil Company, to Air Docket Section, U.S. Environmental Protection Agency, Washington, DC. August 5, 1994. Transmits final report detailing

results of sampling program at gasoline distribution terminal.

6.0 MONITORING OF OPERATIONS

6.1 CONTINUOUS MONITORING OF COLLECTION SYSTEMS

Comment: One commenter stated that the burden of compliance for tank trucks at new sources maintaining a vacuum during loading was placed on the terminal in proposed §63.428(e). The commenter suggested the following language for this provision: "Owners and operators of new proprietary bulk gasoline terminals (terminals that maintain and operate their own fleet of trucks) subject to provisions of the subpart shall submit to the administrator, a quarterly report of all instances in which a vacuum is not maintained in a gasoline tank truck during loading" (IV-D-36, p. 4).

Response: As discussed previously in Section 5.3, the proposed requirement for new sources to install vacuum assisted vapor collection has been deleted from the regulation. Therefore, the provision offered by the commenter would not be applicable in the final rule.

6.2 CONTINUOUS MONITORING OF PROCESSING SYSTEMS

Comment: One commenter stressed that, while continuously monitoring a key operating parameter of a vapor processing device may serve as a guide to warn of potential problems and to gauge efficient operation, such monitoring would not be sufficient to assure compliance with the pertinent emission standard. This commenter and others were concerned that a value of the monitored process variable could be selected that is more stringent than necessary to indicate compliance with the proposed 10 mg/liter emission standard. They felt that requiring a facility to continuously maintain a value determined during an initial performance test and then consider the facility out of compliance if it exceeds that value would be unfair. It is highly probable that during an initial performance test the vapor control device while operating at a particular value will perform much better than the emission limit (IV-D-9, p. 7; IV-D-11, p. 3; IV-D-14, p. 11; IV-F-1, p. 24). One of the commenters said that, as an example, thermally controlled combustion systems do not require elevated temperatures all of the time to achieve 10 mg/liter. The commenter recommended that, for these units, a single high temperature value not be set because assist fuel gas consumption would be very high and the unit would be made to operate at control efficiencies substantially higher than the standard.

One commenter suggested that facilities be allowed to use an extrapolative method to predict the operating parameter value at the regulated emission standard based upon the operating parameter value associated with the lower emission level recorded during the performance test. Such an allowance is needed because it is usually not possible to operate a vapor processing system at maximum design conditions (IV-D-34, p. 18). Another commenter recommended that the operating parameter value be set by the least stringent parameter value obtained during the test while the unit is in compliance with the standard (IV-D-5, p. 3).

Response: Section 114(a)(3) of the Act requires enhanced monitoring and compliance certification of all major stationary sources. The annual compliance certifications certify whether compliance has been continuous or intermittent. Enhanced monitoring shall be capable of detecting deviations from each applicable emission limit or standard with sufficient representativeness, accuracy, precision, reliability, frequency, and timeliness to determine if compliance is continuous during a reporting period. The monitoring in this regulation satisfies the requirements of enhanced monitoring.

The required performance test is a minimum of 6 hours in duration, with outlet organic concentration and flow rate data recorded every 5 minutes. While it seems reasonable to base the selection of the parameter range or limit on a 6-hour period to be consistent with the length of the test (as the Agency did at proposal), the Agency has decided this is too long a period to calculate a meaningful average on a continuous basis. One commenter requested that EPA consider using an extrapolative method (not specified by the commenter) using a single high temperature, or setting the parameter based on data just meeting the 10 mg/liter standard. As noted at proposal, EPA proposed that site-specific monitoring parameter values be used to account for the different types and designs of control equipment available and the site-specific facility operating conditions. The proposal required a performance test recording 5-minute readings of outlet concentrations and flow rates while continuously recording the specified parameter values. An engineering assessment of those data, along with the manufacturer's recommendations, could be used to find the appropriate parameter value, monitoring frequency, and averaging time that is equivalent to the emission standard. This approach, which is incorporated into the final rule, is the most straightforward way of accounting for both the emission standard and the variability of the control equipment design and facility operations. Under this approach, the Agency is allowing some latitude for the method by which the parameter range of the "not to exceed" limit is developed under the final standards. The engineering assessment and manufacturer's recommendations must be documented (recorded in facility files) and reported to the Administrator for approval.

Comment: One commenter felt that requiring terminals to continuously calculate rolling 6-hour averages of operating parameters is burdensome and should be removed from the regulation. Such a provision would require terminals to have a microprocessor-driven system or a dedicated computer, which is an onerous requirement for a terminal (IV-D-5, p. 3). Two commenters asked that a provision be inserted that would allow a facility to manually calculate the 6-hour averages from readings taken by the monitor. However, the monitoring requirement will be difficult to comply with since many terminals are frequently or totally unmanned (IV-D-18, p. 6, 9; IV-D-22, p. 82). One of these commenters requested that the 6-hour rolling averages be based on data obtained at a minimum time span of 15-minute intervals (IV-D-22, p. 82). Another commenter said that calculating a 6-hour average value to demonstrate compliance is not applicable for flares because the flame does not burn continuously (IV-D-36, p. 4).

Response: As discussed in the previous response, EPA has decided to delete the requirement to continuously calculate 6-hour averages of the operating parameter value. The EPA does not believe that a microprocessor would be necessary to record and analyze the monitoring data required under the final rule, because no specific time averages are required. However, the averaging time for determining the operating parameter value should not exceed the time period of the performance test as specified in §60.503(c)(1). With regard to the last comment, only data recorded during the loading of gasoline cargo tanks would be taken into account, and any type of processor would have to be in operation during these periods.

Comment: One commenter asked that EPA clarify whether the operating parameter values established in the initial performance test would form the sole basis for future compliance determinations at the facility, or if repeat testing would establish new values or could even be used by the facility to establish new parameter values reflecting new operating conditions (IV-D-22, p. 80).

Response: The EPA does not foresee that the initial performance test would necessarily establish parameter values that would be in effect for the life of the loading rack control system. The proposed and final rules allow for multiple tests under §63.425(b), and all procedures required under the initial test would have to be satisfied for the repeat test. However, this process must take place prior to any enforcement action or notification issued for non-compliance with the current operating parameter value. In addition, §63.425(c) specifies that the owner or operator must document the reasons for any change in the operating parameter value since the previous performance test.

Comment: Two commenters felt that the rule should provide more flexibility in monitoring for compliance. Alternative monitoring methods should be allowed, if such methods demonstrate continuous compliance. For some units there is no known continuous emissions monitoring (CEM) method for measuring all the necessary parameters to assure continuous compliance with the proposed standard (IV-D-29, p. 3; IV-D-36, p. 4).

A few commenters also recommended that EPA allow carbon adsorption systems to have continuous parametric emission monitors rather than continuously monitoring the exhaust VOC concentration. One pointed out that monitoring the concentration of total organics in the outlet gas is an extremely poor surrogate for the 10 mg/liter limit (IV-D-14, p. 11). Another stated that monitoring of carbon regeneration frequency, as adopted in New Jersey, should be allowed as an alternative to CEM (IV-D-29, p. 3). It was also suggested by a number of commenters that monitoring the vacuum level during carbon bed regeneration would be an effective and far less expensive means of gauging system performance. The peak vacuum level is an indication that the working capacity of the carbon bed has been reestablished, the emission control device does not have any vacuum leaks within the system, and the settings of the components related to the regeneration system are adjusted properly. This monitoring would provide a proactive position to correct the problem rather than reacting once the emission limit has been exceeded. The vacuum monitor would continuously measure the vacuum on the carbon bed during the regeneration cycle and could signal an alarm to the facility when 25 inches of mercury vacuum was not achieved during the last 5 minutes of regeneration for two consecutive cycles. Additionally, the system could be set to shut down the loading operation if three consecutive regeneration cycles of the carbon bed do not reach 25 inches of mercury during the last 5 minutes of the cycle (IV-D-7, p. 10, IV-D-9, p. 7; IV-D-15, p. 6; IV-D-22, p. 78; IV-D-34, p. 19; IV-F-1, p. 24).

Two commenters said that continuous emission monitors are unnecessary for carbon adsorption systems and recommended that annual performance tests be allowed to demonstrate compliance (IV-D-13, p. 2; IV-D-17, p. 6). Another commenter said that averaging emissions data annually would be a more reliable method of determining compliance. In lieu of the continuous monitoring requirements, the commenter recommended requiring terminals to conduct performance tests every 3 years; to monitor pumps, valves, and operating gauges, and retain the records for EPA inspection; and allow carbon adsorbers the provision that if the regeneration cycle for the carbon is 15 or 30 minutes, the unit is considered to be in compliance (IV-D-20, p. 12).

<u>Response</u>: The EPA believes that continuous monitoring of a parameter of the control system is necessary for ensuring that the system is properly maintained and operated and that the emission limit of the standards is being achieved continuously (see first response in this section). The use of periodic performance testing to accomplish this would be inadequate, since an out-of-compliance system could operate for a long period of time before the problem was recognized and corrected. For similar reasons, annual averaging of emissions data would be unacceptable.

The Agency recognizes that vapor control systems may have a variety of operating parameters that could indicate their proper operation and whether the emission limit being achieved. At proposal [§63.427(a)], EPA's best judgment concerning parameters suitable for this purpose was exhaust organic concentration for carbon adsorption and downstream temperature for refrigeration condenser and thermal oxidation. Proposed §63.427(a)(5), however, allowed the monitoring of an alternative operating parameter upon demonstrating to the Administrator's satisfaction that the alternative parameter indicates continuous compliance.

One industry commenter provided a technical report (IV-D-45) presenting continuous operating data for a carbon bed vapor control system installed at one of their bulk terminals. Two types of continuous monitors have been installed on this control system. One of these monitors provides a continuous record of the exhaust hydrocarbon concentration, measured as equivalent butane percentage or parts per million (ppm) of propane. A second monitor continuously records the vacuum pressure achieved in each carbon bed during the carbon regeneration cycles. The recording system on the vacuum monitor keeps track of the sequencing of the carbon beds and the vacuum level achieved during regeneration.

A permit limit of 20,500 ppm propane (1-hour average) is in effect for this control installation. During a 30-day test on the system, the highest 1-hour average concentration was 13,806 ppm (and the highest 15-minute concentration was 19,360 ppm). These values occurred on the day with the highest gasoline throughput. During the test period, a consistent bed vacuum pattern was observed; the regeneration vacuum quickly rose to the specified 25 inches of mercury and peaked between 27 and 28 inches.

The report concluded that the CEM output (exhaust concentration) can be correlated with the vacuum being pulled on the activated carbon. This conclusion was based on the good performance of the system during the test; i.e., the concentration never exceeded the permit limit and the bed vacuum consistently peaked at the proper levels. The report further concludes that the carbon bed regeneration recorder has benefits not only when used as a means of compliance, but also as a maintenance tool. Due to its simplicity and low purchase and maintenance costs, the report characterizes this system as an "effective, reliable, flexible, and cost efficient replacement for CEM's."

The EPA has reviewed this technical report and the included data. While the data indicate that both exhaust concentration and peak vacuum pressure were within acceptable limits during the test, the report does not demonstrate that any correlation exists between these parameters. In other words, it is unclear from these data whether a decreased vacuum level (for example, 20 inches of mercury) would correlate with a significant increase in hydrocarbons (and HAP emissions) at the outlet. Further, there is no indication that vacuum level relates to the emission level in milligrams per liter (the units of the regulatory limit), which is required for this parameter to be used as an indicator of compliance. These additional test data would be necessary in order for an operating parameter value to be established under the final rule.

The EPA believes that the parameters discussed at proposal are appropriate for typical vapor processors. As a particular example, the Puget Sound Air Pollution Control Agency (PSAPCA) in Washington State prescribes continuous exhaust VOC concentration monitors for carbon adsorption systems at bulk terminals within its jurisdiction, and has found this approach useful in monitoring the operation of these systems (IV-E-5).

The provision allowing for an alternative operational or emission parameter is retained in §63.427(a)(5) of the final rule. This provision allows an owner or operator to present data and supporting information for parameters (including carbon bed vacuum) other than those listed in the rule. However, the data must demonstrate that the parameter is an indicator of compliance with the emission limit and must establish and support a specific operating parameter value.

Comment: One commenter felt that continuous monitoring should not be required at terminals and pipeline breakout stations that are not in continuous use. Monitoring should only be required when the systems are in operation. Continuous monitoring of vapor control systems which are not operating continuously wastes time and money, and is an administrative burden (IV-D-19, p. 5).

Response: The EPA recognizes that loading operations are a noncontinuous batch-type operation, and that most vapor processors operate on demand to process vapors as they are released from the loading racks. The monitoring systems required under these standards must have the ability to record the operating parameter value during times that cargo tanks are actually loading. Monitoring and recording this parameter at other times would not provide information concerning emissions control at the facility, and so would not be required. The language of §63.428(f) has been worded to clarify that monitoring and recording are required only for times when a gasoline cargo tank is actually loading at the facility.

Comment: One commenter stated that continuous emissions monitoring is necessary to assure compliance but should revolve around more stringent local standards, not the federally enforceable limit. The EPA has not recommended any monitoring parameters for the three control technologies utilized to achieve the 10 mg/liter standard (IV-D-28, p. 9).

Response: The term "federally enforceable" is defined in the final General Provisions (§63.2) as follows:

> "Federally enforceable means all limitations and conditions that are enforceable by the Administrator and citizens under the Act or that are enforceable under other statutes administered by the Administrator. Examples of federally enforceable limitations and conditions include, but are not limited to:

(1) Emission standards, alternative emission standards, alternative emission limitations, and equivalent emission limitations established pursuant to section 112 of the Act as amended in 1990;

(2) New source performance standards established pursuant to section 111 of the Act, and emission standards established pursuant to section 112 of the Act before it was amended in 1990;

(3) All terms and conditions in a title V permit, including any provisions that limit a source's potential to emit, unless expressly designated as not federally enforceable;

(4) Limitations and conditions that are part of an approved State Implementation Plan (SIP) or a Federal Implementation Plan (FIP);

(5) Limitations and conditions that are part of a Federal construction permit issued under 40 CFR 52.21 or any construction permit issued under regulations approved by the EPA in accordance with 40 CFR part 51;

(6) Limitations and conditions that are part of an operating permit issued pursuant to a program approved by the EPA into a SIP as meeting the EPA's minimum criteria for Federal enforceability, including adequate notice and opportunity for EPA and public comment prior to issuance of the final permit and practicable enforceability;

(7) Limitations and conditions in a State rule or program that has been approved by the EPA under subpart E of this part for the purposes of implementing and enforcing section 112; and

(8) Individual consent agreements that the EPA has legal authority to create."

The EPA has several reasons for including a requirement that the emission limits in MACT standards must be federally enforceable. To summarize, the purposes of these requirements (as discussed more fully in the preamble to the final General Provisions at 59 FR 12414) are: (1) to make certain that limits on a source's capacity are, in fact, part of its physical and operational design, and that any claimed limitations will be observed; (2) to ensure that an entity with strong enforcement capability (i.e., the Federal government) has legal and practical means to make sure that such commitments are actually carried out; and (3) to support the goal of the Act that EPA should be able to enforce all relevant features of the air toxics program as developed pursuant to section 112. Federal enforceability is both necessary and appropriate to ensure that State and local limitations and reductions are actually incorporated into a source's design and followed in practice.

As discussed previously, §63.427(a) of the proposed rule specified particular parameters that are to be monitored continuously for carbon adsorption, refrigeration condenser, and thermal oxidation systems. In addition, §63.427(a)(5) allowed the monitoring of an alternative operating parameter to those mentioned in the rule upon a demonstration that the alternative parameter is an indicator of continuous compliance. The final rule retains these provisions. The EPA believes that terminal operators and equipment manufacturers are in the best position to identify and recommend such alternatives; however, EPA must review and approve any such recommendations.

6.3 CONTROL EQUIPMENT

Comment: One commenter stated that, because no equipment operates correctly at all times, EPA should provide some allowance for excess emissions or exceedances of the standards due to unforeseen or unpreventable occurrences (IV-D-36, p. 2).

Response: The EPA understands that even well-designed and maintained equipment is subject to malfunctions. The General Provisions in §63.6(e) contain detailed provisions dealing, in particular, with periods of startup, shutdown, and malfunction of process and pollution control equipment. Each affected facility is expected to develop and implement a written startup, shutdown, and malfunction plan that describes, in detail, procedures for operating and maintaining the source during periods of startup, shutdown, and malfunction and a program of corrective action for malfunctioning process and air pollution control equipment used to comply with the emission limit of the standard. In addition, §63.8(c) specifies operation and maintenance requirements for continuous monitoring systems. These plans and requirements are intended to reduce emissions, especially during startup, shutdown, and malfunction events at the facility, and do provide the requested allowance needed for unpreventable occurrences.

Comment: One commenter pointed out that short-term air quality standards allow one exceedance per year at any one receptor, which translates into an exceedance rate of 6.6 percent over a 24-hour average time standard. The EPA should allow a similar exceedance rate at loading racks (IV-D-36, p. 2).

Response: The commenter did not explain why there should be a correlation between exceedances of the ambient air quality standards and excess emissions events at the loading racks. However, as discussed in the previous response, exceedances due to unpreventable upsets at a facility are accounted for in the operation and maintenance provisions of the General Provisions (and, thus, these standards). The Agency believes that these provisions adequately address the issue raised by the commenter.

6.4 REFERENCES

IV-E-5 Telecon. LaFlam, G., PES, Inc., with Pade, G., Puget Sound Air Pollution Control Agency. July 15, 1994. PSAPCA's continuous monitoring requirements for bulk terminals.

7.0 CARGO TANK REQUIREMENTS

7.1 EMISSION FACTORS

Comments: Several commenters felt that EPA's assumption at proposal that tank trucks that have passed the EPA Method 27 annual vapor tightness test leak 10 percent of their emissions during controlled loading is outdated and inaccurate. Consequently, the baseline emissions calculated for tank trucks are grossly overstated. New data suggest that very few tank trucks leak due to today's better construction standards and the test requirements in effect under current Federal and State rules (IV-D-2, p. 9; IV-D-7, p. 2; IV-D-14, p. 12; IV-D-15, p. 3; IV-D-22, p. 42; IV-D-30, p. 6; IV-D-34, p. 14; IV-F-1, p. 13). One commenter provided calculations indicating that, under the proposed pressure decay standard (which is the same as the subpart XX NSPS requirement), a typical controlled tank truck would have a leakage emission factor for loading of 5.6 mg/liter (at the maximum 18 inches of water backpressure) (IV-D-28, p. 5). Another commenter estimated, on the basis of test failure rate data from the BAAQMD and several oil companies, that the overall average leak rate is 0.88 percent of the total volume of vapors displaced during the loading of tank trucks connected to a vapor recovery device (IV-D-22).

Response: The EPA's estimate of 10 percent vapor leakage from emission sources in tank trucks while loading at controlled loading racks was based on data collected in 1978 on 27 tank trucks in California (II-A-12, II-A-25). These tank trucks were under a State requirement to be certified annually in a vapor tightness test, and time periods ranging from 4 days to a full year had elapsed since the last certification test for these trucks. The volume losses among the trucks varied from 0.1 to 35.8 percent, with the average leakage being about 10 percent. The data from these tests were further described, and the 10 percent figure derived, in the BID for the proposed NSPS for bulk gasoline terminals (II-A-14).

The commenter who supplied the 0.88 percent overall leakage estimate relied upon vapor volume loss data for individual tank trucks reported in the 1978 study, and combined these data with test failure rate data from BAAQMD (pressure test data) and from several oil companies (combustible gas detector results gathered during loading rack performance tests). Based on an assumption that a leak definition of 10,000 ppm is equivalent to a 1 percent loss of vapors through leakage, the commenter determined that the average leak rate for tanks with leakage rates over 1 percent ("failing" tanks) was 12.1 percent, while the average leak rate for the remaining, "passing" tanks was 0.5 percent. On the basis of the failure rate data, the overall failure rate during 1989 to 1994 was found to be 3.3 percent. Combining the average leak rate figures with these failure prevalence data, the commenter arrived at the overall leak rate for all tank trucks of 0.88 percent.

The EPA recognizes and agrees with the commenter that the available data indicate that overall vapor leakage rates from tank trucks subject to a regular test and repair program using the pressure decay procedure have been reduced over the past 16 years. However, the use of concentration data to estimate a volume leakage rate, as the commenter has done, is uncertain. In addition, neither EPA nor industry have access to current data for several areas throughout the country that would allow a national average calculation of this volume leakage to be made. Therefore, any numerical result derived from the existing data would be at best a broad estimate, which would not account for the full range of truck ages, ownership scenarios, and local control programs.

In spite of these limitations, EPA has made an estimate which it feels more closely reflects actual overall emissions under a vapor-tight cargo tank program than the emission factor used for the proposal. The Agency's new emission factor, 0.8 percent of the total vapors displaced or 8 mg of VOC/liter, is based on the use of a volume loss equation found in EPA's tank truck CTG (II-A-9) combined with the test failure rate data submitted by one commenter and measured leakage from trucks that failed the test. This new emission factor represents the emissions after control to the level of the final standards as discussed in the following section. Appendix A presents more details on the calculation of this new emission factor.

7.2 LEVEL OF CONTROL

Comment: Two commenters recommended that EPA implement the cargo tank vapor tightness program in effect within the State of California since 1977. The California standard requires annual certification that cargo tanks meet 5-minute pressure and vacuum decay standards of 1 inch of water. Based on a Bay Area survey of 200 tank truck owners which quantified actual pressure change values, California is proposing to lower this standard to 0.5 inch of water.

In addition, the same commenters recommended that cargo tanks be required to meet a year-round inspection standard of 2.5 inches of water in 5 minutes. Using a simple, accurate field test method, the Bay Area has implemented a comprehensive outreach program for cargo tanks since 1986. Operators are instructed in the source test method, and participate in an ongoing inspection and maintenance program. Participation is voluntary, and the incentives are reduced penalties for violations if documentation shows a history of regular tests and maintenance on the tanks. Both commenters recommended that EPA adopt California's proposed annual Method 27 limit of 0.5 inch and a year-round standard of 2.5 inches of water (IV-D-28, p. 6; IV-D-38, p. 4).

As discussed in Section 5.3, following proposal EPA published supplemental information pertaining to the cargo tank vapor tightness program in California and requested comment on EPA's determination that these standards are the new and existing source floor for this MACT rule. The EPA received the following comments on the floor determination and on the level of control that is appropriate for controlling cargo tank leakage.

Five commenters felt that the existing California standards should be specified for cargo tanks at new sources, but would be inappropriate for existing sources (IV-D-49, p. 1,4; IV-D-51, p. 1; IV-D-52, p. 1; IV-D-53, p. 3; IV-D-54, p. 2). These commenters based their opinion on the conclusion that EPA had inappropriately based its floor determination on the gasoline throughput, or number of tank trucks operating in California. They felt that, since the legal responsibility for compliance would be on the terminal owner or operator, the basis should be the number of terminals in California. One commenter said that this figure is 71, out of a total of 1,125 terminals nationwide (6.3 percent). Since this value is less than the required 12 percent, applying this control level to existing sources would be an "above the floor" option. Thus, a cost effectiveness analysis should be provided to justify the California standards as the existing source floor. Another commenter stated that the California Highway Patrol, which administers California's cargo tank testing program, does not include vapor tightness testing in its 44-point program for inspecting out-of-State cargo tanks. The commenter felt that this issue could impact the foundation upon which EPA had reopened the proposal action (IV-D-56, p. 1). Two commenters had no objections to incorporating the California standards for both new and existing sources (IV-D-50, p. 2; IV-D-55, p. 1).

Several commenters responded to EPA's request for comments on whether the level of control for cargo tanks at new and existing facilities should be based on the existing or the proposed California standards. Commenters were unanimous in asserting that only the existing, and not the proposed, California standards should be considered (IV-D-48, p. 1; IV-D-49, p. 4; IV-D-52, p. 1; IV-D-53, p. 3; IV-D-54, p. 2; IV-D-55, p. 1). Two of the commenters felt that BAAQMD's survey of 200 tank truck owners was not sufficiently representative to indicate that the more stringent proposed standards should be applied. One of them questioned whether data exist to show that a large percentage (91 percent passing the 0.5-inch level) were achieving the proposed California control level by August 1992, as required by section 112(d)(3)(A) of the Act (18 months before proposal of a standard) (IV-D-48, p. 1). Another commenter said the proposed requirements should not be adopted because: 1) the testing in the survey has not been properly peer reviewed, 2) the proposal has yet to be adopted by the California Air Resources Board (ARB), and 3) there is no conclusive demonstration of any significant difference between the current and proposed standards (IV-D-53, p. 3). Two other commenters echoed that there is no basis for considering the more stringent standards because the effect on tank truck emissions is unknown (IV-D-49, p. 4; IV-D-54, p. 2). Finally, one commenter requested that EPA consider the proposed California standards for new and existing facilities, feeling that this would standardize regulations nationwide and result in lower costs for equipment and remove some burden from the California ARB (IV-D-47).

<u>Response</u>: The California ARB and the California air pollution control districts have been implementing cargo tank leakage standards since the late 1970's. Currently, all cargo tanks transporting gasoline in California, including tank trucks from neighboring States that operate in California, must meet the California standards and are checked by the California air

pollution control districts. In summary, they include three major standards: an annual certification test, a year-round pressure standard for the tank and its vapor piping and hoses, and a year-round pressure standard for the cargo tank's internal vapor valve (IV-E-3). The annual certification standards include initially pressurizing, and later evacuating the tank and associated vapor piping and hoses, to 18 inches of water and to 6 inches of water, respectively. In 5 minutes the maximum pressure change can be no more than the values shown in Table 7-1. Further details on the performance requirements and test

TABLE 7-1. ALLOWABLE CARGO TANK TEST PRESSURE OR VACUUM CHANGE

Cargo Tank or Compartment Capacity, liters (gal)	Annual Certification-Allowable Pressure or Vacuum Change in 5 Minutes, mm H_2O (in. H_2O)	Allowable Pressure Change in 5 Minutes at Any Time, mm H_2O (in. H_2O)
9,464 or more (2,500 or more)	25 (1.0)	64 (2.5)
9,463 to 5,678 (2,499 to 1,500)	38 (1.5)	76 (3.0)
5,679 to 3,785 (1,499 to 1,000)	51 (2.0)	89 (3.5)
3,782 or less (999 or less)	64 (2.5)	102 (4.0)

procedures used in the California program were discussed in EPA's supplemental FR notice (59 FR 42788). The EPA's Control Techniques Guideline (CTG) document for tank trucks (II-A-9) and the bulk terminal NSPS (40 CFR part 60, subpart XX) contain annual pressure and vacuum test levels of initial pressures and test duration which are the same as California's. However, a less stringent pressure change of 3 inches of water column is allowed for all tank trucks under the NSPS, the CTG, and the proposal.

In the August 19, 1994 supplemental FR notice, EPA stated that the gasoline throughput in California accounts for nearly 12 percent of the national gasoline consumption (13.46 billion gal/yr out of 117.9 billion gal/yr) (III-B-1, Table D-2). Essentially all of this gasoline would be transported by tank trucks, which include both California and out-of-State cargo tanks, all of which are subject to the State's vapor tightness standards (IV-E-8). For this reason, it was assumed that about 12 percent of the national tank truck population is under a requirement for annual certification and periodic testing in accordance with the California vapor tightness standards.

On the basis of public comments, however, EPA has examined the effect of considering the number of terminals in California on the floor determination. As pointed out by one of the commenters, California terminals account for 6.3 percent of the national total. In determining the floor for existing sources, EPA looks at emission limitations achieved by each of the best performing 12 percent of existing sources, and averages those limitations (59 FR 29196). In this case, the "best performing" cargo tanks are presumed to be those subject to the most stringent vapor tightness standards. The Agency interprets "average" to mean a measure of central tendency such as the arithmetic mean, mode, or median. It can be seen here that on the basis of the number of terminal facilities, the California standards meet this test by constituting certainly the 94th percentile or median, and mode. Therefore, even when the number of terminals is used in the floor determination, the existing California standards constitute the floor level of control for cargo tanks at existing bulk terminals affected by the final MACT standards. As proposed and discussed in Section 5.4, it has also been determined that the same tests can be applied to railcars since they are similar sources. Therefore, the final rule incorporates the existing California standards for cargo tanks (tank trucks and railcars) loading at existing and new facilities.

Commenters had several concerns on the level of control for cargo tanks. In the supplemental notice, EPA had discussed promulgating cargo tank leakage control levels based either on the existing or the proposed California certification annual leak rate, 1 in. H_2O or 0.5 in. H_2O pressure change, respectively. Some commenters questioned the data collected on the number of tank trucks meeting the lower proposed California standard as not representative, not peer reviewed, and not providing a conclusive demonstration of increased emission reduction. Also, some commenters were concerned that the proposed standards based on those data have not at this time been adopted by the California ARB. The EPA shares the commenters' concerns and is reluctant to move forward and recommend a final standard based on data the California ARB has not acted on by adopting and implementing the standards that have been proposed within the State. Thus, the Agency is setting the level of cargo tank leak standards for new and existing facilities on the basis of the existing California standards.

Comment: One commenter suggested several strategies to reduce tank truck vapor leakage. These suggestions included the following: 1) a phase-out of top loading of gasoline; 2) a minimum inside diameter of 4 inches for vapor return hoses and cargo tank vapor plumbing; 3) at new sources, a maximum pressure drop across the rack-to-control device vapor collection system of 5 inches of water during peak loading; 4) at new sources, a maximum allowable backpressure in the cargo tank of 10.0 inches of water; and 5) the use of a differential pressure gauge across in-line flame arrestors, with a maximum allowable pressure drop specified (IV-D-38, p. 2).

Response: The commenters only suggested these requirements and indicated that California's Bay Area district plans to introduce these changes in the near future. Top loading of gasoline has not been allowed in the Bay Area since 1980. Current EPA rules do not specifically disallow top loading. However, rules requiring vapor recovery and leak-free systems indirectly rule out the use of top loading since such systems cannot meet these criteria. The EPA has no additional information on the number of facilities implementing such measures or on their environmental impacts. Therefore, these changes were not incorporated into the final rule.

7.3 CARGO TANK TESTING

Comment: Several commenters expressed opinions concerning the proposed requirement for annual vapor tightness testing of tank trucks loading at major source terminals. One commenter expressed agreement with the requirement for annual testing of both tank trucks and railcars (IV-D-21, p. 2). Others felt that the requirement was unnecessary. One stated that terminal owners and operators should not have to test for-hire tank trucks owned by others (IV-D-7, p. 11). Other commenters stated that, since leakage rates have declined over the years, the vapor tightness testing is unnecessary and these requirements are duplicative of current Federal and State regulations (IV-D-30, p. 6; IV-D-34, p. 13). Two commenters believe that current DOT testing programs, with modifications if necessary, sufficiently address the leakage problem (IV-D-18, p. 5; IV-D-30, p. 7). One of these felt that inspections by State highway enforcement agencies should be allowed (IV-D-18, p. 5).

Response: The EPA's data indicate that the vapor loss from tank trucks connected to a vapor collection system may average 30 percent of the potential vapor transferred to the system in areas where no regular vapor tightness testing program is in effect. As discussed in Section 7.1, tank trucks subject to an annual test requirement lose an estimated 0.8-1.3 percent of the displaced vapors. Based on these figures, the annual test is very effective and necessary for reducing this source of HAP emissions.

Further, the test does not duplicate DOT programs or Federal and State requirements. As pointed out in BID, Volume I, Section 4.1.4.2, the current DOT leakage test does not verify the integrity of some portions of the vapor containing equipment; on the other hand, DOT allows EPA's Method 27 to be used as an alternative. Many State rules apply only in certain areas, leaving some major source HAP facilities potentially unregulated. As discussed earlier in Section 7.2, annual tank truck testing is considered the floor for existing sources and it is therefore the minimum that can be required. These MACT standards establish a uniform set of requirements, including the use of EPA Reference Method 27, for tank trucks loading at these facilities in all areas of the country.

Comment: One commenter felt it would be a burden to "police" the trucks to verify they have vapor tightness documentation, and thought that the terminal may need to be staffed 24 hours per day to comply (IV-D-18, p. 5).

Response: The cargo tank documentation requirements in these standards were proposed and are now promulgated to apply in the same way, and in fact are the same requirements, as those in 40 CFR 60, subpart XX, the NSPS for bulk gasoline terminals. The cargo tank owner (who may be either the terminal owner or an outside trucking or rail company), in order to load a particular gasoline cargo tank at an affected terminal, would have to outfit the tank for vapor collection and include the annual vapor tightness test in the tank's maintenance schedule. Terminal owners and operators would not have to "police" the loading activities by manning the loading racks. The method for assuring that untested cargo tanks do not load gasoline involves examination of loading records and notification of cargo tank owners if unauthorized loadings are made. At bulk terminals (even automated computer-billed terminals), some hard copy manifest is given to the driver of a for-hire tank truck or railcar to verify the date and the type and amount of product loaded. The driver keeps this copy for his company's records and a copy is often returned to the terminal to cross-check the computer billing. This record containing the tank ID number allows the terminal operator to identify each tank that loaded if he desires to do so in the future. Under these standards, the operator is required to periodically cross-check the tank identification with the vapor tightness documentation kept on file at the terminal. This cross-checking is required within 2 weeks of the loading.

If the terminal discovers that an unauthorized cargo tank has received gasoline, the terminal operator is required to notify the tank owner, indicating that only vapor-tight (tested) tanks may load gasoline at that terminal. Steps would then have to be taken to assure that the unauthorized cargo tank does not reload at the terminal until documentation of a successful vapor tightness test has been provided. Terminals have flexibility in the manner in which these steps are taken as necessary in order to minimize potential disruptions to the terminal operations.

Comment: In response to EPA's FR notice announcing the availability of supplemental information and the reopening of the comment period on the new information (59 FR 42788, August 19, 1994), commenters offered opinions concerning the two field tests used in California to verify compliance with the year-round performance standard for cargo tanks: the nitrogen pressure decay test and the combustible gas detector (CGD) test. Two commenters felt that the nitrogen test should be voluntary and not a mandatory requirement for the terminal operator (IV-D-49, p. 3; IV-D-52, p. 2). One commenter on the CGD test thought that this test should be used only as a screening tool to search for leaks, but it should not be used to issue violations, due to its questionable correlation with the actual leakage rate as determined in pressure decay testing (IV-D-49, p. 3). Another commenter discussed data showing the failure of the CGD test in correctly identifying the compliance status of tank trucks, and agreed that the test should be considered a screening tool. This commenter also felt that the use of this test during loading is inherently unsafe, because a hatch cover could blow open while the tester is on top of the tank truck. The preferred method is for personnel to do the testing after the actual filling process has ceased (IV-E-7).

Response: In the supplemental FR notice, EPA concluded that the existing California standards are the floor for cargo tanks loading at existing bulk terminals. The nitrogen test is part of the California program. The test is utilized in two ways. First, the local control districts perform the test to verify the compliance of cargo tanks with the year-round performance standard. When performed as a compliance evaluation, this test of course is not "voluntary." The second way the test is applied is by terminal facilities themselves, which install the test apparatus at the facility and perform the testing under their own schedule as part of their internal tank truck maintenance program. This is a voluntary activity which is intended to catch leaks and to maintain an acceptable level of compliance. Despite the terminal's own level of test (maintenance) activity, any gasoline cargo tank is subject to testing by the control agency at any time. The EPA is including the same nitrogen test in the final rule. As in the California program, EPA encourages affected source terminals (and cargo tank operators who will be loading at these facilities) to institute programs designed to ensure that continuous year-round compliance is maintained.

The EPA agrees that the leak detection test using a combustible gas detector is best characterized as a screening tool, and the reported low correlation of this test with the quantitative pressure loss tests is a concern to the Agency. For this reason, both the California standards and this final rule do not consider a cargo tank out of compliance and subject to penalty on the basis of failure of the CGD test alone. However, a tank failing this test will not be allowed to load until it demonstrates compliance by passing a pressure decay test (before any leak repair is performed on the tank). Any tank failing the decay test will be penalized and then required to certify to the annual certification standard (with a new 12-month clock starting) before it is authorized to load gasoline at a regulated facility.

7.4 OTHER

Comment: Two commenters suggested that EPA delete the proposed requirements for railcars, re-do the analysis, and focus on regulating railcar loading as a separate subcategory. They said EPA has presented little information regarding controls for railcar loading. The commenters believe that the top 12 percent of existing terminals where railcar loading exists probably do not control railcar loading; therefore, "uncontrolled" should be the floor. Railcar loading at new terminals should not be regulated beyond the current NSPS subpart XX standard of 35 mg/liter of gasoline loaded, if any standard is required at all (IV-D-2, p. 8; IV-D-17, p. 4).

Response: The EPA agrees that the data base for facilities loading gasoline into railcars, including data on vapor control operations at these facilities, is limited. However, vapor control with a 10 mg/liter emission limit is being achieved in practice at facilities in parts of California, Texas, and Washington. Although there are obvious construction differences between tank trucks and railcars, both are equipped with similar cargo tanks, have the same displacement losses of HAP, and employ similar loading and vapor control equipment. Since this standard is currently being practiced at some facilities, the emission limit of 10 mg/liter is the appropriate MACT control level applicable to new railcar loading sources. Also, since the floor for existing tank truck loading operations is an emission limit of 10 mg/liter, the similar operation of railcar loading with the same emission characteristics can also be presumed to be capable of achieving the same 10 mg/liter level of emission control. Therefore, EPA is promulgating the 10 mg/liter standard for all cargo tanks, which includes both tank trucks and railcars.

In addition to this comment, a few miscellaneous comments were received in response to EPA's proposal to incorporate California's cargo tank vapor tightness program into these MACT standards.

Comment: One commenter supported the adoption of the 1-inch pressure drop annual standard and the 2.5-inch pressure drop year-round standard for all cargo tanks regardless of tank capacity as a compliance option to be used at the discretion of the terminal owner or operator to streamline applicability and recordkeeping (IV-D-53, p. 3).

Response: The California 5-minute annual certification pressure change ranges from 1 to 2.5 inches H_2O, and the year-round standard ranges from 2.5 to 4.0 inches H_2O, depending on the capacity of the cargo tank or compartment being tested. The lower levels of allowable pressure change correspond to the largest cargo tanks (2,500 gallons and up). For smaller tanks, the higher pressure losses that are specified correspond to an equivalent vapor leakage rate. Therefore, application of the lower pressure change limits to the smaller tanks would be a more stringent option, and would be above the floor. For this reason, EPA is promulgating the California limits in this final rule. However, as a compliance option intended to simplify these procedures, individual companies or facilities may choose to apply a single (the most stringent) level to all sizes of cargo tanks.

Comment: The same commenter felt that applying this cargo tank proposal to existing sources would create a problem of inequitable treatment for bulk terminals nationwide. Tank truck owners and operators would prefer to load at unaffected terminals due to less burdensome testing and paperwork requirements. The commenter suggested that such a problem would not be created if the existing DOT and NSPS subpart XX requirements were extended to major HAP sources that are not already covered under those standards (IV-D-53, p. 4).

Response: As discussed in Section 7.2, EPA has determined the California level of control to be the floor for all gasoline cargo tanks (tank trucks and railcars) loading at new and existing bulk terminals. The differences between the testing and recordkeeping requirements under the NSPS versus this MACT program are relatively minor; however, additional emission reductions are expected under the MACT standards due to increased maintenance and repair activity on cargo tanks. The EPA does not believe that a significant number of cargo tank operators will forfeit their access to major bulk terminals in exchange for a slightly less stringent maintanance program for their fleet.

Comment: Two commenters contended that mandating the California testing standards for existing major source terminals will create a de facto new nationwide cargo tank testing standard. Maintaining appropriate records as to which cargo tanks may load at individual terminals would be excessively burdensome and would unacceptably reduce critical transportation and terminal operational flexibility. Accordingly, terminals and truck companies would be compelled to test, unnecessarily, all cargo tanks to the California standards (IV-D-49, p. 4; IV-D-51, p. 2).

Response: The response to this comment is similar to the previous response. Under the NSPS subpart XX, bulk terminals must keep records indicating their own or for-hire tank trucks that are certified as vapor-tight. The EPA is not aware of this practice being an excessive burden for the NSPS terminals. Many cargo tank operators would undoubtedly certify their equipment to the more stringent levels in order to increase their flexibility to load at any terminal facility. However, many others would probably not find this necessary or desirable. To the extent that operators choose to apply enhanced maintenance standards, additional HAP emission reductions should be realized.

7.5 REFERENCES

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8.0 STORAGE VESSEL STANDARDS

8.1 DETERMINATION OF MACT FLOOR CONTROL LEVEL

Comment: Several commenters claimed that the discussion in the proposal concerning the "floor" level of control for storage vessels was inadequate and unclear. The EPA's conclusion was that the NSPS requirements of 40 CFR part 60, subpart Kb constituted the floor for storage vessels at existing sources. One commenter stated that EPA had not performed an adequate evaluation to establish the subpart Kb deck rim seal requirements as the floor (IV-D-15, p. 9). Several other commenters believed that EPA had demonstrated only that subpart Kb's floating roof rim seal requirements are the floor for existing sources, but not the additional subpart Kb requirement to install controls on the roof deck fittings (IV-D-3, p. 1; IV-D-7, p. 7; IV-D-8, p. 4; IV-D-12, p. 1; IV-D-15, p. 9; IV-D-16, p. 2; IV-D-17, p. 5; IV-D-22, p. 29; IV-D-31, p. 3; IV-D-34, p. 16; IV-D-35, p. 4; IV-F-1, p. 9, 12). Other commenters expressed concerns regarding the cost effectiveness of controlling the deck fittings (IV-D-3, p. 1; IV-D-8, p. 4; IV-D-15, p. 9; IV-D-17, p.7; IV-D-22, p. 38; IV-D-34, p. 17; IV-D-35, p. 50).

Response: At proposal, EPA required gasoline storage tanks at existing facilities to comply with the storage vessel standards in NSPS 40 CFR part 60, subpart Kb (NSPS subpart Kb). NSPS subpart Kb specifies closure devices between the wall of the storage vessel and the edge of the floating roof ("rim seals") and the installation of gaskets on specified lids and other openings in the floating deck ("controlled fittings"). The EPA also proposed the same NSPS subpart Kb requirements as the floor for tanks at new facilities. NSPS subpart Kb is the most recent (1984) new source performance standard for new gasoline and certain other liquid storage tanks.

Regarding the comments concerning the floor determination for rim seal requirements for existing sources, EPA continues to maintain its previous conclusion that the NSPS subpart Kb rim seal requirements are the floor for gasoline distribution facilities as proposed and discussed in the proposal notice (59 FR 5868). The EPA believes it did perform a proper evaluation, and the commenter did not provide any data or information to support a change in the finding that NSPS subpart Kb rim seals are the floor level of control. The rim seal requirements in the CTG's and the requirements of the NSPS (40 CFR part 60, subparts K, Ka, and Kb) are identical for both internal and external floating roofs having mechanical and liquid-mounted primary seals. The rim seal requirements for the CTG's and the NSPS subparts Ka and Kb differ only for internal or external floating roofs equipped with a third type of seal, a vapor-mounted primary seal. Vapor-mounted rim seals must be equipped with secondary seals to meet the requirements of NSPS subpart Ka and the CTG for external floating roof tanks and to meet requirements of NSPS subpart Kb for internal floating roof tanks. (NSPS subpart Kb does not allow any vapor-mounted seals on external floating roofs.) Approximately 35 percent and 40 percent, respectively, of external floating roof tanks at breakout stations and bulk terminals have primary and secondary seals meeting some level of NSPS and CTG control. Approximately 40 percent and 70 percent of internal floating roof tanks at breakout stations and bulk terminals, respectively, are equipped with floating roofs with seals meeting some level of NSPS and CTG control.

Vapor-mounted seals are the only source of uncertainty in concluding that over 35 percent of all gasoline storage tanks meet NSPS subpart Kb rim seal requirements, because no data are available to estimate the number of tanks with vapor-mounted seals. However, since this seal type is one of three types available, it is reasonable to assume that one-third of the tanks may have vapor-mounted seals. Thus, the Agency concludes that over 20 percent of the tanks currently meet NSPS subpart Kb control levels. Additionally, analysis of the tank survey for the proposed refinery MACT standard (59 FR 36130, July 15, 1994) found that the rim seal requirements of the NSPS subpart Kb was the floor for existing storage tanks at refineries. Those refinery tanks are same type of storage tanks as those used at terminals and breakout stations; however, on average they normally contain liquids of lower volatility. Therefore, it is reasonable to assume that a higher percentage of gasoline storage tanks would be better controlled due to the value of the gasoline that would be subject to loss through evaporation. Based on these arguments, EPA concludes that the rim seal requirements in the most recent NSPS standard (40 CFR part 60, subpart Kb) represent the average limitation achieved by the best performing 12 percent of sources.

The EPA, however, does agree with the commenters' statements that the discussion in the proposal preamble did not support the NSPS subpart Kb <u>fitting</u> control requirements set in 1984 for new tanks as part of the floor for storage vessels at existing facilities. The EPA did not have access to any data regarding the number of gasoline storage vessels that are equipped with controlled fittings. The commenters also did not provide any data or information on the number of storage vessels with or without fitting controls for these subcategories. Information obtained in the tank survey conducted for the refinery MACT standards was inconclusive regarding the use of controlled fittings on storage vessels. As a result, EPA has no data to support the conclusion that controls on tank fittings are part of the floor for existing sources. Therefore, EPA has determined the existing source floor for fittings as "uncontrolled."

The Agency has considered controlled fitting requirements as an option providing the maximum degree of reduction in HAP emissions ("above the floor") as required by the Act. The Administrator is required under section 112(d) to set emission standards for new and existing sources of HAP's that require the maximum degree of reduction in emissions of HAP's that is achievable, taking into consideration the cost of achieving the emission reduction, any nonair quality health and environmental impacts, and energy requirements. New tanks at new or existing facilities since 1984 are meeting the deck fitting control requirements in 40 CFR part 60, subpart Kb and, therefore, these requirements are achievable. Controlling fittings to that level is also considered the maximum degree of emission reduction.

Emission reductions and costs for controlled fittings were analyzed on both a per model storage vessel and a nationwide basis using two typical size and throughput vessels, and different potential HAP contents in gasoline. Additionally, installation of controlled fittings on many tanks requires degassing and cleaning of the tanks. Industry reports that storage vessels are degassed and cleaned at least every 10 years for safety inspections and requested that EPA require all retrofits (fittings and rim seals) on storage tanks to occur simultaneously. Therefore, EPA's new analysis included two options, with and without degassing and cleaning costs. If fitting controls were required in the first 3 years, the cost impact for this standard would include the cost for tank degassing and cleaning along with the cost of installing controlled fittings if a tank's routine safety inspection would not have occurred during that 3-year time period. The option of waiting until the next routine tank degassing and cleaning would avoid the additional costs of cleaning and degassing as an impact of this standard since the activity would have occurred anyway. A discussion and presentation of the model tank analysis of fitting controls is included in Appendix B.

Installing controlled fittings on floating roof tanks, without degassing and cleaning costs, would result in a cost savings due to the value of gasoline vapor prevented from evaporating through openings in the floating roof deck. The capital costs of installing deck fitting controls on the model tanks, without the cost of degassing and cleaning of the tanks, ranged in the analysis from $1,200 to $2,800, annualized costs ranged from a savings to a cost of $340 per year, and the cost effectiveness ranged from a savings to a cost of $7,500 per megagram of HAP reduced. When controlled deck fitting installation costs included degassing and cleaning costs, the capital costs ranged from $21,000 to $67,000, annualized costs ranged from $4,000 to $14,000 per year, and the cost effectiveness ranged from $25,000 to $300,000 per megagram of HAP reduced. Calculation of product price increases under either option showed them to be insignificant (less than 0.05 cent per gallon). In conclusion, installing controlled deck fittings is significantly less costly if it can be done at the next scheduled tank degassing and cleaning.

The Agency has decided to require installation of controlled deck fittings on each existing external floating roof storage tank that is required to be degassed and taken out of service for the purpose of replacing or upgrading rim seals to meet 40 CFR 60, subpart Kb requirements. Since these tanks must be degassed and cleaned and have plant maintenance personnel on site, it is reasonable to require installation of the fitting controls at the same time. A national impact analysis was performed on this requirement. Table D-1 in Appendix D presents the results of the national analysis on storage tanks and other emission sources at bulk terminals and pipeline breakout stations. Installing fitting controls on external floating roof tanks is estimated to reduce 66 megagrams per year of HAP at an annualized cost savings of $93,000 per year.

The cost analyses show that installing controlled fittings when installing or replacing rim seals on existing external floating roof tanks involves a small capital cost (approximately $2,000 per tank), with an annualized cost savings, and insignificant change in gasoline prices. Given these low costs and the simplicity of these control measures when tanks are otherwise out of service, EPA has concluded that fitting controls are practical and affordable for existing external floating roof storage tanks. These controls also prevent pollution and conserve energy by preventing liquid gasoline from evaporating. Having given full consideration to the directives in the Act, the Administrator is requiring existing facilities to control the deck fittings when replacing or installing rim seals on external floating roof storage tanks to comply with the requirements in the final rule. Given the small national HAP emission reduction, the Agency has decided not to require fitting controls on existing internal floating roof storage tanks. While EPA is not at this time requiring these controls nationally on internal floating roofs, EPA encourages industry to consider the installation of these controls on a case-by-case basis. All new storage tanks at both new and existing facilities are already required under NSPS requirements of 40 CFR part 60, subpart Kb to install these same fitting controls. Those NSPS requirements are cross-referenced and are therefore part of the final rule. This level of control for roof deck fittings for new sources and for existing external floating roof tanks upgrading to rim seal requirements under this rule, is the same level as proposed on February 8, 1994. The storage vessel compliance period is discussed and analyzed in the next section.

While the final rule does not require fitting controls for existing internal floating roof storage tanks or the existing external floating roof storage tanks currently meeting the rim seal requirements in this rule, the Agency believes it is appropriate and recommends the inspection, repair, and upgrading of gasketing materials on fittings in the tank roof when any storage tank is taken out of service. It is a major part of the normal safety and maintenance procedure to inspect, repair, and upgrade the physical and mechanical condition of all the tank components. Additionally, requiring fitting controls to be installed on all tanks will reduce additional air toxics and volatile organic compounds, and will upgrade all tanks to the same level of control. An effective mechanism for getting controlled fittings in place on all tanks is the combination of this rule, the air toxics programs under section 112(l) of the Act, and the national ambient air quality programs for control of ambient ozone under the Act.

8.2 COMPLIANCE DEADLINE

Comment: Several commenters said that the proposed 3-year compliance period for storage vessels is unreasonable and is more stringent than the compliance schedule in other Federal regulations. To install the required controls, tanks would have to be taken out of service, cleaned, and degassed. Requiring all storage tanks to comply in a 3-year period could potentially disrupt the nation's gasoline supply, causing a gasoline shortage, especially in light of the new reformulated/oxygenated fuel requirements. One commenter stated that limited contractor resources could make the schedule logistically unworkable. Additionally, the cleaning and degassing of a storage tank creates an air emissions event that in many cases will exceed the emission reductions resulting from the new controls (e.g., the retrofit of internal floating roof already meeting subpart Ka seal requirements). All of the commenters suggested that EPA relax the compliance schedule and allow storage tank owners and operators to comply at the next scheduled tank inspection or in 10 years, whichever comes first. One of the commenters felt that a 10-year period has been established as an integral part of the floor for existing sources, and therefore EPA must perform a cost effectiveness analysis to support a 3-year compliance period. This commenter recommended that, should EPA not allow up to 10 years for compliance for all tanks currently equipped with floating roofs, at a minimum internal floating roof tanks currently meeting NSPS subpart Ka requirements should be provided a compliance period up to 10 years, or the next regular inspection cycle, whichever occurs first (IV-D-2, p. 8; IV-D-3, p. 1; IV-D-5, p. 4; IV-D-6, p. 2; IV-D-7, p. 7; IV-D-8, p. 4; IV-D-12, p. 1; IV-D-14, p. 9; IV-D-15, p. 9; IV-D-16, p. 2; IV-D-17, p. 3; IV-D-18, p. 6; IV-D-22, p. 33; IV-D-29, p. 4; IV-D-30, p. 7; IV-D-31, p. 3; IV-D-32, p. 2; IV-D-34, p. 17; IV-D-35, p. 4; IV-D-36, p. 3; IV-F-1, p. 10).

Response: Section 112(i)(3) of the Act requires the Administrator to establish a compliance date which shall provide for compliance as expeditiously as practicable, but in no event later than 3 years after the effective date (promulgation) of the standards. In addition, the Administrator (or a State with a program approved under title V) may issue a permit which grants up to a 1-year extension to comply with the standards if an additional period is necessary for installation of controls. However, some commenters suggest that taking a tank out of service before its normal cleaning and inspection schedule to comply with the regulation may generate more emissions than the added controls would reduce or control in the 3-year period.

To determine whether any tanks should be allowed an extension of the compliance time to achieve the maximum degree of reduction in emissions of HAP's, EPA compared the emission reductions achieved by the controls (i.e., rim seals and fitting controls) to the emissions generated from degassing and cleaning of fixed-roof and internal and external floating roof tanks for various tank diameters and gasoline turnover rates. The results of this analysis showed that degassing and cleaning emissions do not exceed the emission reductions from tanks complying with the final rule within the required 3-year compliance period. The analysis did show net emissions increases for some very large tanks either installing secondary seals without installing fitting controls, or installing fitting controls alone. However, the final standards require a facility to install fitting controls when installing secondary rim seals, and no tanks are required to install fitting controls alone. A discussion of emissions generated from tank cleaning and degassing, as well as an analysis of the environmental impacts of storage vessel controls, is presented in Appendix B.

8.3 OTHER

Comment: One commenter felt that the proposed rule overlooked the distinction between "breakout tanks" and bulk terminal "storage tanks." A "breakout tank" is a tank used to:
(a) relieve surges in a hazardous liquid pipeline system, or
(b) receive and store hazardous liquid transported by a pipeline for reinjection and continued transportation by pipeline. The commenter felt this distinction has been historically recognized by EPA and the Department of Transportation (DOT) in developing regulations, and clarifies the distinction between facilities regulated by these two agencies. In its preamble to proposed changes to the SPCC regulation plan, EPA noted that EPA regulates facilities with bulk storage tanks, while DOT regulates breakout tanks (56 FR 54612). The commenter pointed out that the regulations developed by DOT impose design and maintenance specifications for breakout tanks (§49 CFR sections 195.192 and 192.264) (IV-D-1, p. 1).

Response: The EPA proposed to regulate storage tanks at both gasoline bulk terminals and breakout stations to the level of the 40 CFR part 60, subpart Kb requirements. The commenter cited a proposed rule entitled "Oil Pollution Prevention; Non-transportation related Onshore and Offshore facilities" (56 FR 54612), which was promulgated under section 311(j)(1)(C) of the Clean Water Act, as amended by the Oil Pollution Act of 1990. This proposed rulemaking would establish requirements for Spill

Prevention and Control Countermeasures (SPCC) Plans to prevent oil spills by non-transportation related onshore and offshore facilities into the waters of the United States or adjoining shorelines. The following definitions were proposed:

> Breakout tank means a container that is part of a pipeline facility regulated by the Department of Transportation and is used solely for the purpose of compensating for pressure surges or to control and maintain the flow of oil through pipelines. Such tanks are frequently in-line.
>
> Bulk storage tank means any container used to store oil. These tanks are used for purposes including, but not limited to, the storage of oil prior to use, while being used, or prior to further distribution in commerce.

In that rulemaking, EPA excluded facilities under the jurisdiction of DOT (transportation-related onshore and offshore facilities including breakout tanks) from regulation based on a previous EPA and DOT Memorandum of Understanding (MOU) dated November 24, 1971, which established the responsibilities of EPA and DOT for the purposes of administering their respective spill prevention programs. The commenter also cited 49 CFR §195.192 and §192.264 as regulations developed by DOT for the transportation of hazardous liquids and pipeline facilities.

Although the purpose of the MOU between EPA and DOT was to delegate responsibility for administering their respective spill prevention programs, for the purposes of this rulemaking, EPA does not consider the MOU between EPA and DOT to be applicable to regulations developed to control air emissions. As an example, 40 CFR part 60, subpart Kb, which is the NSPS for volatile organic liquid storage vessels built or reconstructed after 1984, does not exempt "breakout tanks" from regulation. The EPA considers breakout tanks to be subject to the subpart Kb requirements. For this final rulemaking, EPA will continue to regulate storage tanks at pipeline breakout stations (or "breakout tanks") to control HAP emissions. At the same time, EPA has modified the definition of "pipeline breakout station" in §63.421 to more fully describe and distinguish breakout stations from bulk terminal facilities.

Comment: One commenter felt that the exemption for certain pressure vessels in §60.110b(d)(2) should be retained in the reference to NSPS subpart XX (IV-D-4, p. 2).

Response: Section 60.110b(d)(2) of NSPS subpart Kb exempts pressure vessels designed to not operate in excess of 204.9 kPa and without emissions to the atmosphere. The EPA agrees that storage vessels meeting these specifications should not be covered by this rulemaking, so this exemption is retained in the final rule.

Comment: One commenter felt that EPA should not specify vapor control technology (internal sealed floating roofs) for fixed-roof storage tanks, but should instead develop allowable vapor emission standards. This would recognize the use of vapor balancing through a common vapor collection pipe with the loading racks, a practice which may have some advantages over internal floating roofs. The commenter stated that the overall vapor control efficiencies of these two approaches are comparable (IV-D-9, p. 10; IV-F-1, p. 25).

Response: NSPS subpart Kb allows the use of a closed vent system and control device if the system meets the following specifications stated in section 60.112b(a)(3):

> "The closed vent system shall be designed to collect all VOC vapors and gases discharged from the storage vessel and operated with no detectable emissions indicated by an instrument reading of less than 500 ppm above background and visual inspections, as determined in part 60, subpart VV, section 60.485(b).
>
> The control device shall be designed and operated to reduce inlet VOC emissions by 95 percent or greater. If a flare is used as the control device, it shall meet the specifications described in the general control

device requirements (section 60.18) of the General Provisions."

For the purposes of this rulemaking, EPA proposed and is promulgating that a closed vent system and control device meeting the requirements in §112b(a)(3) are equivalent and an acceptable alternative control technology to reduce HAP emissions from storage vessels.

Comment: One commenter stated that OSHA's confined-space regulations make conducting annual primary and/or secondary seal gap measurements on internal floating roof tanks unnecessarily burdensome and unwarranted. The commenter suggested that visual inspections of seal condition be performed annually (or quarterly), and actual seal gap measurements be conducted every 5 years. More frequent inspections should be reserved only for tank seals greater than 10 years old (IV-D-18, p. 6).

Response: The EPA is requiring the same storage tank inspection requirements stated in NSPS subpart Kb (§60.113b). Subpart Kb does not require annual seal gap measurements for internal floating tanks as the commenter suggests. Instead, subpart Kb requires facilities to perform annual visual inspections of internal floating roof tanks equipped with a liquid-mounted or mechanical shoe-mounted primary seal and secondary seal (if one is in service) through manholes and roof hatches on the fixed roof. Owners or operators of external floating roof tanks must measure the gaps between the tank wall and primary seal at least once every 5 years. Similarly, tank owners or operators must measure the gaps between the tank wall and secondary seal at least once per year.

Comment: One commenter was concerned with the requirement in proposed §63.425(e) [referencing §60.113b(a)(2)] to repair storage tanks within 45 days following an inspection. This commenter believed that this time period is insufficient, and that repairs should be made on an annual basis, or at least "as soon as practicable" (IV-D-20, p. 11).

Response: As stated earlier, subpart Kb rim seal requirements are considered to be the floor for storage vessels. As proposed, EPA will continue to require owners and operators of storage vessels to comply with the testing and procedures requirements of §60.113b to ensure continuous compliance with the rule. It should be noted that §60.113b contains the provision that if a failure detected during an inspection cannot be repaired within 45 days and if the vessel cannot be emptied within 45 days, the owner or operator may request a 30-day extension from the Administrator in the inspection report required in §60.115b(a)(3). The request for an extension must document that alternate storage capacity is unavailable and specify a schedule of action which will ensure that the control equipment will be repaired or the vessel will be emptied as soon as possible.

9.0 EQUIPMENT LEAK STANDARDS

9.1 EMISSION FACTORS

Comment: Several commenters strongly objected to EPA's use of 1980 refinery data to estimate emissions from equipment (pumps, valves, etc.) at bulk terminals and pipeline breakout stations. These commenters were in support of using the new American Petroleum Institute (API) data gathered at several bulk terminals. These data indicate that leakage from bulk terminal equipment is very small and that the refinery emission factors overestimate these emissions greatly. The commenters pointed out that EPA's emission factors were extremely high and that this would lead to incorrect calculations of applicability status and baseline emissions (IV-D-4, p. 3; IV-D-7, p. 8; IV-D-11, p. 2; IV-D-12, p. 1; IV-D-13, p. 2; IV-D-14, p. 1; IV-D-16, p. 2; IV-D-18, p. 7; IV-D-19, p. 2; IV-D-22, p. 7; IV-D-26, p. 2; IV-D-30, p. 5; IV-D-31, p. 3; IV-D-34, p. 10; IV-D-35, p. 4; IV-F-1, p. 6, 12, 17).

Response: At proposal, EPA used the refinery equipment emission factors in publication AP-42 (II-A-17) to estimate emissions from equipment components at marketing terminals and pipeline breakout stations. The API supplied new data contained in Appendices A and C of their comments (IV-D-22) which indicated that corresponding emission factors for marketing terminals and breakout stations are over 99 percent lower. The EPA has reviewed the data submitted by API. In May 1994, EPA released a draft report presenting new correlation equations for marketing terminals using the API data. The Agency is still reviewing and analyzing the API data to determine new EPA emission factors. For the purposes of this analysis and completion of the final rule, API's suggested emission factors are being used because in the Agency's judgment these new factors better reflect emissions from this source category than the 1980 refinery data. The EPA intends to issue new EPA emission factors in the near future.

9.2 NEED FOR LDAR STANDARDS

Comment: Several commenters expressed disagreement with the proposal to require a leak detection and repair (LDAR) program at major source bulk terminals and pipeline breakout stations. Many believe that the baseline emissions resulting from fugitive leaks are much smaller than EPA has estimated. Consequently, the commenters considered EPA's estimated emission reductions due to an LDAR program to be greatly overstated. As a result, the LDAR program would provide an extremely small benefit (if any) and is "infinitely cost-ineffective." In lieu of an LDAR program, many commenters believe that a mandatory visual inspection program (similar to existing programs at many terminals) would be more appropriate. The API performed a leak rate survey at bulk terminals, including both terminals where an LDAR program was in effect and terminals that were not carrying out a formal LDAR program. The API's conclusion was that there was no statistically significant difference in the leak rates found at the two groups of terminals. The commenters concluded that LDAR programs are more appropriate for refineries, where equipment handles fluids at higher temperatures and pressures (IV-D-2, p. 9; IV-D-3, p. 1; IV-D-4, p. 2; IV-D-5, p. 2; IV-D-7, p. 9; IV-D-12, p. 1; IV-D-13, p. 2; IV-D-14, p. 1; IV-D-15, p. 1; IV-D-16, p. 1, 2; IV-D-17, p. 2; IV-D-18, p. 7; IV-D-19, p. 2; IV-D-20, p. 7; IV-D-22, p. 12; IV-D-26, p. 2; IV-D-30, p. 4; IV-D-31, p. 3; IV-D-34, p. 11; IV-D-35, p. 3; IV-F-1, p. 5, 16). One commenter expressed support for the imposition of an LDAR program at gasoline distribution facilities (IV-D-21, p. 2).

Response: Before proposal of this MACT regulation, EPA learned that few existing terminals and pipeline breakout stations (less than 1 percent) routinely use a portable organic vapor analyzer (OVA) to carry out leak detection and repair programs (LDAR) on their gasoline handling equipment. As a result, the "floor" for control of equipment leaks at existing terminals was found to be periodic visual inspections (no formal, federally enforceable inspection program). A monthly LDAR program using an OVA was determined to be in practice at a few terminals associated with refineries and therefore was determined to be the floor for equipment at new terminals and breakout stations. As stated earlier, EPA in the proposal analysis used the refinery emission factors in AP-42 to calculate baseline emissions from equipment leaks at existing facilities and analyzed instrument LDAR as an "above the floor" option. The EPA found LDAR to be cost effective; however, the Agency noted that there were industry concerns with the refinery factors and so did not select the higher emission reduction alternative (monthly instead of quarterly LDAR). As discussed in the previous section of this chapter, after reviewing equipment leak data submitted by API, EPA agrees that the equipment leak factors at marketing terminals are much lower than the refinery factors, resulting in much lower potential emission reductions due to an LDAR program. As a result of this determination, the cost effectiveness of a formal instrument LDAR program has been found to be much less favorable for gasoline marketing facilities.

The new gasoline distribution equipment leak data submitted by API showed only a slight difference (0.2 percent) between emission factors at facilities performing periodic LDAR (with an instrument) and facilities with a periodic visual program. Based on its review of these data, EPA agrees with API's assessment that this difference is statistically insignificant. Therefore, EPA is in agreement with the majority of commenters that periodic visual inspection and LDAR programs achieve essentially equal emission reductions for these facilities.

Industry submitted survey information that 81 percent of terminal facilities are implementing some type of periodic visual inspection program. The survey data did not show the frequency of visual inspections, but API has stated that current industry periodic visual programs range in frequency from daily to quarterly. The API suggested a quarterly program and provided language to make it enforceable and verifiable through recordkeeping. The suggested API program included: 1) a quarterly determination of leaks by visual, audible, and olfactory inspection of pumps and valves; 2) a log book listing all of the equipment in gasoline service; 3) note all non-inspected equipment; 4) if a leak is detected: (a) repair as soon as practical (considering safety), (b) if the leak cannot be repaired immediately, then the leak must be repaired or the equipment replaced within 15 calendar days, unless not practical for reasons stated in the log book, or (c) when possible, use of the leaking equipment is to be suspended; 4) annual checks of log book by facility supervisor; and 5) quarterly logs and records of annual checks retained for 5 years and accessible within 3 business days.

The NSPS for bulk terminals [40 CFR part 60, subpart XX, §60.502(j)] requires monthly inspection of loading racks as follows:

> "(j) Each calendar month, the vapor collection system, the vapor processing system, and each loading rack handling gasoline shall be inspected during loading of gasoline tank trucks for total organic compounds liquid or vapor leaks. For the 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."

The visual inspection program in the final rule is similar to these NSPS provisions; however, the provisions have been expanded based on suggestions of the commenters and certain requirements in existing Federal LDAR regulations. As in the NSPS, a monthly inspection using sight, sound, and smell is required. Each detection of a leak is to be recorded in a log book. Leaks must be repaired as soon as practicable, but with the first attempt at repair made no later than 5 calendar days after detection, and repair completed within 15 days after detection. Delay of repair is allowed upon demonstration to EPA that timely repair is not feasible. Full records of each inspection are required, including for each leak a record of the date of detection, nature of the leak and detection method, dates of repair attempts and methods used, and details of any delays of repairs.

The final rule contains a requirement for both new and existing facilities to perform a visual inspection of equipment on a monthly basis because it is achieved in practice on the same and similar equipment as required under the above 40 CFR part 60, subpart XX requirements [§60.502(j)] and at some facilities that are covered under monthly LDAR programs in response to 40 CFR part 60, subparts VV and GGG, and 40 CFR part 61, subparts J and V. As noted earlier, the emission reductions resulting from these visual inspection programs have not been established, so the emission benefits cannot be quantified other than to say that periodic inspections achieve low emission levels. The nationwide annual cost for monthly visual inspections under the final rule is estimated to be $43,000 per year.

9.3 OTHER

Comment: One commenter felt that, since the leak incidence rate at terminals in Southern California is less than 1 percent, only leaking components should be tagged and recorded. Complicated systems that require records on all components are not justified (IV-D-19, p. 5).

One commenter recommended that existing facilities be required to conduct LDAR monitoring at least as frequently as, or more frequently than, new facilities. Since leaks would be more likely from the older pumps and valves, monthly monitoring at existing facilities would be more beneficial (IV-D-41, p. 2).

One commenter asked whether a 1-month old pump at an existing facility would have to be monitored monthly or quarterly under the LDAR program (i.e., would the new or existing facility requirements apply?). This commenter felt that facilities should be allowed to offer alternative monitoring schedules in order to increase efficiency and save costs (IV-D-19, p. 4).

One commenter disagreed with the implementation date for LDAR of August 8, 1994 as indicated in the preamble to the proposed standards. The commenter felt that the appropriate date would be 180 days after promulgation of the final rule (IV-D-8, p. 4). Two other commenters felt that at least 1 year should be provided to set up an LDAR program (IV-D-18, p. 6; IV-D-36, p. 3).

One commenter felt that the frequency of monitoring at existing facilities should be reduced to once every 6 months for equipment that does not leak for 2 consecutive quarters (IV-D-29, p. 5).

Proposed §63.424 references §60.482-1 to 60.482-10 (NSPS subpart VV) as the basic requirements for an equipment leak control program. Two commenters felt that references to "heavy liquid service" in these NSPS provisions should be removed since this MACT standard deals only with gasoline. Also, since control devices are addressed in §63.422 of the proposed rule, reference to controls should be removed in §60.482-10 (IV-D-5, p. 2; IV-D-17, p. 2).

One commenter felt that it should be stated that the requirements of §60.482-1 to §60.482-10 of subpart VV are not applicable to equipment in vacuum service, as long as the equipment is identified. This commenter also pointed out that the provisions of §60.482-3 relate to compressors, so the rule should not reference this section (IV-D-36, p. 3).

Response: All of the comments in this section pertain to the proposed LDAR program. As discussed in Section 9.2, the LDAR requirement has been deleted from the rule and replaced with a monthly visual inspection program; therefore, response is not necessary.

9.4 REFERENCES

II-A-17 Compilation of Air Pollutant Emission Factors, Fourth Edition (AP-42). Section 9.1.3, Fugitive Emissions and Controls at Petroleum Refineries. U.S. Environmental Protection Agency, Research Triangle Park, NC. September 1985.

10.0 BASELINE/ENVIRONMENTAL IMPACT CALCULATIONS

10.1 GENERAL

Comment: One commenter identified several factors that may have led EPA to overestimate baseline emissions from loading racks and storage vessels. First, the commenter challenged EPA's data base indicating that 13 percent of gasoline storage tanks are uncontrolled fixed-roof tanks (with a consequently high emission factor). The commenter believes that there are fewer of this type of tank because of the product quality, safety, and financial issues that discourage the use of these tanks. Second, EPA did not use the most recent tank emission estimation methods (1992 AP-42, Chapter 12), which may have led to an overstatement of emissions. Third, the commenter expressed that EPA calculated loading rack baseline emissions using the regulatory limits in effect for control systems, whereas actual controlled emissions are lower than these limitations indicate. The commenter urged EPA to revise its baseline emissions estimates on the basis of corrected emission factors (IV-D-14, p. 8).

Response: The EPA has not located any new data or information indicating the percentage of uncontrolled fixed-roof tanks located at gasoline distribution facilities and therefore has no basis to change the assumption used in previous EPA studies that 13 percent of gasoline storage tanks are uncontrolled fixed-roof tanks. Also, the commenter did not provide any data that would allow EPA to make a better estimate.

The EPA has recalculated its baseline storage tank emissions using the TANKS software referenced in Chapter 12 of EPA's

Compilation of Air Pollutant Emission Factors, AP-42 (IV-A-2). The revised nationwide storage tank baseline emissions are 6,370 Mg of HAP per year at pipeline breakout stations and 4,930 Mg of HAP per year at bulk terminals. The assumptions and methodology used to calculate the nationwide storage tank emissions are discussed further in Appendix D.

Regarding the calculation of loading rack baseline emissions at proposal, EPA did calculate baseline emissions based on actual emissions, rather than regulatory limits. The EPA first estimated the percentage of existing gasoline throughput occurring in each of the regulated control level areas (see Table D-3 of BID, Volume I). As seen in Table 4-1 of BID, Volume I, the test data that EPA evaluated showed that many processors regulated in the 80, 35 and 10 mg/liter control level area perform much better than these standards. For example, some of the processors regulated to 80 mg/l performed much better than 80 mg/l, 35 mg/l, 10 mg/l, and in some cases better than 5 mg/l. Similarly, the data suggested that vapor processors regulated in 35 and 10 mg/l control level areas also performed better than these standards. As a result, to calculate the baseline emissions, a portion of the throughput in each regulatory control level area was redistributed into more stringent control level areas. Also, a portion of the throughput was allocated into a hypothetical 5 mg/l control level area to account for the systems operating below 10 mg/l (see Table D-20 of BID, Volume I).

10.2 GASOLINE RVP

Comment: One commenter felt that EPA has overestimated the Reid vapor pressure (RVP) of 1998 (base year) gasoline, leading to overestimation of baseline emissions from loading racks and storage vessels. The commenter stated that current gasoline pools average about 10.0 psia RVP, and are expected to have lower average values in 1998. Due to EPA's estimate of 11.4 psia as the national annual average RVP, the commenter concluded that EPA overestimated these emissions by approximately 20 percent (IV-D-14, p. 8).

Response: At proposal, EPA's Emission Standards Division (ESD) estimated that 68 percent of the gasoline throughput occurred in the summer and had an average RVP of 10.2 psia and that 32 percent of the gasoline throughput occurred in the winter and had an average RVP of 14.0 psia, resulting in a nationwide average RVP of 11.4 psia. Based on analyses generated by EPA's Office of Mobile Sources (OMS), EPA has lowered its estimate of the nationwide RVP of gasoline from 11.4 psia to 10.4 psia. A Federal Register notice dated February 16, 1994 indicated a 1990 gasoline summer RVP of 8.7 and a winter RVP of 11.5 (IV-I-4). According to OMS, 39.6 percent of the gasoline throughput occurs in the summer while 60.4 percent occurs in the winter (IV-E-4). Although the assumed percentages of summer and winter throughputs were different for the OMS and ESD data, for the purpose of the gasoline distribution MACT rulemaking, the proposed summer and winter RVP's of 10.2 and 14.0 psia, respectively, were lowered to 9.3 and 12.8 psia, resulting in a nationwide average RVP of 10.4 psia.

10.3 REFERENCES

IV-A-2 Compilation of Air Pollutant Emission Factors, Fourth Edition (AP-42). U.S. Environmental Protection Agency, Research Triangle Park, N.C. Chapter 12, Storage of Organic Liquids. October 1992.

IV-E-4 Telecon. Johnson, T., Pacific Environmental Services, Inc. with Korotney, D., EPA:OMS. May 17, 1994. Reid Vapor Pressure of Gasoline.

IV-I-4 40 CFR 80. Regulation of Fuel and Fuel Additives: Standards for Reformulated and Conventional Gasoline. 59 FR 7716-7878. February 16, 1994.

11.0 TEST METHODS AND PROCEDURES

11.1 ALTERNATIVE TEST METHODS

Comment: Two commenters felt that test methods adopted by local districts that have stricter emission standards should be included in the rule as equivalent methods. These commenters stated that EPA Methods 25A and 25B are not accurate enough to verify compliance with these strict limits (IV-D-28, p. 9; IV-D-38, p. 6).

Response: Both EPA Test Methods 25A and 25B have sufficient accuracy at the level of the emission standard in this regulation. Other methods may be acceptable as alternatives provided they meet the criteria in Method 301 of appendix A to 40 CFR part 63.

Comment: One commenter suggested that the wording of §63.425(d) be changed to read: " ... shall comply with the test methods and procedures in §60.485(b) through (g) of this chapter, or as approved by the local administrator" (the phrase following the comma was added by the commenter). These test methods pertain to the performance of an LDAR program for equipment leaks (IV-D-36, p. 4).

Response: As discussed previously in Section 9.2, the proposed requirement for sources to implement an instrument based LDAR program has been deleted from the regulation. Therefore, the provision offered by the commenter would not be applicable in the final rule.

11.2 TESTING OF CARGO TANKS

Comment: One commenter recommended that EPA adhere to DOT methods for the detection of defects in the cargo tanks of tank railcars. The commenter felt that it would be unreasonable to subject tank cars transporting gasoline to the same tank tightness testing criteria as cargo tank trucks, because of the construction and operational differences between the two types of vehicles. DOT's proposed rules, once promulgated, will provide adequate integrity testing of all tank cars, so the additional testing criteria under the gasoline MACT regulation are unnecessary (IV-D-15, p. 7).

Response: The EPA proposed that railcars annually pass the EPA Method 27 pressure and vacuum test before loading gasoline at existing and new major source facilities. Additionally, EPA proposed for new facilities the use of a loading rack vacuum assist system, in addition to the proposed annual pressure and vacuum test, to further control leakage from cargo tanks (tank trucks and railcars).

The commenter referred to a rule proposed by the Department of Transportation (DOT) which focuses on the use of non-destructive testing methods to identify potential failures of tank car shells, welds, and fittings. The purpose of this proposed rule, "Detection and Repair of Cracks, Pits, Corrosion, Lining Flaws, Thermal Detection Flaws and Other Defects of Tank Car Tanks" (58 FR 48485), is to increase the confidence that critical tank car defects (e.g., structural fatigue, crack propagation, and corrosion) will be detected and to enhance the safe transportation of hazardous material in tank cars. The rule proposes that tank cars used in hazardous materials service (other than chlorine) be inspected at 10-year intervals. Included in the railcar testing is a leakage pressure test [see proposed §180.509(j)(1)] which requires the following:

> "At minimum, each tank car facility shall perform a leakage pressure test on the tank fittings and appurtenances. The leakage pressure test must include

> product piping with all valves and accessories in place and operative, except that during the pressure test the tank car facility shall remove or render inoperative any vent devices set to discharge at less than the test pressure. Test pressure must be maintained for at least 5 minutes. Leakage test pressure must not be less than 50% of the tank test pressure."

According to the Federal Railroad Administration, the leakage pressure test may be either a hydrostatic or a pressurized air test performed at pressures as high as 300 psi. Although the leakage pressure test requires a high test pressure, it is performed only once every 10 years. The EPA considers a 10-year test frequency too long to ensure continuous vapor tightness of the railcar. In addition, the test allows certain pressure relief vents to be capped off or closed during testing. To ensure that railcars are vapor-tight during loading, EPA believes that all product piping, vapor piping, and pressure relief devices should remain operative during testing to ensure vapor tightness of all the equipment. As proposed, EPA is requiring that railcars annually pass the EPA Method 27 pressure and vacuum tests before loading gasoline at existing and new major source facilities, as well as be subject to additional testing as noted in Section 7.

12.0 REPORTING AND RECORDKEEPING

12.1 STORAGE OF RECORDS

Comment: A few commenters stated that the proposed recordkeeping requirements would be onerous and excessive. One stated that 5-year records of control system monitoring data would be voluminous and more than could be analyzed (IV-D-20, p. 14), while another found no justification for the requirement to retain tank tightness testing records for 5 years (IV-D-23, p. 4). One commenter felt that monitoring records should be retained for no more than 2 years (IV-D-36, p. 4). Another commenter believed that it should suffice to preserve actual emissions data for the previous 12 months and to keep exception and repair reports for 5 years (IV-D-18, p. 9).

Response: In the final rule, every effort has been made to reduce the recordkeeping and reporting burden associated with the rule. The EPA has examined all of the proposed requirements and has streamlined the rule to include only those necessary to ensure compliance.

As discussed in the preamble to the final General Provisions to part 63 (59 FR 12408, March 16, 1994), EPA believes that the 5-year records retention requirement is reasonable and needed for consistency with the part 70 operating permit program and the 5-year statute of limitations, on which the permit program based its requirement. This retention period will also allow EPA to establish a source's history and patterns of compliance for the purpose of determining appropriate levels of enforcement action.

Comment: One commenter felt that the recordkeeping and reporting requirements associated with tank truck vapor tightness should be the responsibility of the vehicle owner, and not of the terminal owner who does not own every truck that loads at the terminal (IV-D-7, p. 11). Another commenter stated that the terminal should be required to hold only the current certificate indicating compliance with the tightness requirements, and that the owner of operator of the tank truck should maintain records for previous years (IV-D-20, p. 15).

Response: The owner or operator of an affected major source bulk terminal is responsible for ensuring that tank trucks and railcars loading gasoline and potentially emitting HAP's are certified as vapor-tight through an annual pressure-vacuum test. This includes both "branded" trucks and those operated by "for-hire" tank truck firms, as well as any railcars that may load gasoline at the facility. To carry out this responsibility, records of all gasoline cargo tanks loading at the facility together with the test records for those tanks need to be collected at a central location, logically the affected facility. For their part, cargo tank owners (whether terminal owners or outside firms) who wish to load specific tanks at affected terminals have the responsibility of equipping those tanks with compatible vapor collection and loading hardware, having the annual test performed, and supplying the test results for each tank to the facility. (Cargo tanks are also subject to being tested for vapor tightness at any time under a continuous performance requirement; see Section 7.2.) The terminal owner then need only cross-check to ensure that there is up-to-date vapor tightness documentation for each tank loaded, within 2 weeks after the loading occurs. Finally, the terminal owner must notify the cargo tank owner within 3 weeks of any loading that was made into a noncertified tank, and then take steps to ensure that any such tanks are not reloaded until the test requirement has been met and the documentation provided.

This is the same approach that has been in use under 40 CFR part 60, subpart XX, the NSPS for tank trucks at new bulk terminals since 1983. The EPA believes that these requirements are reasonable and necessary to reduce a potentially large emission source at bulk terminals. Further, it is reasonable for the owner/operator of the affected source to bear the responsibility for ensuring that loadings at the source are performed using cargo tanks subject to the maximum control level.

Comment: Several commenters objected to the requirement to store all records at the facility site, especially at unmanned facilities. These commenters pointed out that space at these facilities is often at a premium, and requested that some alternate place of business in the same geographic area be allowed to store the records and make them available within a reasonable time period upon request (IV-D-18, p. 9; IV-D-20, p. 14; IV-D-22, p. 82; IV-D-34, p. 26).

Response: The concern of these commenters is addressed by §63.10(b)(1) of the General Provisions, which apply to these MACT standards. At a minimum, the most recent 2 years of data must be retained on site; i.e., at the bulk terminal or pipeline breakout station. The remaining 3 years of data may be retained off site. Such files may be maintained on microfilm, on a computer (hard disk), on computer floppy disks, on magnetic tape, or on microfiche. However, they must be "recorded in a form suitable and readily available for expeditious inspection and review."

12.2 REPORTING REQUIREMENTS

Comment: Several commenters felt that 45 days is much too short a time period for facilities to provide initial notification of applicability for existing facilities or of construction for new facilities [per §63.9(b) of the General Provisions]. They suggested a period of 1 year to make this notification, or at least the 120 days provided in the final General Provisions. One commenter said this extension is necessary because: (1) revisions to RFG and oxygenated fuel mandates are still underway and may change HAP emission calculations over the next 2 years, especially if States opt into oxygenated fuel requirements; (2) EPA may still be reviewing the revised emission factors for fugitive equipment leaks for these sources and, unless completed by the final rule as requested, additional time will be necessary for EPA to complete that review and to allow States to adopt those factors as revised, and to allow facilities to utilize those factors for major source determination; and (3) the emissions audits that will be necessary for many sources could require several months to contract and conduct, once the gasoline makeup and emission factor issues are fully resolved (IV-D-4, p. 3; IV-D-7, p. 10; IV-D-15, p. 10; IV-D-18, p. 5; IV-D-22, p. 83). Two of these commenters also recommended that this initial notification not be irreversible and subject to substantial additional documentation, and that the notifier not be subject to EPA enforcement action for reversing their notification (IV-D-18, p. 5; IV-D-22, p. 84).

Response: The preamble to the proposed MACT standards stated that, as outlined in §63.5 of the proposed General Provisions, existing sources would have to submit their required initial notifications within 45 days after promulgation of the final rule. Subsequent to the preparation of the MACT proposal, and after EPA had considered public comments on the proposed General Provisions, the final General Provisions allowing a 120-day period for submitting the initial notifications were published. In addition, EPA has considered the comments and concerns of commenters on the MACT proposal, and agrees that there are factors that would make it difficult for many facilities to submit this notification report even within 120 days. The principal issue (in addition to points made by the commenters) concerns the collocation of marketing facilities with refineries, which may necessitate more time for facilities to assess the combined effects of the refinery and gasoline distribution MACT rules. Therefore, EPA is allowing up to 1 year for existing facilities to submit the initial notification, although many facilities will likely be able to make the submittal within 120 days.

Since this extra time has been granted, the Agency feels that the facility should be confident of the accuracy of the information it has provided. Therefore, this notification will be considered a source's final decision.

<u>Comment</u>: Two commenters believed that the required amount of recordkeeping represents an excessive burden, and that all reporting requirements in the rule should be consolidated into a single annual report (IV-D-18, p. 9; IV-D-36, p. 5). The second commenter stated that a quarterly report could be submitted for periods of noncompliance.

<u>Response</u>: The proposed rule in §63.428(j) provided that most of the required reports be consolidated into a periodic report that must be submitted semiannually, except that exceedances of the monitored operating parameter and failures to maintain a vacuum in the vapor collection system during loading were to be reported quarterly. The Administrator in proposed §63.428(k) retained the authority to request more frequent reporting of monitored operating parameter data if the source was found to be frequently out of compliance or if the monitoring system was out of service excessively. This latter provision has been determined to be unnecessary because the part 63 General Provisions already address more frequent reporting, as discussed below.

These semiannual reporting requirements are consistent with the part 70 operating permit program as well as the General Provisions, §63.10(e)(3); furthermore, EPA believes that these reporting requirements are reasonable for gasoline distribution facilities. Therefore, the requirement for a semiannual report has been retained in the final rule.

All reporting is to be performed in accordance with §63.10(e)(3)(i). As indicated under §63.10(e)(3)(i)(C), once a source reports excess emissions, the source must follow a quarterly reporting format until a request to reduce reporting frequency is approved. Thus, the final rule follows the General Provisions with regard to the frequency of reporting.

12.3 OTHER

Comment: One commenter stated that the requirements of §63.428(c)(3) should be clarified to note their applicability only to those flares that must comply with §63.11 of the General Provisions. The commenter felt that the language suggests that data must be recorded and reported for all flares (including enclosed flares) in accordance with the requirements of §63.11 (IV-D-38, p. 3).

Response: The EPA agrees that the requirements of proposed §63.428(c)(3) were intended to apply only to flares that cannot be tested directly to determine their compliance with the emission limit (as referred to under proposed §63.425(a)). The language of §63.428(c)(3) [now §63.428(c)(2)(ii)] has been revised in the final rule to reflect this intent.

13.0 COSTS/ECONOMIC IMPACTS

13.1 STORAGE VESSEL CONTROL COSTS

Comment: Two commenters said that EPA's estimates of the costs to comply with the proposed storage vessel requirements are too low. One commenter estimated that it would cost $33,500 to install an internal floating roof in a 50-foot diameter tank, rather than EPA's estimate of $20,000 (IV-D-5, p. 4). Another commenter estimated that it would cost approximately $50,000 (including the cost of cleaning, degassing, and sludge disposal) to install a secondary seal on an existing external floating roof tank, rather than EPA's estimate of $31,000 (IV-D-17, p. 3). This commenter also provided a cost for degassing a tank at $20,000-30,000 when the capital cost of additional tankage is required (IV-D-17, p. 5).

Response: Storage vessel equipment costs can vary significantly depending on the storage vessel contractor and other site-specific factors. Retrofit costs for installing secondary seals and gasketed fittings were provided to EPA by industry (IV-D-44). These costs were collected from three manufacturers and varied by as much as 100 to 1,300 percent.

To estimate storage tank equipment costs, EPA used the document "Alternative Control Techniques (ACT) Document: Volatile Organic Liquid Storage in Floating and Fixed Roof Tanks" (IV-A-3). The average costs presented in the ACT document were obtained from four contractors. The EPA believes that these costs are reasonable estimates and has used them in the final cost analysis.

The EPA revised its degassing and cleaning costs assumed at proposal using the estimates provided in the ACT document. Assuming a sludge depth of 2 inches, a sludge disposal cost of $5/gal, and a cleaning cost of approximately $150/foot-diameter, the new revised degassing and cleaning costs for a 50 ft., 78 ft., and 100 ft. tank are $19,730, $41,470, and $63,930, respectively. The degassing and cleaning costs are discussed further in Appendix B.

Comment: Several commenters claimed that EPA's cost analysis does not include an assessment of the costs associated with the fitting controls required under 40 CFR 60, subpart Kb and incorporated by reference into the proposed rule (IV-D-7, p. 7; IV-D-8, p. 4; IV-D-15, p. 9; IV-D-16, p. 2; IV-D-22, p. 30; IV-D-31, p. 3; IV-F-1, p. 9). Another commenter estimated the cost effectiveness of roof fitting control requirements at well over $40,000 per Mg of HAP's reduced, which does not consider the costs associated with tank degassing (IV-D-17, p. 5).

Response: In BID, Volume I, EPA stated that the cost for installing controlled fittings on a new internal floating roof tank was $200 (page 7-3) and the cost for installing controlled fittings on an existing external floating roof tank was $680 (page 7-4). These costs were obtained from docket item II-A-24 and were restated in EPA's ACT document. Industry provided information collected from three manufacturers regarding the cost of installing gasketed fittings (IV-D-44). For the purposes of this rulemaking, EPA used the lowest of the three cost estimates provided by industry to determine the cost effectiveness of fitting controls because the range of the costs was so large (100 to 1,300 percent). The estimated cost to install controlled fittings (excluding degassing/cleaning cost) is $1,225 for a 50 ft. tank, $2,175 for a 78 ft. tank, and $2,800 for a 100 ft.

tank. Based on these costs, a net savings will be realized for external floating roof tanks that have controlled fittings installed while they are being retrofitted with the required deck rim seals. Controlled fitting costs are discussed in detail in Appendix B.

13.2 OTHER

Comment: One commenter stated that EPA's estimates of nationwide annual gasoline savings resulting from the proposed standards (about 14.3 million gallons saved) would be accurate only if incineration were banned as a control technology. The commenter suggested that energy impacts be analyzed and presented on a control technology basis. This will indicate that recovery units save approximately 1.5 gallons/1,000 gallons loaded, while incineration systems have negative savings (IV-D-28, p. 10).

Response: The EPA's calculations of net energy savings due to various control alternatives were summarized in Table 6-6 of BID, Volume I. As stated in footnote "b" of Table 6-6, the assumption was that 25 percent of the control systems would be recovery type devices, while the remainder would be destruction (incineration) type devices. Therefore, for bulk terminals only 25 percent of the 12,400 Mg/yr emission reduction at loading racks was used to derive the 1.2 million gallons per year savings. The remaining 10.8 million gallons/yr saved at terminals is due to controls on storage tanks, tank truck vapor leakage, and equipment component leaks. If all control systems were assumed to recover product, the loading rack gasoline savings would have been calculated as 4.9 million gallons per year.

In reanalyzing baseline emissions and regulatory impacts, as well as the likely population of control technologies selected to comply with the standards, EPA has calculated new energy impacts for the final regulation. These results are summarized in Section 1.2.5.

Comment: Three commenters said that EPA has overestimated the price of recovered product in the calculation of recovery credits by using the average retail price of gasoline (which includes taxes). In fact, the tax portion of the gasoline price cannot be realized by a terminal owner. Two of the commenters estimated the value of recovered product to be $0.50 to $0.60 per gallon in 1990 dollars, plus any real dollar increase in price up to the 1998 baseline (IV-D-2, p. 7; IV-D-5, p. 4; IV-D-17, p. 7).

Response: At proposal, EPA did overestimate the price of recovered product because it included the value of taxes in the price of gasoline. The price of gasoline currently used to estimate recovery credits is the wholesale price at the point in the distribution chain where the recovery occurs. The base year for costing this standard is 1990. The EPA is using estimated 1990 wholesale prices of $0.79 per gallon at bulk terminals and $0.77 per gallon at pipeline breakout stations in its reestimation of recovery credits. These values were derived by first estimating the price of gasoline at service stations and subtracting an average State gas tax of $0.178 per gallon and an average Federal tax of $0.14 per gallon (IV-J-1). The wholesale price of gasoline at bulk terminals and breakout stations was estimated using the pricing margins stated in Table 8-20 of BID, Volume I. The Agency anticipates that the real price of motor vehicle gasoline will increase from base year levels to 1998 impact year levels. Therefore, the value of recovered product will be worth more in real terms in 1998 than it is worth today. In order to be conservative, the 1990 wholesale prices above do not reflect this real increase in value.

Comment: One commenter said that EPA should consider the competitive effect that the proposed regulation will have on the independent sector of the petroleum market. Independent marketers are generally smaller than the major integrated oil companies. The cost of environmental compliance will have a greater impact on the financial viability of the independent marketer than of the major oil companies (IV-D-20, p. 16).

Response: The EPA did not separately address the potential impact of the proposed rules on independent distributors because the Agency did not collect or receive financial information on any of the affected companies. Company size and diversification, considered alone, do not affect a company's relative performance. The Agency believes that the cost of the controls in this NESHAP can be passed on to the end users without significant increases in prices or significant changes in end-user demand. The Agency does not possess information necessary to conclude that the financial viability of the independent companies is more or less threatened by the proposed rule than major integrated companies, or that independent companies will be unable to obtain the required capital funding to comply with the rule.

Comment: One commenter suggested that EPA conduct more definitive research pertaining to the number of tank trucks potentially impacted by the standards, and reevaluate the associated economic impacts. They stated that it is unclear in the proposal how many tank trucks are estimated to be impacted by the regulation. The commenter believes that retrofitting a four-compartment tank truck to meet the mandated "closed loop" vapor recovery will cost approximately $3,200 per unit (not including downtime). As a result, the compliance cost for the tank truck industry would be in excess of $32 million assuming 10,000 retrofits (IV-D-23, p. 3).

Response: At proposal, EPA estimated that approximately 2,500 tank trucks (including terminal owned and independent tank trucks) would need to be retrofitted to comply with the standard at a cost of $3,500 per truck (see page 7-26 of BID, Volume I) resulting in a nationwide cost of approximately $8.8 million.

The estimation of the number of trucks impacted by the regulation was determined as follows:

1) The EPA estimated that 81,300 tank trucks (including new and existing tank trucks) will be used in 1998 to distribute motor vehicle (non-aviation) gasoline. Fifty-four percent of these trucks, or 43,900 trucks, are estimated to be used in 1998 at bulk gasoline terminals. Of these trucks, 7,200 are estimated to be owned by bulk terminal facilities and 36,700 are estimated to be independent (see BID, Volume I Table 5-6).

2) The Agency assumes that 72.1 percent of the 1998 tank truck population comprises existing tank trucks. The Agency further assumes that only 29 percent of all existing terminal-dedicated tank trucks loading at bulk terminals (B.T.'s) will require retrofit because most tank trucks are regulated by bulk terminal NSPS and tank truck CTG requirements. Finally, EPA is estimating that approximately 27 percent of all bulk terminals will be classified as major sources. Using the assumptions stated above, the number of tank trucks that will be impacted by this regulation is estimated as follows:

43,900 tank trucks x 72.1 % = 31,680 existing tank trucks.

31,680 T.T.'s x 29 % need to retrofit x 27 % are at major B.T.

= 2,500 tank trucks to be retrofitted.

Based on some changes in the analysis (e.g., assumption of a lower RVP), EPA has estimated that only 24 percent of the bulk terminals will be classified as major sources resulting in approximately 2,200 tank trucks being impacted by this regulation. As a result, the revised nationwide cost impact to the tank truck industry is estimated at $7.6 million.

The Agency's economic impact assessment, which uses a worst-case assumption, indicates that up to 51 fewer jobs would be required to satisfy post-regulatory demand for tank truck services. This reduction is equivalent to 5 small for-hire trucking firms, which employ 10 workers each.

Comment: One commenter suggested that EPA conduct the cost analysis on both a per-facility and a per-control technology basis. Based on EPA's estimated capital cost of $93 million and that approximately 245 facilities will be impacted, the average capital cost to comply with the 10 mg/liter standard is $380,000 per facility (excluding the additional cost of vacuum assist). The commenter stated that the cheapest approach (a direct-mode incinerator) would cost $430,000 for an 800,000 gallon-per-day facility, which does not include the cost of vacuum assist equipment (IV-D-28, p. 10). The commenter suggested that EPA survey the States that have had equipment installed in the last 5 years to obtain accurate cost information.

Response: The EPA did base its costs on both a per-facility and a per-control technology basis. Section 7.1.3 of BID, Volume I, discusses the loading rack conversion costs for the model plant bulk terminals to meet the 10 mg/liter standard using either carbon adsorption, refrigeration condenser, or thermal oxidation units to process the vapors. The model plant costs were based on various vendor quotes and represent 1990 dollars.

The commenter incorrectly calculated the average capital cost of $380,000 per facility to comply with the 10 mg/liter standard by including the number of breakout stations in the calculation. The EPA currently estimates that 176 existing terminals and 67 new terminals will be impacted by this regulation at a nationwide capital cost of $55.2 million and $7.7 million, respectively. Therefore, the average capital cost per facility is approximately $314,000 for existing facilities and approximately $115,000 for new facilities. These costs do not represent the average cost of a new vapor processing unit but the average cost to retrofit a unit to meet the 10 mg/liter standard. For example, new facilities would already be subject to 40 CFR part 60, subpart XX which requires loading racks at bulk terminals to be controlled to 35 mg/liter. For the purposes of calculating the cost impacts of this MACT regulation, EPA assumes the additional cost to retrofit the vapor processing unit to meet 10 mg/liter. Likewise, EPA assumed that most of the existing units could be retrofitted to meet the 10 mg/liter standard and would not require a new control device. The costs for retrofitting the control device to meet the 10 mg/liter standard were obtained from various vendors and have been peer reviewed. The EPA does not agree that further changes to the costing data are required.

13.3 REFERENCES

II-A-24 Control of Volatile Organic Compound Emissions from Volatile Organic Liquid Storage in Floating and Fixed Roof Tanks - Guideline Series. Draft. U.S. Environmental Protection Agency, Research Triangle Park, NC. September 1991.

IV-A-3 Alternative Control Techniques Document: Volatile Organic Liquid Storage in Floating and Fixed-Roof Tanks. U.S. Environmental Protection Agency, Research Triangle Park, NC. EPA 453/R-94-001. January 1994.

IV-D-44 Letter from Ferry, R., TGB Partnership, to Shedd, S., Chemicals and Petroleum Branch, U.S. Environmental Protection Agency, Research Triangle Park, NC. June 3, 1994. Cost basis for IFRT fitting controls.

IV-J-1 National Petroleum News. 1991 Fact Book Issue. Volume 83, No. 7.

APPENDIX A.
CARGO TANK VAPOR LEAKAGE

The purpose of this appendix is to explain the methodology used to estimate the average amount of vapor that leaks from loading cargo tanks subject to an annual vapor tightness test allowing either a 1-inch of water pressure decay (in 5 minutes) as required in California or a 3-inch pressure decay as discussed in the control techniques guideline (CTG) for tank trucks (II-A-9) and required under the bulk terminal NSPS, 40 CFR part 60, subpart XX. This appendix also discusses the cost of annually testing a cargo tank at the 1-inch pressure decay limit versus the 3-inch limit.

A.1 VAPOR LEAKAGE FROM CARGO TANKS

A.1.1 California Decay Limit of 1-inch H_20

In order to calculate the cargo tank leakage factor for a cargo tank just passing the 1-inch pressure decay limit required by California, it was estimated that the allowable leakage from cargo tanks passing the pressure decay test (change of less than 1 inch of water from an initial pressure of 18 inches, over 5 minutes) is approximately 0.3 percent. This value was derived from the following equation located in the tank truck CTG:

$$V_L = (0.5V)(T/t_p)(1 - P_f/P_i),$$

where V_L = allowable volume of leakage (liters)

V = capacity volume of tank (liters)

T = total time for loading (minutes)

t_p = time limit for pressure test (minutes)

P_f = final pressure for test (inches H_2O absolute)

P_i = initial pressure for test (inches H_2O absolute).

Using the bulk terminal model plant parameters shown in Chapter 5 of BID, Volume I (III-B-1),

V = 32,200 liters, T = 32,200 liters/2,270 lpm = 14 minutes.

Therefore, V_L = (0.5)(32,200)(14/5)(1 - 424/425)

= 106 liters.

The percentage leakage with a 1-inch pressure decay is then 106/32,200 = 0.0033 = 0.33 percent. Using the same methodology, a 3-inch pressure decay results in vapor leakage of 1 percent (see Section A.1.2).

Second, EPA analyzed the cargo tank failure rates from data submitted by four commenters (IV-D-14, IV-D-22, IV-D-28, IV-D-38). One of the data sets (IV-D-14) summarized failure rates for tank trucks surveyed by the Bay Area Air Quality Management District (BAAQMD) (5 percent failure rate) and the John F. Jordan Company (2.5 percent failure rate). The BAAQMD data (1986-1992) were identified as representing tank trucks that failed the annual tightness tests based on not sustaining adequate pressure (exceeded the 1-inch allowable pressure decay). The data collected by the John F. Jordan Company were listed by State and did not identify any California tank trucks. As a result, these data represented tank trucks failing the CTG and 40 CFR part 60, subpart XX requirements (3-inch pressure decay). Two of the commenters (IV-D-28, IV-D-38) supplied leakage data from only the BAAQMD, which were identical to the data discussed above. One commenter (IV-D-22) supplied over 10 years of data from the BAAQMD (which were identical to the BAAQMD data supplied in IV-D-14), four oil companies, and the Jordan Company (which was approximately the same information supplied by IV-D-14). From these data, it was determined that the data collected from both the oil companies and John F. Jordan Company represented tank trucks failing the CTG and 40 CFR part 60, subpart XX requirements (3-inch pressure decay). Consequently, from all the leakage data received, EPA determined that only the BAAQMD data represent cargo tanks failing a 1-inch pressure decay limit. The EPA elected to use the most current data (for the years 1988 through 1992) because it would be more representative of current conditions. The BAAQMD data are summarized in Table A-1.

TABLE A-1. 1988 TO 1992 BAAQMD TANK TRUCK LEAKAGE DATA
(Source: IV-D-14, IV-D-22, IV-D-28, IV-D-38)

Year	#TT Tested	#Leakers	% Failed
1988	772	43	5.6
1989	1,003	45	4.5
1990	785	29	3.7
1991	606	14	2.3
1992	442	5	1.1
TOTALS	3,608	136	Avg. = 3.8 %

As seen in Table A-1, a total of 3,608 tank trucks were tested, with 136 failing the initial test (before repairs). Thus, the failure rate was 136/3,608 = 3.8 percent for this sample of tanks. The percentage passing the test was 100 - 3.8 = 96.2 percent.

To estimate the leakage occurring from cargo tanks that do not pass the annual vapor tightness testing on the first attempt, EPA relied on information in the EPA document "Bulk Gasoline Terminals--Background Information for Proposed Standards" (II-A-14). In Table C-4 of that document, tank truck leakage data were separated into two groups, those tanks that would pass and those tanks that would fail the current certification standards. The data from Table C-4 showed that 16 of the trucks tested leaked over a range of 1.9 to 35.8 percent, with an overall average of 12.1 percent. For the purposes of this analysis, it was assumed that trucks failing either annual certification test (1-inch pressure decay or 3-inch pressure decay) would leak 12.1 percent.

The average leakage and failure rate data were combined to determine the average leakage from all tank trucks subject to the annual test. The average leakage from all tank trucks is calculated as follows:

$$(0.038)(0.121) + (0.962)(0.0033) = 0.0078 = 0.8 \text{ percent.}$$

The leakage emission factor for cargo tanks subject to the 1-inch decay limit is (0.8 percent)(1,014 mg/liter) = 8 mg/liter.

A.1.2 Tank Truck CTG Decay Limit of 3 inches H_20

Using the same methodology discussed above, V_L = 318 liters when assuming a 3-inch pressure decay. The percentage vapor leakage with a 3-inch pressure decay is 318/32,200 = 0.0099 = 1 percent. As discussed above, EPA determined that the test failure rate data collected from the four oil companies and the John F. Jordan Company represented tank trucks subject to an annual vapor tightness test with a 3-inch vapor decay limit. Although the commenters supplied over 10 years worth of data, EPA elected to use the more current data for the years 1989 through 1994 since it would be more representative of current conditions. The data supplied by the four oil companies and the John F. Jordan Company for the years 1989 through 1984 are summarized in Table A-2.

TABLE A-2. 1989 TO 1994 TANK TRUCK LEAKAGE DATA
(DATA FROM 4 OIL COMPANIES AND JORDAN CO.)

Year	#TT Tested	#Leakers	% Failed
1989	212	24	11.3
1990	395	16	4.1

1991	388	6	1.5
1992	392	10	2.5
1993	3,386	91	2.7
1994	75	1	1.3
TOTALS	4,848	148	Avg. = 3.1 %

As seen in Table A-2, a total of 4,848 tank trucks were tested, with 148 failing the initial test (before repairs). Thus, the failure rate was 148/4,848 = 3.1 percent for this sample of tanks, which is a slightly lower failure rate than for the California trucks which are required to pass at the 1-inch criterion (3.8 percent). The percentage passing the test was 100 - 3.1 = 96.9 percent.

Using the same methodology as discussed above, the average leakage from cargo tanks required to pass a 3-inch annual vapor tightness test is 1.3 percent, which results in a leakage emission factor of 13 mg/liter.

A.2 COST OF 1-INCH PRESSURE DECAY TEST

As discussed in Section 7.1.3 of BID, Volume I, the cost of the EPA Method 27 pressure/vacuum test was estimated at approximately $350 per cargo tank. The cost impact of the proposed regulation, which required a 3-inch pressure test, was only $150 per cargo tank because all trucks were already required to pass an annual DOT pressure test estimated to cost $200 per cargo tank.

The final rule requires annual pressure and vacuum tests at the 1-inch decay limit. To estimate the cost of the 1-inch test, EPA used data supplied by one of the commenters (IV-D-38). The commenter estimated that the cost to perform the 1-inch pressure test ranged from $300 to $1,200 per cargo tank, depending on the amount of repair required to pass the test. Assuming that the trucks which <u>pass</u> the annual test incur the cost of $300 and the trucks which <u>fail</u> the annual test incur the cost of $1,200, the average cost for a tank truck to pass the annual test is calculated as:

(0.038)($1,200) + (0.962)($300) = $334 per cargo tank.

Comparing the proposal cost estimate for the annual vapor tightness test of $350 to the estimated cost of $334 for the 1-inch test from a second source, EPA cannot discern a cost difference in certifying tanks to the 1-inch limit versus the 3-inch limit. As a result, the $150/tank cost impact of tank truck testing at the 3-inch pressure decay limit is assumed to be a reasonable estimate for the 1-inch pressure decay test.

A.3 REFERENCES

II-A-9 Control of Volatile Organic Compound Leaks from Gasoline Tank Trucks and Vapor Collection Systems. U.S. Environmental Protection Agency, Research Triangle Park, NC. EPA-450/2-78-051. December 1978.

II-A-14 Bulk Gasoline Terminals--Background Information for Proposed Standards. U.S. Environmental Protection Agency, Research Triangle Park, NC. EPA-450/3-80-038a. December 1980.

III-B-1 Gasoline Distribution Industry (Stage I) - Background Information for Proposed Standards (NESHAP). EPA-453/R-94-002a. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. Research Triangle Park, NC. January 1994.

APPENDIX B.

ENVIRONMENTAL AND COST IMPACTS OF STORAGE VESSEL CONTROLS

The purpose of this appendix is to present the environmental and economic impacts of imposing 40 CFR part 60, subpart Kb (NSPS subpart Kb) rim seal and controlled (or gasketed) fitting requirements for storage vessels. Section B.1 discusses the methodology used to calculate emissions generated from the cleaning and degassing of gasoline storage vessels. Section B.2 discusses the balancing of degassing and cleaning emissions versus the emission reductions achieved by installing rim seals and controlled deck fittings on various types and sizes of storage vessels. Section B.3 discusses the cost of cleaning and degassing storage vessels as well as the costs for adding the controls specified under NSPS subpart Kb.

B.1 DEGASSING AND CLEANING EMISSIONS FACTOR DEVELOPMENT

For the purposes of this rulemaking, EPA has estimated that tank degassing and cleaning emissions are generated from both the release of gasoline vapors that exist beneath the floating roof prior to cleaning (degassing emissions) and the expulsion of vapors from beneath the roof during the initial refilling after cleaning (refilling emissions). Degassing and refilling emissions are assumed to be equivalent because the volume of vapors beneath the roof during degassing and refilling are equal. These emissions were estimated by calculating the working losses from a hypothetical fixed-roof tank (FRT) assuming a height of 6 feet and 1 turnover (the typical leg heights for floating roofs are 6 feet). These working losses, L_w, were calculated using equation 1-23 in Chapter 12 of AP-42 (IV-A-2) shown below.

$$L_w = 0.0010\ M_v\ P_{va}\ Q\ K_n\ K_p$$

where,

M_v = vapor molecular weight (65.8 lb/lb-mole)

P_{va} = vapor pressure at daily liquid surface temperature (5.6 psia)

Q = annual net throughput, bbl/yr (assuming 1 turnover and 6' roof height)

K_n = turnover factor, dimensionless (1)

K_p = working loss product factor, dimensionless (1).

Degassing and cleaning emissions are shown for various size storage vessels in Table B-1. Clingage emissions (vapors evaporating from the exposed tank wall) were also calculated but were found to be insignificant from only one turnover. Also, due to lack of data, emissions were not estimated from the handling and disposal of the sludge removed from the tank bottom.

The EPA considered the approach of one commenter (IV-D-22) who used the factor of 1 Mg of VOC generated from cleaning a 200,000 gallon tank, generating 2,000 gallons of sludge. The EPA could not establish the support for this emission factor. For the purposes of this analysis, therefore, EPA estimated degassing and cleaning emissions for various size tanks using the method described above.

TABLE B-1. STORAGE VESSEL DEGASSING AND REFILLING EMISSIONS

Tank Diameter (ft.)	30	100	150	180	240
Degassing Emissions	0.35 Mg	1.40 Mg	3.15 Mg	4.55 Mg	8.1 Mg

Refilling Emissions	0.35 Mg	1.40 Mg	3.15 Mg	4.55 Mg	8.1 Mg
Total Emissions	0.70 Mg	2.8 Mg	6.3 Mg	9.1 Mg	16.2 Mg

B.2 BALANCE OF EMISSIONS AND EMISSION REDUCTIONS

The "TANKS" program cited in Chapter 12 of EPA's AP-42 document (IV-A-2) was used to calculate evaporative emissions from gasoline storage vessels. The following methodology was then used to determine if degassing and cleaning emissions exceed the emission reductions achieved by adding NSPS subpart Kb rim seals and controlled fittings within the statutory requirement of 3 years as suggested by commenters.

First, the annual evaporative emissions were calculated for storage vessels meeting 40 CFR part 60, subpart K or Ka requirements [e.g., internal floating roof tanks (IFRT's) with only a vapor-mounted primary seal or external floating roof tanks (EFRT's) with only a primary seal]. Second, annual evaporative emissions were calculated for the same size storage vessels meeting the NSPS subpart Kb rim seal or the full NSPS subpart Kb (rim seal and controlled fitting) requirements. Third, emission reductions resulting from the installation of NSPS subpart Kb rim seals or NSPS subpart Kb rim seals and controlled fittings were calculated by taking the difference between the annual NSPS subpart Kb losses and the annual NSPS subpart K or Ka losses. Fourth, the degassing and cleaning emissions, which were calculated using the methodology described in Section B.1, were divided by the annual emission reductions to determine the number of years in which the emission reductions achieved by adding the controls are equivalent to the degassing and cleaning emissions ("years to balance").

Shown in Tables B-2 through B-9 are the "years to balance" for various types of storage vessels currently meeting the NSPS subpart K or Ka level of control when retrofitted to meet either the NSPS subpart Kb rim seal or the full NSPS subpart Kb control level.

Tables B-2 through B-4 show the "years to balance" for storage vessels currently meeting NSPS subpart K or Ka requirements when retrofitted to meet the NSPS subpart Kb rim seal requirements. In general, the larger the diameter of the storage vessel, the longer it takes for the emission reductions

TABLE B-2. EMISSIONS BALANCING--INSTALL SECONDARY SEAL (SUBPART Kb RIM SEALS) ON AN IFRT WITH A VAPOR-MOUNTED PRIMARY SEAL

Tank Diameter (Capacity)	Annual Emissions at Ka level of control (Mg/yr)	Annual Emissions at Kb Rim Seals (Mg/yr)	Annual Emission Reduction (Mg/yr)	Degassing and Cleaning Emissions (Mg)	Years to Balance
30 ft. (190,360 gal)	1.93	1.48	0.45	0.70	1.6
100 ft. (2,100,000 gal)	7.6	6.1	1.5	2.8	1.9
150 ft. (5,287,300 gal)	13.5	11.33	2.17	6.3	2.9
180 ft. (7,613,700 gal)	19.2	16.5	2.7	9.1	3.4

TABLE B-3. EMISSIONS BALANCING--INSTALL SECONDARY SEAL (SUBPART Kb RIM SEALS) ON AN EFRT WITH A MECHANICAL-SHOE PRIMARY SEAL

Tank Diameter (Capacity)	Annual Emissions at K level of control (Mg/yr)	Annual Emissions at Kb Rim Seals (Mg/yr)	Annual Emission Reduction (Mg/yr)	Degassing and Cleaning Emissions (Mg)	Years to Balance
30 ft. (190,360 gal)	6.66	3.95	2.71	0.70	0.26
150 ft. (5,287,300 gal)	23.3	9.8	13.5	6.3	0.5
240 ft. (13,535,500 gal)	35.9	14.24	21.7	16.2	0.75

NOTE: The environmental impacts for less-controlled external floating roof tanks (i.e., EFRT's equipped with a vapor-mounted primary seal) will be less than shown for the EFRT's equipped with a mechanical-shoe primary seal.

TABLE B-4. EMISSIONS BALANCING--INSTALL SECONDARY SEAL (SUBPART Kb RIM SEALS) ON AN EFRT WITH A LIQUID-MOUNTED PRIMARY SEAL

Tank Diameter (Capacity)	Annual Emissions at K level of control (Mg/yr)	Annual Emissions at Kb Rim Seals (Mg/yr)	Annual Emission Reduction (Mg/yr)	Degassing and Cleaning Emissions (Mg)	Years to Balance
30 ft. (190,360 gal)	3.8	2.8	1	0.70	0.7
150 FT. (5,287,300 gal)	9.25	4.3	4.95	6.3	1.3
240 ft. (13,535,500 gal)	12.79	4.87	7.92	16.2	2.0

to balance the degassing and cleaning emissions. As shown in Table B-2, the "years to balance" for a 150-ft. internal floating roof tank adding a secondary seal is 2.9 years. The "years to balance" for a 180-ft. internal floater adding a secondary seal is 3.4 years, which is longer than the statutory period for compliance mandated by the Act (3 years). As shown in Tables B-3 and B-4, the "years to balance" for external floating roof tanks retrofitting to meet NSPS subpart Kb rim seals is well within the statutory compliance period of 3 years.

Tables B-5 through B-7 show the "years to balance" for storage vessels currently meeting NSPS subpart K or Ka requirements when retrofitted to meet the full NSPS subpart Kb requirements [both rim seals and controlled (gasketed) fittings]. As shown in these tables, the emission reductions achieved by any storage vessel retrofitting both rim seals and gasketed fittings balances the degassing and cleaning emissions well within the statutory compliance period of 3 years.

Tables B-8 and B-9 show the "years to balance" for storage vessels currently meeting NSPS subpart Kb rim seals to retrofit to meet the NSPS subpart Kb controlled (gasketed) fitting requirements. As shown in Table B-8, the emission reductions achieved by adding controlled fittings to a 100-ft. internal floating roof tank meeting NSPS subpart Kb rim seals is slightly longer than the statutory compliance period of 3 years. Also as shown in Table B-9, the emission reductions achieved by adding controlled fittings to a 150-ft. external floating roof is slightly less than the statutory compliance period of 3 years.

B.3 STORAGE TANK COSTS/ECONOMIC IMPACTS

As stated in Section 13.1, EPA believes that the installation/equipment costs for storage vessel controls calculated at proposal are reasonable. However, EPA was questioned by commenters and has reconsidered the costs for storage vessel degassing and cleaning, as well as for installing the emission controls required under NSPS subpart Kb.

TABLE B-5. EMISSIONS BALANCING--INSTALL SECONDARY SEAL AND CONTROLLED FITTINGS (SUBPART Kb) ON AN IFRT WITH A VAPOR-MOUNTED PRIMARY SEAL

Tank Diameter (Capacity)	Annual Emissions at Ka level of control (Mg/yr)	Annual Emissions at Kb level of control (Mg/yr)	Annual Emission Reduction (Mg/yr)	Degassing and Cleaning Emissions (Mg)	Years to Balance
30 ft. (190,360 gal)	1.93	1.16	0.77	0.70	0.9
150 ft. (5,287,300 gal)	13.5	9.8	3.7	6.3	1.7
180 ft. (7,613,700 gal)	19.2	14.2	5	9.1	1.8
240 ft. (13,535,500 gal)	32.0	24.35	7.65	16.2	2.2

TABLE B-6. EMISSIONS BALANCING--INSTALL SECONDARY SEAL AND CONTROLLED FITTINGS (SUBPART Kb) ON AN EFRT WITH A MECHANICAL-SHOE PRIMARY SEAL

Tank Diameter (Capacity)	Annual Emissions at K level of control (Mg/yr)	Annual Emissions at Kb level of control (Mg/yr)	Annual Emission Reduction (Mg/yr)	Degassing and Cleaning Emissions (Mg)	Years to Balance
30 ft (190,360 gal)	6.66	1.71	4.95	0.70	0.14
240 ft (13,535,500 gal)	35.9	12	23.9	16.2	0.68

NOTE: The environmental impacts for less-controlled external floating roof tanks (i.e., EFRT's equipped with a vapor-mounted primary seal) will be less than shown for the EFRT's equipped with a mechanical-shoe primary seal.

TABLE B-7. EMISSIONS BALANCING--INSTALL SECONDARY SEAL AND CONTROLLED FITTINGS (SUBPART Kb) ON AN EFRT WITH A LIQUID-MOUNTED PRIMARY SEAL

Tank Diameter (Capacity)	Annual Emissions at K level of control (Mg/yr)	Annual Emissions at Kb level of control (Mg/yr)	Annual Emission Reduction (Mg/yr)	Degassing and Cleaning Emissions (Mg)	Years to Balance
30 ft (190,360 gal)	3.76	0.54	3.22	0.70	0.2
240 ft (13,535,500 gal)	12.79	2.64	10.1	16.2	1.60

TABLE B-8. EMISSIONS BALANCING--INSTALL CONTROLLED FITTINGS (SUBPART Kb) ON AN IFRT WITH A VAPOR-MOUNTED PRIMARY SEAL AND SECONDARY SEAL (SUBPART Kb RIM SEALS)

Tank Diameter (Capacity)	Annual Emissions at Kb Rim Seal (Mg/yr)	Annual Emissions at Kb level of control (Mg/yr)	Annual Emission Reduction (Mg/yr)	Degassing and Cleaning Emissions (Mg)	Years to Balance
30 ft. (190,360 gal)	1.48	1.16	0.32	0.70	2.1
100 ft. (2,100,000 gal)	6.1	5.22	0.88	2.8	3.2
180 ft. (7,613,700 gal)	8.86	6.55	2.31	9.1	3.9
240 ft. (13,535,500 gal)	14.65	10.59	4.06	16.2	4.0

TABLE B-9. EMISSIONS BALANCING--INSTALL CONTROLLED FITTINGS (SUBPART Kb) ON AN EFRT WITH A MECHANICAL-SHOE PRIMARY SEAL AND SECONDARY SEAL (SUBPART Kb RIM SEALS)

Tank Diameter (Capacity)	Annual Emissions at Kb Rim Seals (Mg/yr)	Annual Emissions at Kb level of control (Mg/yr)	Annual Emission Reduction (Mg/yr)	Degassing and Cleaning Emissions (Mg)	Years to Balance
30 ft. (190,360 gal)	3.94	1.71	2.23	0.70	0.3
100 ft. (2,100,000 gal)	7.34	5.11	2.23	2.8	1.3
150 ft. (5,287,300 gal)	9.78	7.54	2.24	6.3	2.8
180 ft. (7,613,700 gal)	11.28	9.05	2.23	9.1	4.1
240 ft. (13,535,500 gal)	14.25	12.01	2.24	16.2	7.2

NOTE: The environmental impacts for less-controlled external floating roof tanks (i.e., EFRT's equipped with a vapor-mounted primary seal) will be less than shown for the EFRT's equipped with a mechanical-shoe primary seal.

B.3.1 Degassing and Cleaning Costs

Degassing and cleaning costs were reconsidered using information from the EPA ACT document (IV-A-3). According to the ACT document, cleaning and degassing costs can be divided into two separate costs: 1) cleaning and 2) hazardous waste disposal. In the ACT document, it is estimated that the cost to clean and dispose of the hazardous waste generated by a 200,000 gallon tank is approximately $18,000 to $20,000 (2,000 gallons of sludge and 1,000 gallons of rinseate are generated from the tank). The cost to dispose of the hazardous waste is approximately $15,000 (@ $5 per gallon of waste) leaving $3,000 to $5,000 for cleaning the tank. The dimensions of the vessel are not shown in the document (only the capacity of the tank is given); however, assuming that the tank is approximately 33 feet in diameter, the cleaning cost of $5,000 represents a cost of about $150 per foot-diameter. For the purposes of this analysis, if one assumes a tank cleaning cost of $150 per foot-diameter, the costs to clean a 50-ft., 78-ft., and 100-ft. tank are $7,500, $11,700, and $15,000, respectively.

To calculate sludge disposal costs, the EPA ACT document stated that 2,000 gallons of sludge would be generated from a 200,000 gallon tank. Assuming that the tank is 33 feet in diameter, the sludge depth in the tank was calculated at approximately 3.75 inches. It was assumed that this tank was storing crude oil, because crude oil is one of the model liquids discussed in the document. However, for the purposes of this analysis, it was assumed that gasoline, being a refined petroleum product, would contain less sludge-forming materials than crude oil. Therefore, it was assumed that the average sludge depth in a gasoline storage tank is 2 inches. It was also assumed that no rinseate would be generated in cleaning the tank since gasoline is a less viscous fluid than crude oil. Therefore, assuming a sludge depth of 2 inches and a disposal cost of $5 per gallon, the sludge disposal costs for a 50-ft., 78-ft., and 100-ft. tank are approximately $12,230, $29,770, and $48,930, respectively.

B.3.2 Controlled (or Gasketed) Fitting Costs

As stated in Section 13.1, EPA reconsidered the cost to install gaskets on existing uncontrolled fittings. Industry provided estimates obtained from three manufacturers for various tank sizes (IV-D-44) which varied significantly (100 to 1,300 percent difference). It is uncertain why the cost estimates ranged as much as 1,300 percent, but for the purposes of this analysis, EPA believes that installing gaskets should be relatively inexpensive when performed while degassing and cleaning the tank. The EPA used the lowest of the three cost estimates provided by industry because it was closer to the cost documented in the ACT document. The EPA interpolated between these reported costs for the given tank sizes to determine the capital cost to add controlled (gasketed) fittings for the gasoline distribution model tank sizes. The capital costs for adding controls to the fittings on the model tanks are $1,225 for a 50-ft. tank, $2,175 for a 78-ft. tank, and $2,800 for a 100-ft. tank. The cost effectiveness for installing controlled fittings (with and without degassing costs) on floating roof tanks is summarized in Table B-10. As shown in the table, the cost effectiveness for adding controlled (gasketed) fittings is significantly higher when the tank degassing and cleaning cost is included in the compliance costs. However, as also shown in the table, the approximate increase in the price of gasoline when considering the cost of installing fittings on the storage tanks is relatively insignificant (well below 0.1 cent per gallon) with or without the tank degassing and cleaning costs.

Tables B-11 through B-20 are similar to Tables 7-1 and 7-2 of BID, Volume I and show the costs for model storage tanks of different control levels to meet the NSPS subpart Kb rim seal requirements only, as well as the full NSPS subpart Kb rim seal and controlled fitting requirements.

Tables B-21 and B-22 show the model tank and nationwide costs for bulk terminals and breakout stations to meet only the NSPS subpart Kb rim seal requirements for storage vessels. Tables B-23 and B-24 show the model tank and nationwide costs for bulk terminals and breakout stations to control all their tanks to meet the rim seal and controlled fitting requirements of NSPS subpart Kb.

TABLE B-10. COST AND EMISSIONS IMPACT OF REQUIRING CONTROLLED FITTINGS ON ALL GASOLINE STORAGE TANKS

	Wait Until Next Degassing, or 10 years (No Degassing and Cleaning Costs)							Degas Tank (Adds Degassing and Cleaning Costs)						
Tank Type	E.R. @ 5% HAP (Mg/yr)	E.R. @ 16% HAP (Mg/yr)	Capital Cost ($)	Net Ann. Cost ($/yr)	C.E. @ 5% HAP ($/Mg)	C.E. @ 16% HAP ($/Mg)	△ increase in gasoline price (¢/gal.)	E.R. @ 5% HAP (Mg/yr)	E.R. @ 16% HAP (Mg/yr)	Capital Cost ($)	Net Ann. Cost ($/yr)	C.E. @ 5% HAP ($/Mg)	C.E. @ 16% HAP ($/Mg)	△ increase in gasoline price (¢/gal.)
PER TANK														
B.T.														
EFR	0.11	0.352	$2,175	($211)	($1,900)	($600)	(0.001)	0.11	0.352	$43,645	$8,813	$80,000	$25,000	0.04
IFR	.02	.064	$1,225	$142	$7,100	$2,200	0.00002	.02	0.064	$20,955	$4,435	$220,000	$69,000	0.05
B.O														
EFR	0.11	.352	$2,800	($57)	$(520)	($160)	(0.00001)	0.11	0.352	$66,730	$13,854	$126,000	$39,000	0.004
IFR	.045	0.144	$2,800	$337	$7,500	$2,300	0.0001	.045	0.144	$66,730	$14,248	$317,000	$99,000	0.005
NATION-WIDE														
B.T.														
EFR	90		$1,600,000	($153,000)	(1,530)		(0.001)	90		$31,642,000	$6,389,000	71,000		0.04
IFR	15		$780,000	$93,000	6,200		0.002	15		$13,774,000	$2,916,000	194,000		0.05
B.O.														
EFR	25		$420,000	($49,000)	(340)		(0.00001)	25		$9,440,000	$1,960,000	78,000		0.004

IFR	5	$200,000	$24,000	4,800	0.0001	5	$4,545,000	$970,000	194,000	0.005

TABLE B-11. COSTS TO INSTALL FLOATING DECK, LIQUID-MOUNTED PRIMARY SEAL, AND CONTROLLED FITTINGS ON A 50' FRT (THIRD QUARTER 1990 DOLLARS)

Tank Capacity = 2,680 m^3
Tank Diameter = 15.2 m
Tank Height = 14.6 m
13 Turnovers

	Deck + Seal Only	Deck + Seals and Controlled Fittings
Capital Cost & Installation		
Degassing, Cleaning, & Waste	$19,730	$19,730
Disposal[a]	$19,900	$19,900
Roof with Liquid-Mounted Seal[b]	$0	$1,225
Controlled Deck Fittings[c]		
Total Capital Cost	$39,630	$40,885
Annualized Costs ($/yr)		
Maintenance (5%)[b]	$1,982	$2,043
Taxes, Insurance, G&A (4%)[b]	$1,585	$1,634
Inspections (1%)[b]	$369	$409
Annual Capital Charges (11.76%, 20 yrs. @ 10%)[c]	$4,660	$4,805
Total Annualized Cost	$8,596	$8,890
Product Recovery Credit	$13,743[d]	$13,867[e]
Net Annualized Cost ($/yr)[f]	($5,147)	($4,977)
Emission Reduction Deck + Seal = 44.2 Mg VOC Deck + Seal + Fittings = 44.6 Mg VOC		
Cost Effectiveness @ 5% HAP ($/Mg)	(2,329)	($2,232)
Cost Effectiveness @ 16% HAP ($/Mg)	($728)	($697)

FOOTNOTES FOR TABLE B-11

[a] Assuming sludge depth of 2 inches, with a disposal cost of $5 per gallon of sludge. Assumed cleaning cost is approximately $150 per foot-diameter.

[b] Docket item IV-A-3.

[c] Docket item IV-D-44.

[d] Based on a calculation which subtracts annual evaporative losses from an internal floating roof tank equipped with a liquid-mounted primary seal (subpart Kb rim seal requirements) from uncontrolled evaporative losses from a fixed-roof tank, and a cost of gasoline at bulk terminals of $0.79/gal.

[e] Based on a calculation which subtracts annual evaporative losses from an internal floating roof tank equipped with a liquid-mounted primary seal and controlled deck fittings (full subpart Kb requirements) from uncontrolled evaporative losses from a fixed-roof tank, and a cost of gasoline at bulk terminals of $0.79/gal.

[f] Parentheses indicate a net savings.

TABLE B-12. COSTS TO INSTALL A FLOATING DECK, LIQUID-MOUNTED PRIMARY SEAL, AND CONTROLLED FITTINGS ON A 100' FRT (THIRD QUARTER 1990 DOLLARS)

Tank Capacity = 8,000 m^3
Tank Diameter = 30 m
Tank Height = 12 m
150 Turnovers

	Deck + Seal Only	Deck + Seals and Controlled Fittings
Capital Cost & Installation		
Degassing, Cleaning, & Waste Disposal[a]	$63,930	$63,930
Roof with Liquid-Mounted Seal[b]	$41,550	$41,550
Controlled Deck Fittings[c]	$0	$2,800
Total Capital Cost	$105,480	$108,280
Annualized Costs ($/yr)		
Maintenance (5%)[b]	$5,274	$5,414
Taxes, Insurance, G&A (4%)[b]	$4,219	$4,331
Inspections (1%)[b]	$1,055	$1,083
Annual Capital Charges (11.76%, 20 yrs. @ 10%)	$12,404	$12,734
Total Annualized Cost	$22,952	$23,562
Product Recovery Credit	$158,646[d]	$158,919[e]
Net Annualized Cost ($/yr)[f]	($135,693)	($135,358)
Emission Reduction Deck + Seal = 522.6 Mg VOC Deck + Seal + Fittings = 523.5 Mg VOC		
Cost Effectiveness @ 5% HAP ($/Mg)	($5,192)	($5,162)
Cost Effectiveness @ 16% HAP ($/Mg)	($1,623)	($1,613)

FOOTNOTES FOR TABLE B-12

[a] Assuming sludge depth of 2 inches, with a disposal cost of $5/gallon of sludge. Assumed cleaning cost is approximately $150 per foot-diameter.

[b] Docket item IV-A-3.

[c] Docket item IV-D-44.

[d] Based on a calculation which subtracts annual evaporative losses from an internal floating roof tank equipped with a liquid-mounted primary seal (subpart Kb rim seal requirements) from uncontrolled evaporative losses from a fixed-roof tank, and a cost of gasoline at breakout stations of $0.77/gal.

[e] Based on a calculation which subtracts annual evaporative losses from an internal floating roof tank equipped with a liquid-mounted primary seal and controlled deck fittings (full subpart Kb requirements) from uncontrolled evaporative losses from a fixed-roof tank, and a cost of gasoline at breakout stations of $0.77/gal.

[f] Parentheses indicate a net savings.

TABLE B-13. COSTS TO INSTALL SECONDARY SEAL AND CONTROLLED FITTINGS ON 78' EFRT WITH A MECHANICAL-SHOE PRIMARY SEAL (THIRD QUARTER 1990 DOLLARS)

Tank Capacity = 5,760 m^3
Tank Diameter = 23.8 m
Tank Height = 12 m
13 Turnovers

	Secondary Seal Only	Secondary Seal and Controlled Fittings
Capital Cost & Installation		
Degassing, Cleaning, & Waste Disposal[a]	$41,470	$41,470
Secondary Seal Cost[b]	$13,200	$13,200
Controlled Deck Fittings[c]	$0	$2,175
Total Capital Cost	$54,670	$56,845
Annualized Costs ($/yr)		
Maintenance (5%)[b]	$2,734	$2,842
Taxes, Insurance, G&A (4%)[b]	$2,187	$2,274
Inspections (1%)[b]	$547	$568
Annual Capital Charges (11.76%, 20 yrs. @ 10%)	$6,429	$6,685
Total Annualized Cost	$11,897	$12,369
Product Recovery Credit	$3,126[d]	$3,824[e]
Net Annualized Cost ($/yr)	$8,770	$8,545
Emission Reduction Secondary Seal = 10.1 Mg VOC Secondary Seal + Fittings = 12.3 Mg VOC		
Cost Effectiveness @ 5% HAP ($/Mg)	$17,340	$13,895
Cost Effectiveness @ 16% HAP ($/Mg)	$5,419	$4,342

FOOTNOTES FOR TABLE B-13

[a] Assuming sludge depth of 2 inches, with a disposal cost of $5 per gallon of sludge. Assumed cleaning cost is approximately $150 per foot-diameter.

[b] Docket item IV-A-3.

[c] Docket item IV-D-44.

[d] Based on a calculation which subtracts annual evaporative losses from an external floating roof tank equipped with a mechanical-shoe primary seal and secondary seal (subpart Kb rim seal requirements) from losses from an external floating roof tank equipped with a mechanical-shoe primary seal (subpart K requirements), and a cost of gasoline at bulk terminals of $0.79/gal.

[e] Based on a calculation which subtracts annual evaporative losses from an external floating roof tank equipped with a secondary seal and controlled deck fittings (full subpart Kb requirements) from losses from an external floating roof tank equipped with a mechanical-shoe primary seal (subpart K requirements), and a cost of gasoline at bulk terminals of $0.79/gal.

TABLE B-14. COSTS TO INSTALL SECONDARY SEAL AND CONTROLLED FITTINGS ON 100' EFRT WITH A MECHANICAL-SHOE PRIMARY SEAL (THIRD QUARTER 1990 DOLLARS)

Tank Capacity = 8,000 m^3
Tank Diameter = 30 m
Tank Height = 12 m
150 Turnovers

	Secondary Seal Only	Secondary Seal and Controlled Fittings
Capital Cost & Installation		
Degassing, Cleaning, & Waste Disposal[a]	$63,930	$63,930
Secondary Seal Cost[b]	$16,960	$16,960
Controlled Deck Fittings[c]	$0	$2,800
Total Capital Cost	$80,890	$83,690
Annualized Costs ($/yr)		
Maintenance (5%)[b]	$4,405	$4,185
Taxes, Insurance, G&A (4%)[b]	$3,236	$3,348
Inspections (1%)[b]	$809	$837
Annual Capital Charges (11.76%, 20 yrs. @ 10%)	$9,513	$9,842
Total Annualized Cost	$17,963	$18,211
Product Recovery Credit	$3,879[d]	$4,546[e]
Net Annualized Cost ($/yr)	$14,084	$13,665
Emission Reduction Secondary Seal = 12.8 Mg VOC Secondary Seal + Fittings = 15.0 Mg VOC		
Cost Effectiveness @ 5% HAP ($/Mg)	$22,006	$18,220
Cost Effectiveness @ 16% HAP ($/Mg)	$6,877	$5,694

FOOTNOTES FOR TABLE B-14

[a] Assuming sludge depth of 2 inches, with a disposal cost of $5 per gallon of sludge. Assumed cleaning cost is approximately $150 per foot-diameter.

[b] Docket item IV-A-3.

[c] Docket item IV-D-44.

[d] Based on a calculation which subtracts annual evaporative losses from an external floating roof tank equipped with a mechanical-shoe primary and secondary seal (subpart Kb rim seal requirements) from an external floating roof tank equipped with a mechanical-shoe primary seal (subpart K requirements), and a cost of gasoline at breakout stations of $0.77/gal.

[e] Based on a calculation which subtracts annual evaporative losses from an external floating roof tank equipped with a primary and secondary seal and controlled deck fittings (full subpart Kb requirements) from losses from an external floating roof tank equipped with a mechanical-shoe primary seal (subpart K requirements), and a cost of gasoline at breakout stations of $0.77/gal.

TABLE B-15. COSTS TO INSTALL SECONDARY SEAL AND CONTROLLED FITTINGS ON 50' IFRT WITH A VAPOR-MOUNTED PRIMARY SEAL (THIRD QUARTER 1990 DOLLARS)

Tank Capacity = 2,680 m^3
Tank Diameter = 23.8 m
Tank Height = 12 m
13 Turnovers

	Secondary Seal Only	Secondary Seal and Controlled Fittings
Capital Cost & Installation		
Degassing, Cleaning, & Waste Disposal[a]	$19,730	$19,730
Secondary Seal Cost[b]	$4,080	$4,080
Controlled Deck Fittings[c]	$0	$1,225
Total Capital Cost	$23,810	$25,035
Annualized Costs ($/yr)		
Maintenance (5%)[b]	$1,191	$1,252
Taxes, Insurance, G&A (4%)[b]	$952	$1,001
Inspections (1%)[b]	$238	$250
Annual Capital Charges (11.76%, 20 yrs. @ 10%)	$2,800	$2,944
Total Annualized Cost	$5,181	$5,448
Product Recovery Credit	$218[d]	$342[e]
Net Annualized Cost ($/yr)	$4,963	$5,106
Emission Reduction Secondary Seal = 0.7 Mg VOC Secondary Seal + Fittings = 1.1 Mg VOC		
Cost Effectiveness @ 5% HAP ($/Mg)	$141,800	$92,829
Cost Effectiveness @ 16% HAP ($/Mg)	$44,313	$29,009

FOOTNOTES FOR TABLE B-15

[a] Assuming sludge depth of 2 inches, with a disposal cost of $5 per gallon of sludge. Assumed cleaning cost is approximately $150 per foot-diameter.

[b] Docket item IV-A-3

[c] Docket item IV-D-44.

[d] Based on a calculation which subtracts annual evaporative losses from an external floating roof tank equipped with a vapor-mounted primary seal and secondary seal (subpart Kb rim seal requirements) from losses from an external floating roof tank equipped with only a vapor-mounted primary seal (subpart K requirements), and a cost of gasoline at bulk terminals of $0.79/gal.

[e] Based on a calculation which subtracts annual evaporative losses from an external floating roof tank equipped with a vapor-mounted primary seal, secondary seal, and controlled fittings (full subpart Kb requirements) from losses from an external floating roof tank equipped with only a vapor-mounted primary seal (subpart K requirements), and a cost of gasoline at bulk terminals of $0.79/gal.

TABLE B-16. COSTS TO INSTALL SECONDARY SEAL AND CONTROLLED FITTINGS ON 100' IFRT WITH A VAPOR-MOUNTED PRIMARY SEAL (THIRD QUARTER 1990 DOLLARS)

Tank Capacity = 8,000 m^3
Tank Diameter = 30 m
Tank Height = 12 m
150 Turnovers

	Secondary Seal Only	Secondary Seal and Controlled Fittings
Capital Cost & Installation		
Degassing, Cleaning, & Waste Disposal[a]	$63,930	$63,930
Secondary Seal Cost[b]	$8,170	$8,170
Controlled Deck Fittings[c]	$0	$2,800
Total Capital Cost	$72,100	$74,900
Annualized Costs ($/yr)		
Maintenance (5%)[b]	$3,605	$3,745
Taxes, Insurance, G&A (4%)[b]	$2,884	$2,996
Inspections (1%)[b]	$721	$749
Annual Capital Charges (11.76%, 20 yrs. @ 10%)	$8,479	$8,808
Total Annualized Cost	$15,689	$16,298
Product Recovery Credit	$454[d]	$727[e]
Net Annualized Cost ($/yr)	$15,235	$15,571
Emission Reduction Secondary Seal = 1.5 Mg VOC Secondary Seal + Fittings = 2.4 Mg VOC		
Cost Effectiveness @ 5% HAP ($/Mg)	$203,133	$129,758
Cost Effectiveness @ 16% HAP ($/Mg)	$63,479	$40,549

FOOTNOTES FOR TABLE B-16

[a] Assuming sludge depth of 2 inches, with a disposal cost of $5 per gallon of sludge. Assumed cleaning cost is approximately $150 per foot-diameter.

[b] Docket item IV-A-3.

[c] Docket item IV-D-44.

[d] Based on a calculation which subtracts annual evaporative losses from an internal floating roof tank equipped with a vapor-mounted primary seal and secondary seal (subpart Kb rim seal requirements) from losses from an internal floating roof tank equipped with a vapor-mounted primary seal (subpart K requirements), and a cost of gasoline at breakout stations of $0.77/gal.

[e] Based on a calculation which subtracts annual evaporative losses from an internal floating roof tank equipped with a vapor-mounted primary seal, secondary seal, and controlled deck fittings (full subpart Kb requirements) from losses from an internal floating roof tank equipped with only a vapor-mounted primary seal (subpart K requirements), and a cost of gasoline at breakout stations of $0.77/gal.

TABLE B-17. COSTS TO INSTALL CONTROLLED FITTINGS ON 50' IFRT WITH A LIQUID OR MECHANICAL PRIMARY SEAL--WITH AND WITHOUT DEGASSING COSTS (THIRD QUARTER 1990 DOLLARS)

Tank Capacity = 2,680 m^3
Tank Diameter = 15.2 m
Tank Height = 14.6 m
13 Turnovers

	With Degassing Costs	Without Degassing Costs
Capital Cost & Installation		
Degassing, Cleaning, & Waste Disposal[a]	$19,730	$0
Roof with Liquid-Mounted Seal[b]	$0	$0
Controlled Deck Fittings[c]	$1,2250	$1,225
Total Capital Cost	$20,955	$1,225
Annualized Costs ($/yr)		
Maintenance (5%)[b]	$1,048	$61
Taxes, Insurance, G&A (4%)[b]	$838	$49
Inspections (1%)[b]	$210	$12
Annual Capital Charges (11.76%, 20 yrs. @ 10%)[a]	$2,464	$144
Total Annualized Cost	$4,560	$267
Product Recovery Credit[d]	$124	$124
Net Annualized Cost ($/yr)	$4,435	$142
Emission Reduction (controlled fittings) = 0.4 Mg VOC		
Cost Effectiveness @ 5% HAP ($/Mg)	$221,722	$7,110
Cost Effectiveness @ 16% HAP ($/Mg)	$69,304	$2,222

[a] Assuming sludge depth of 2 inches, with a disposal cost of $5 per gallon of sludge. Assumed cleaning cost is approximately $150 per foot-diameter.

[b] Docket item IV-A-3

[c] Docket item IV-D-44.

[d] Based on a calculation which subtracts annual evaporative losses from an internal floating roof tank equipped with either a liquid-mounted or mechanical-shoe primary seal and controlled deck fittings (full subpart Kb requirements) from losses from an internal floating roof tank equipped with only a liquid-mounted primary seal (subpart Ka requirements), and a cost of gasoline at bulk terminals of $0.79/gal.

TABLE B-18. COSTS TO INSTALL CONTROLLED FITTINGS ON 100' IFRT WITH A LIQUID OR MECHANICAL PRIMARY SEAL--WITH AND WITHOUT DEGASSING COSTS (THIRD QUARTER 1990 DOLLARS)

Tank Capacity = 8,000 m^3
Tank Diameter = 30 m
Tank Height = 12 m
150 Turnovers

	With Degassing Costs	Without Degassing Costs
Capital Cost & Installation		
Degassing, Cleaning, & Waste Disposal[a]	$63,930	$0
Roof with Liquid-Mounted Seal[b]	$0	$0
Controlled Deck Fittings[c]	$2,800	$2,800
Total Capital Cost	$66,730	$2,800
Annualized Costs ($/yr)		
Maintenance (5%)[b]	$3,337	$140
Taxes, Insurance, G&A (4%)[b]	$2,669	$112
Inspections (1%)[b]	$667	$28
Annual Capital Charges (11.76%, 20 yrs. @ 10%)	$7,847	$329
Total Annualized Cost	$14,520	$609
Product Recovery Credit[d]	$273	$273
Net Annualized Cost ($/yr)	$14,248	$337
Emission Reduction (controlled fittings) = 0.9 Mg VOC		
Cost Effectiveness @ 5% HAP ($/Mg)	$316,616	$7,749
Cost Effectiveness @ 16% HAP ($/Mg)	$98,942	$2,337

[a] Assuming sludge depth of 2 inches, with a disposal cost of $5/gallon of sludge. Assumed cleaning cost is approximately $150 per foot-diameter.

[b] Docket item IV-A-3.

[c] Docket item IV-D-44.

[d] Based on a calculation which subtracts annual evaporative losses from an internal floating roof tank equipped with either a liquid-mounted or mechanical-shoe primary seal and controlled deck fittings (full subpart Kb requirements) from losses from an internal floating roof tank with only a liquid-mounted or mechanical-shoe primary seal (subpart Ka requirements), and a cost of gasoline at breakout stations of $0.77/gal.

TABLE B-19. COSTS TO INSTALL CONTROLLED FITTINGS ON A 78' EFRT WITH A MECHANICAL-SHOE PRIMARY SEAL AND SECONDARY SEAL--WITH AND WITHOUT DEGASSING COSTS (THIRD QUARTER 1990 DOLLARS)

Tank Capacity = 5,760 m^3
Tank Diameter = 23.8 m
Tank Height = 12 m
13 Turnovers

	With degassing Costs	Without degassing costs
Capital Cost & Installation		
Degassing, Cleaning, & Waste Disposal[a]	$41,470	$0
Secondary Seal Cost[b]	$0	$0
Controlled Deck Fittings[c]	$2,175	$2,175
Total Capital Cost	$43,645	$2,175
Annualized Costs ($/yr)		
Maintenance (5%)[b]	$2,182	$109
Taxes, Insurance, G&A (4%)[b]	$1,746	$87
Inspections (1%)[b]	$436	$22
Annual Capital Charges (11.76%, 20 yrs. @ 10%)	$5,133	$256
Total Annualized Cost	$9,497	$473
Product Recovery Credit[d]	$684	$684
Net Annualized Cost ($/yr)[e]	$8,813	($211)
Emission Reduction (controlled fittings) = 2.2 Mg VOC		
Cost Effectiveness @ 5% HAP ($/Mg)	$80,199	($1,196)
Cost Effectiveness @ 16% HAP ($/Mg)	$25,037	($599)

FOOTNOTES FOR TABLE B-19

[a] Assuming sludge depth of 2 inches, with a disposal cost of $5 per gallon of sludge. Assumed cleaning cost is approximately $150 per foot-diameter.

[b] Docket item IV-A-3.

[c] Docket item IV-D-44.

[d] Based on a calculation which subtracts annual evaporative losses from an external floating roof tank equipped with a mechanical-shoe primary seal, secondary seal, and controlled fittings (full subpart Kb requirements) from losses from an external floating roof tank equipped with only a mechanical-shoe primary seal and secondary seal (subpart Ka requirements), and a cost of gasoline at bulk terminals of $0.79/gal.

[e] Parentheses indicate a net savings.

TABLE B-20. COSTS TO INSTALL CONTROLLED FITTINGS ON 100' EFR WITH A MECHANICAL-SHOE PRIMARY SEAL AND SECONDARY SEAL--WITH AND WITHOUT DEGASSING COSTS (THIRD QUARTER 1990 DOLLARS)

Tank Capacity = 8,000 m^3
Tank Diameter = 30 m
Tank Height = 12 m
150 Turnovers

	With Degassing Costs	Without Degassing Costs
Capital Cost & Installation		
Degassing, Cleaning, & Waste Disposal[a]	$63,930	$0
Secondary Seal Cost[b]	$0	$0
Controlled Deck Fittings[c]	$2,800	$2,800
Total Capital Cost	$66,730	$2,800
Annualized Costs ($/yr)		
Maintenance (5%)[b]	$3,337	$140
Taxes, Insurance, G&A (4%)[b]	$2,669	$112
Inspections (1%)[b]	$667	$28
Annual Capital Charges (11.76%, 20 yrs. @ 10%)	$7,847	$329
Total Annualized Cost	$14,520	$609
Product Recovery Credit[d]	$667	$667
Net Annualized Cost ($/yr)[e]	$13,854	($57)
Emission Reduction (controlled fittings) = 2.2 Mg VOC		
Cost Effectiveness @ 5% HAP ($/Mg)	$125,943	($522)
Cost Effectiveness @ 16% HAP ($/Mg)	$39,357	($1,163)

FOOTNOTES FOR TABLE B-20

[a] Assuming sludge depth of 2 inches, with a disposal cost of $5 per gallon of sludge. Assumed cleaning cost is approximately $150 per foot-diameter.

[b] Docket item IV-A-3.

[c] Docket item IV-D-44.

[d] Based on a calculation which subtracts annual evaporative losses from an external floating roof tank equipped with a mechanical-shoe primary seal, secondary seal, and controlled fittings (full subpart Kb requirements) from losses from an external floating roof tank equipped with only a mechanical-shoe primary seal and secondary seal (subpart Ka requirements), and a cost of gasoline at breakout stations of $0.77/gal.

[e] Parentheses indicate a net savings.

TABLE B-21. BULK TERMINAL MODEL TANK AND NATIONWIDE COSTS TO MEET SUBPART Kb RIM SEAL REQUIREMENTS (FLOOR)

Tank Type	No. of Tanks	Model Tank Capital Cost ($)	Model Tank Annual Cost ($)	Nationwide Capital Costs ($)	Nationwide Annual Costs ($/year)
External floater w/sec[a]	309	$0	$0	$0	$0
External floater w/primary[b]	416	$56,670	$8,770	$22,742,720	$3,648,320
Internal floater w/vapor-mounted primary[b]	154	$23,810	$4,963	$3,666,740	$764,302
Internal floater w/liquid-mounted primary[a]	314	$0	$0	$0	$0
Fixed-roof[c]	184	$39,630	($5,147)	$7,291,920	($947,048)
TOTAL				$33,701,380	$3,465,574

[a] Currently meeting subpart Kb rim seal requirements and incurs no cost to meet the floor.

[b] Needs a secondary seal to meet subpart Kb rim seal requirements (floor).

[c] Needs a floating deck with a liquid-mounted primary seal to meet subpart Kb rim seal requirements (floor).

TABLE B-22. BREAKOUT STATION MODEL TANK AND NATIONWIDE COSTS TO MEET SUBPART Kb RIM SEAL REQUIREMENTS (FLOOR)

Tank Type	No. of Tanks	Model Tank Capital Cost ($)	Model Tank Annual Cost ($/year)	Nationwide Capital Costs ($)	Nationwide Annual Costs ($/year)
External floater w/sec[a]	54	$0	$0	$0	$0
External floater w/primary[b]	95	$80,890	$14,084	$7,684,550	$1,337,980
Internal floater w/vapor-mounted primary[b]	15	$72,100	$15,235	$1,081,500	$228,525
Internal floater w/liquid-mounted primary[a]		$0	$0	$0	$0
Fixed-roof[c]	28	$105,480	($135,693)	$2,953,440	($3,799,404)
TOTAL				$11,719,490	($2,232,899)

[a] Currently meeting subpart Kb rim seal requirements and incurs no cost to meet the floor.

[b] Needs a secondary seal to meet subpart Kb rim seal requirements (floor).

[c] Needs a floating deck with a liquid-mounted primary seal to meet subpart Kb rim seal requirements (floor).

TABLE B-23. BULK TERMINAL MODEL TANK AND NATIONWIDE COSTS TO MEET FULL SUBPART Kb REQUIREMENTS FOR ALL TANKS

Tank Type	No. of Tanks	Model Tank Capital Cost ($)	Model Tank Annual Cost ($)	Nationwide Capital Costs ($)	Nationwide Annual Costs ($/year)
External floater w/sec[a]	309	$2,175	(211)	$672,075	($65,200)
External floater w/primary[b]	416	$56,845	$8,545	$23,647,520	$3,555,000
Internal floater w/vapor-mounted primary[b]	154	$25,035	$5,106	$3,855,390	$786,300
Internal floater w/liquid-mounted primary[a]	314	$1,225	$142	$384,650	$44,600
Fixed-roof[c]	184	$40,855	($4,977)	$7,517,320	($915,800)
TOTAL				$36,076,955	$3,405,000

[a] Currently meeting NSPS subpart Kb rim seal requirements and needs only the controlled fittings.

[b] Needs a secondary seal and controlled fittings.

[c] Needs a floating deck, liquid-mounted primary seal, and controlled fittings.

TABLE B-24. BREAKOUT STATION MODEL TANK AND NATIONWIDE COSTS TO MEET FULL SUBPART Kb REQUIREMENTS FOR ALL TANKS

Tank Type	No. of Tanks	Model Tank Capital Cost ($)	Model Tank Annual Cost ($/year)	Nationwide Capital Costs ($)	Nationwide Annual Costs ($/year)
External floater w/sec[a]	54	$2,800	($57)	$151,200	($3,078)
External floater w/primary[b]	95	$83,690	$13,665	$7,950,550	$1,298,175
Internal floater w/vapor-mounted primary[b]	15	$74,900	$15,571	$1,123,500	$233,565
Internal floater w/liquid-mounted primary[a]	29	$2,800	$337	$81,200	$9,773
Fixed-roof[c]	28	$108,280	($135,358)	$3,031,840	($3,790,024)
TOTAL				$12,338,290	($2,251,589)

[a] Currently meeting NSPS subpart Kb rim seal requirements and needs only the controlled fittings.

[b] Needs a secondary seal and controlled fittings.

[c] Needs a floating deck, liquid-mounted primary seal, and controlled fittings.

B.4 REFERENCES

IV-A-2 Compilation of Air Pollutant Emission Factors (AP-42). Chapter 12, Storage of Organic Liquids. October 1992. U.S. Environmental Protection Agency, Research Triangle Park, NC.

IV-A-3 Alternative Control Techniques Document: Volatile Organic Liquid Storage in Floating and Fixed Roof Tanks. EPA-453/R-94-001. U.S. Environmental Protection Agency, Research Triangle Park, NC. January 1994.

IV-D-22 API Storage Tank Analysis on Net Emission Increases from Premature Degassing and Cleaning of Gasoline Storage Tanks, and Cost Analysis. March 29, 1994. Appendix H of API's comments.

IV-D-44 Memorandum. Ferry, R., The TGB Partnership, to Shedd, S., U.S. Environmental Protection Agency. June 3, 1994. Cost Basis for IFRT Fitting Controls Gasoline Distribution MACT for Storage Tanks.

APPENDIX C.

EMISSIONS FROM EQUIPMENT COMPONENTS AT BULK TERMINALS AND PIPELINE BREAKOUT STATIONS

The purpose of this appendix is to discuss the methodology used to recalculate the emissions occurring from equipment components at bulk terminals and pipeline breakout stations in the gasoline distribution (Stage I) industry. Two major elements have been changed in the analysis prepared before proposal--the emission factors and the equipment counts at each model facility. Section C.1 discusses the new emission factors, Section C.2 discusses the revised equipment component populations, and Section C.3 summarizes the revised baseline equipment emissions occurring at bulk terminals and pipeline breakout stations.

C.1 EMISSION FACTORS

As discussed in Section 9.2, at proposal EPA used refinery equipment leak emission factors to calculate the baseline equipment emissions for both bulk terminals and pipeline breakout stations. However, the American Petroleum Institute (API) provided mass emissions data [bagging of leaks at four terminals and equipment leak frequency data from 74 terminals and pipeline facilities (IV-D-22)] which EPA evaluated and then used to recalculate emissions from leaking equipment. Based on the API data, EPA determined that emissions occurring from equipment at bulk gasoline terminals and pipeline breakout stations are much less than was previously estimated through use of the refinery emission factors.

The EPA issued a draft report for public review, discussing the preliminary results of the comparison and analysis of the 1993 refinery data, the 1993 marketing terminal data, and the 1980 refinery data. It is expected that new EPA emission factors for equipment at gasoline distribution facilities will be developed in the near future. For this analysis, API's suggested emission factors have been used.

Table C-1 compares the refinery emission factors used at proposal to the new API emission factors. The API's new emission factor for pump seals is approximately 99.8 percent lower, and the new factor for valves is 99.6 percent lower, than the respective refinery emission factors for these components. At proposal, emission factors were not available for connectors, loading arm valves, open-ended lines, and other miscellaneous components at bulk terminals and pipeline breakout stations and, therefore, EPA did not attempt to estimate emissions from such equipment.

C.2 EQUIPMENT POPULATIONS

The API's new emission factors for equipment leaks included factors for connectors, open-ended lines, loading arm valves, and other miscellaneous components (IV-D-22, Appendices A and B). Also included in the data were equipment component counts for both bulk terminals and pipeline breakout stations. In order to estimate emissions from equipment leaks using the new API factors, EPA estimated the equipment component populations for both bulk terminals and pipeline breakout stations using the equipment count data submitted by API.

C.2.1 Equipment Populations for Bulk Terminals

The API provided selected characteristics (e.g., number of components and throughputs) for four petroleum marketing terminals in Table 2-1 of Appendix A of their comments (IV-D-22). Table C-2 below summarizes the throughput and component count data extracted from that table. Using these data, EPA reevaluated the equipment count populations for the four "model plants" in BID, Volume I (III-B-1). As a starting point, EPA assumed that Terminals A and D shown in Table C-2 were comparable to Model Plant 4 in BID, Volume I on the basis of throughput.

TABLE C-1. REVISED EMISSION FACTORS FOR EQUIPMENT LEAKS

Equipment Type	Emission Factor Used at Proposal (lbs/hr)[a]	Revised Emission Factor (lbs/hr)[b]
Pump Seals		
liquid service	0.25	0.00053
Valves	0.024	9.2E-05
Connectors	Not Available	8.4E-05
Loading Arm Valves		
gas service	Not Available	0.045
liquid service	Not Available	0.00087
Open-Ended Lines		
gas service	Not Available	0.0067
liquid service	Not Available	0.0065
Other	Not Available	0.0003

[a] Docket item II-A-17.

[b] Docket item IV-D-22. (The EPA expects to develop its own emission factors in the near future.)

TABLE C-2. TERMINAL THROUGHPUTS AND COMPONENT COUNTS[a]

Terminal Description	Terminal A	Terminal B	Terminal C	Terminal D
Avg. throughput (gal/day)	>900,000	>2,500,000	>1,300,000	>650,000

# of light liquid and gas equipment components	3,600	6,800	5,800	4,300

[a] Appendix A of docket item IV-D-22. Extract from Table 2-1, Comparison of Selected Petroleum Marketing Terminals Characteristics.

Consequently, it was assumed that the average of the number of light liquid and gas components at terminals A and D (approximately 4,000 components) represent the Model Plant 4 facility.

Also provided in the API data was information that approximated the percentage of each component type and service occurring at a bulk gasoline terminal. These data are summarized in Table C-3.

Based on the assumption made at proposal that Model Plant 4 has 12 loading arms (3 loading arms per rack), it was assumed that there are 12 loading arm valves (LAV's) in liquid service and 4 LAV's in gas vapor service (1 vapor return line per loading rack). All other equipment component types were estimated using the distribution of component types (by percent) shown in Table C-3 (excluding components in heavy liquid service). The total equipment populations for bulk terminal Model Plants 1, 2, and 3 were estimated by scaling down Model Plant 4 using the ratio of the number of components for each model plant shown in Table 5-3 of BID, Volume 1. For example, at proposal it was estimated that Model Plant 1 has 100 components and Model Plant 4 has 170 components. To re-estimate the total number of equipment components for Model Plant 1, the ratio of 100/170 was applied to the total number of components in Model Plant 4 (approximately 4,000). The total equipment populations for Model Plants 1, 2, and 3 were distributed into the various component types using the same methodology as used for Model Plant 4. The distribution of the total number of components for each of the bulk terminal model plants is shown in Table C-4.

C.2.1 Equipment Populations for Breakout Stations

The API provided equipment counts for 36 pipeline breakout stations in Appendix B of their comments (IV-D-22). These data are summarized in Table C-5. As shown in Table C-5, the range of the number of component types varies significantly among breakout stations. For example, the number of fitting/connectors ranges from 15 components at the code-named "Plum" facility to 169,587 components at the "Zucchini" facility. Also, there was no

TABLE C-3. OCCURRENCE OF COMPONENT TYPES AT BULK TERMINALS[a]

Component Type and Service	Percent of Total
Connector:	
Gas Vapor	5.15
Heavy Liquid	5.22
Light Liquid	74.86
Valves:	
Gas Vapor	0.57
Heavy Liquid	1.3
Light Liquid	10.48
Loading Arm Valves:	
Gas Vapor	0.2
Heavy Liquid	0.04
Light Liquid	0.49
Open-Ended Lines:	
Gas Vapor	0.08
Heavy Liquid	0.08
Light Liquid	0.44
Pump Seals:	
Gas Vapor	NA
Heavy Liquid	0.05
Light Liquid	0.41
"Other"	
Gas Vapor	0.09
Heavy Liquid	0.03
Light Liquid	0.51

Total	100.00

[a] Appendix A of docket item IV-D-22. Extract from Table 5-13, Summary of Components Studied.

discussion regarding the throughput characteristics for any of the breakout stations.

At proposal, EPA assumed two model plant sizes for pipeline breakout stations (see Table 5-2 of BID, Volume 1). The average number of components shown in Table C-5 was distributed among the two model plants by assuming that Model Plant 1 has 50 percent of the average number of each component type and that Model Plant 2 has 150 percent of the average number of each component type.

TABLE C-4. EQUIPMENT COMPONENT POPULATIONS AT BULK TERMINALS

	MP1 # Comp.	MP2 # Comp.	MP3 # Comp.	MP4 # Comp.
Pump seals				
LL[a]	10	15	15	20
Valves	290	350	400	500
Connectors	2,000	2,400	2,700	3,400
Loading Arm Valves				
gas[b]	2	3	3	4
LL[a]	6	9	9	12
Open-Ended Lines				
gas[b]	7	8	8	12
LL[a]	7	8	8	12
Other[c]	15	17	20	25
# Comp.	2,337	2,810	3,163	3,985
# Facilities	410	230	280	100

[a] LL = light liquid service.
[b] gas = gas vapor service.

[c] "Other" - as stated in Appendix A of API's comments, includes components such as hatches, covers, manholes, thermal wells, and pressure relief valves.

The revised number of components for breakout stations is shown in Table C-6.

C.3 REVISED NATIONWIDE BASELINE EQUIPMENT EMISSIONS

The revised equipment component populations shown in Tables C-4 and C-6 and the new emission factors shown in Table C-1 were used to recalculate the nationwide baseline emissions occurring from equipment leaks. The basic methodology used to recalculate the new baseline emissions (per model plant) is shown below.

$$\#\text{ of Facilities (per model plant)} \times \#\text{ components (by type)} \times \text{Emission Factor (lbs/hr)} \times 24\text{ hrs/day} \times \#\text{ operating } \frac{\text{days}}{\text{yr}} \times \frac{\text{Mg}}{2{,}204\text{ lbs}}$$

The total emissions for each model plant are added together over all model plant sizes to derive the nationwide totals. It

TABLE C-5. BREAKOUT STATION COMPONENT DATA (IV-D-22, App. A)

Station ID	#fittings/ conn.	Others	PRD's*	Pumps	Valves	Total
Avocado	343	140	129	110	1,397	2,119
Brussels Sprout	4,602	1,059	1,539	351	17,406	24,957
Cabbage	20,534	497	---	95	7,194	28,320
Cashew	2,550	239	53	40	830	3,712
Cauliflower	20	10	---	---	75	105
Chive	806	277	13	66	820	1,982
Cilantro	203	126	63	---	602	994
Date	6,322	253	96	137	4,829	11,637
Fig	24,481	792	48	7	7,137	32,465
Grape	855	19	10	6	220	1,110
Grapefruit	19,025	2,823	110	301	9,764	32,023
Kumquat	3,210	1,176	677	399	7,352	12,814
Leek	104	166	73	32	900	1,275
Lemon	15	10	---	---	50	75

Lettuce	12,918	189	602	75	5,971	19,755
Nutmeg	15	15	---	5	185	220
Okra	2,555	397	65	34	1,117	4,168
Olive	3,309	246	76	26	1,416	5,073
Papaya	2,500	79	32	19	794	3,424
Peanut	11,827	1,664	288	100	6,028	19,907
Pear	4,969	170	52	52	1,167	6,410
Pickle	10,437	500	2,442	253	8,117	21,749
Pistachio	756	13	36	24	435	1,264
Plum	15	---	---	4	85	104
Poi	3,394	121	286	77	1,760	5,638
Prune	68	20	---	12	232	332
Radish	470	245	10	50	2,350	3,125
Raisin	24,898	3,333	687	99	6,768	35,785
Rice	1,103	72	12	36	598	1,821
Spinach	130	56	10	18	460	674
Squash	6,425	622	600	109	2,971	10,727
Tangerine	671	20	1	4	161	857
Truffle	12,464	590	---	63	4,227	17,344
Turnip	128	112	34	---	396	670
Yam	955	43	69	11	373	1,451
Zucchini	169,587	8,589	2,729	1,358	85,948	268,211
Average	9,796	686	301	110	5,282	16,175

*PRD's = Pressure Relief Devices.

is assumed that bulk terminals operate 340 days per year and breakout stations operate 365 days per year). The nationwide emissions are summarized in Table C-7.

TABLE C-6. REVISED EQUIPMENT COMPONENT POPULATIONS FOR BREAKOUT STATIONS

	MP1 # Comp.	MP2 # Comp.	Emission Factor (lbs/hr)
Pump seals (2/pump) LL	110	330	0.00053
Valves -avg.	2,640	7,920	9.2E-05
Connectors -avg.	4,900	14,700	8.4E-05
Other -avg.	340	1,030	0.0003
# Comp.	7,990	23,980	
# Facilities	150	120	

TABLE C-7. NATIONWIDE BASELINE EQUIPMENT EMISSIONS FOR BULK TERMINALS AND BREAKOUT STATIONS

Baseline Emissions	Bulk Terminal[a] Equipment Emissions (Mg/yr)		Breakout Station[b] Equipment Emissions (Mg/yr)	
	HAP	VOC	HAP	VOC
Existing facilities	100	1,310	110	1,500
New[c] facilities	40	510	10	150
Total	140	1,820	120	1,650

[a] Facility operates 24 hours per day, 340 days per year.

[b] Facility operates 24 hours per day, 365 days per year.

[c] Approximately 24 percent of bulk terminal facilities are new and approximately 9 percent of breakout station facilities are new.

C.4 REFERENCES

II-A-17 Compilation of Air Pollutant Emission Factors, Fourth Edition (AP-42). U.S. Environmental Protection Agency, Research Triangle Park, NC. Section 9.1.3, Fugitive Emissions and Controls at Petroleum Refineries. September 1985.

III-B-1 Gasoline Distribution Industry (Stage I) - Background Information for Proposed Standards (NESHAP). EPA-453/R-94-002a. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. Research Triangle Park, NC. January 1994.

IV-D-22 Development of Fugitive Emission Factors and Emission Profiles for Petroleum Marketing Terminals, API Report Number 4588. March 1993. Appendix A of API's comments.

IV-D-22 Marketing Terminal and Pipeline Breakout Station Data. Prepared by Hal Taback Co., Phillips Ranch, CA. April 5, 1994. Appendix B of API's comments.

APPENDIX D.

REVISIONS TO THE NATIONWIDE EMISSION REDUCTION AND COST ESTIMATES

The purpose of this appendix is to discuss the methodology used and to present the results of the calculation of the nationwide emission reductions and costs of the final regulatory action. Section D.1 discusses the emission reductions and Section D.2 discusses the compliance cost estimates that have been revised since proposal.

As discussed in Section 1.1, several regulatory requirements have been changed since proposal and this has affected both the HAP emission reductions and the cost impacts of this rulemaking. Table D-1 summarizes the revised nationwide emission reductions and compliance costs resulting from the final rule. Tables D-2 and D-3 summarize the revised baseline emissions resulting from the new assumptions (e.g., revisions to the equipment leak and cargo tank leakage emission factors).

D.1 NATIONWIDE EMISSION REDUCTIONS

As discussed in Section 10.2, EPA's estimate at proposal of a nationwide average gasoline Reid vapor pressure (RVP) of 11.4 psia has been reduced based on recent EPA analyses. The new value of 10.4 psia has the effect of lowering the emission factors used to calculate baseline emissions. Since these emission factors are lower, the number of facilities estimated to satisfy the major source definition (10 tpy of a single HAP or 25 tpy of a combination of HAP's) is now lower than at proposal. Table D-4 presents the estimated number of bulk terminals and pipeline breakout stations that will be affected sources under

TABLE D-1. SUMMARY OF NATIONWIDE EMISSION REDUCTIONS AND COST IMPACTS OF THE FINAL RULE

NEW FACILITIES

	Promulgated Action					
	HAP Red. (Mg/yr)	VOC Red. (Mg/yr)	Cap. Cost ($1000)	Ann. Cost ($1000)	HAP C/E ($/Mg)	VOC C/E ($/Mg)
<u>Breakout Stations</u>						
Storage Tanks (NSPS Kb)	0	0	0	0	---	---
Equipment Leaks						
Monthly Visual	UD	UD	0	<1	0	0
Quarterly Visual	UD	UD	0	<1	0	0
Recordkeeping & Reporting	NA	NA	0	4	NA	NA
<u>Bulk Terminals</u>						
Loading Racks (@ 10 mg/l)	55	950	7,700	1,800	32,700	1,900
Storage Tanks (NSPS Kb)	0	0	0	0	---	---
T.T. Leakage (annual vapor tightness @ 1 inch)	10	150	0	0	---	---
Equipment Leaks	UD	UD	0	11	0	0
Monthly Visual	UD	UD	0	3	0	0
Quarterly Visual	NA	NA	0	672	NA	NA
Recordkeeping & Reporting						
TOTALS*	65	1,100	$7,700	$2,490	$38,300	$2,260
w/o Recordkeeping and Reporting	65	1,100	$7,700	$1,818	$28,000	$1,650

EXISTING FACILITIES

	Promulgated Action						
	HAP Red. (Mg/yr)	VOC Red. (Mg/yr)	Cap. Cost ($1000)	Ann. Cost ($1000)	HAP C/E ($/Mg)	VOC C/E ($/Mg)	Inc. HAP C/E ($/Mg)
<u>Breakout Stations</u>							
Storage Tanks							
Floor	430	5,700	11,720	(2,249)	(5,190)	(390)	
+ EFRT Fittings	446	5,910	11,986	(2,244)	(5,000)	(380)	(340)
+ IFRT Fittings	449	5,950	12,106	(2,258)	(5,030)	(370)	4,800
Equipment Leaks							
Monthly Visual	UD	UD	0	4	0	0	
Quarterly Visual	UD	UD	0	<1	0	0	
Record & Reporting	NA	NA	0	37	NA	NA	
<u>Bulk Terminals</u>							
Loading Racks (@ 10 mg/l)	710	12,500	55,200	8,150	11,500	2,700	
Storage Tanks							
Floor	600	10,800	33,700	3,466	5,780	320	
+ EFRT Fittings	650	11,715	34,606	3,378	5,200	290	(1,750)
+ IFRT Fittings	658	11,850	35,020	3,425	5,210	290	
T.T. Leakage							6,000
(annual vapor tightness @ 1 inch)	240	4,500	7,600	2,000	10,500	540	
Equipment Leaks	UD	UD	0	28	0	0	
Monthly Visual	UD	UD	0	7	0	0	
Quarterly Visual	NA	NA	0	1,660	NA	NA	
Record & Reporting							

TOTALS**	2,046	34,625	$109,392	$13,013	$6,360	375
w/o Record & Reporting	2,046	34,625	$109,392	$11,316	$5,530	330
TOTAL NEW & EXISTING	2,111	35,725	$117,092	$15,503	$7,340	$430
w/o Record and Report	2,111	35,725	$117,092	$13,134	$6,200	$370

* Totals include monthly visual leak inspections.
** Totals assume that storage tanks must meet NSPS subpart Kb rim seal requirement and EFRT's adding rim seals must also add controlled fittings. Also assumes monthly visual leak inspections.
UD = undetermined.

TABLE D-2. BASELINE EMISSIONS FROM PIPELINE BREAKOUT STATIONS

Facilities	Storage Tank Emissions (Mg/yr)		Equipment Leak Emissions (Mg/yr)		Total Emissions (Mg/yr)	
	HAP	VOC	HAP	VOC	HAP	VOC
Existing	6,320	83,460	110	1,500	6,430	84,960
New	50	630	10	150	60	780
TOTAL	6,370	84,090	120	1,650	6,490	85,740

TABLE D-3. BASELINE EMISSIONS FROM BULK TERMINALS

Facilities	Loading Rack Emissions (Mg/yr)		Tank Truck Leakage Emissions (Mg/yr)		Equipment Leak Emissions (Mg/yr)		Storage Tank Emissions (Mg/yr)		Total Emissions (Mg/yr)	
	HAP	VOC	HAP	VOC	HAP	VOC	HAP	VOC	HAP	VOC
Existing	3,210	59,450	1,180	21,270	100	1,310	4,390	70,100	8,880	152,130
New	250	4,070	90	1,610	40	510	540	9,050	920	15,240
TOTAL	3,460	63,520	1,270	22,880	140	1,820	4,930	79,150	9,800	167,370

TABLE D-4. NUMBER OF AFFECTED SOURCE BULK TERMINALS AND PIPELINE BREAKOUT STATIONS

Facility Type	Model Plant 1	2	3	4	Total
Bulk Terminals	0	15	166	61	242
Breakout Stations	0	20	--	--	20

the final rule for each model plant size. There may be additional terminals and pipeline facilities affected by this rule as a result of being collocated on plant sites with other HAP-emitting sources. However, data are not available to distinguish these facilities from those included in these estimates. Since both groups are likely to be composed of large sources, the difference is not considered significant.

Table D-5 shows the potential total HAP emissions occurring at pipeline breakout stations and at gasoline bulk terminals that have uncontrolled loading racks. The HAP emissions were calculated assuming HAP contents of 4.8 percent (representing the arithmetic average HAP content of normal gasoline), 11.0 percent (representing the maximum HAP content of normal gasoline), and 16.0 percent (representing the average HAP content of reformulated/oxygenated gasoline). Since Table D-5 estimates the total potential HAP emissions occurring at each of the model plant facilities, potential major sources occur where the total HAP emissions exceed 25 tons per year (tpy). As can be seen in the table, no breakout stations are classified as major sources under the 25 tpy criteria. As can also be seen from the table, either the larger bulk terminals or those terminals that handle reformulated or oxygenated gasoline may be considered major sources.

Table D-6 shows the potential maximum single HAP emissions occurring at both pipeline breakout stations and bulk gasoline terminals assuming a HAP content of 11.0 percent (represents the MTBE content of reformulated/oxygenated gasoline). Since Table

TABLE D-5. MODEL PLANT POTENTIAL TOTAL HAP EMISSIONS

	POTENTIAL EMISSIONS FROM MODEL PLANTS (tons/year)											
	Model Plant 1 HAP/VOC%			Model Plant 2 HAP/VOC%			Model Plant 3 HAP/VOC%			Model Plant 4 HAP/VOC%		
	4.8	11.0	16.0	4.8	11.0	16.0	4.8	11.0	16.0	4.8	11.0	16.0
BREAKOUT STATIONS												
Storage Vessels	3.4	7.8	11.4	4.3	9.8	14.3						
Fugitive Emissions	0.2	0.4	0.6	0.5	1.2	1.7						
Total Emissions	3.6	8.2	12.0	4.8	11.0	16.0						
BULK TERMINALS												
Truck Loading Racks	4.1	9.5	13.9	10.4	23.8	34.7	20.8	47.6	69.3	41.5	95.3	138.9
Storage Vessels	1.9	4.3	6.1	2.5	5.7	8.3	3.1	7.1	10.3	3.7	8.5	12.4
Fugitive Emissions	0.1	0.2	0.3	0.1	0.2	0.3	0.1	0.2	0.3	0.1	0.3	0.5
Total Emissions	6.1	14.0	20.3	13.0	29.7	43.3	24.0	49.9	79.9	45.3	104.1	151.8

TABLE D-6. MODEL PLANT MAXIMUM INDIVIDUAL HAP EMISSIONS

	POTENTIAL EMISSIONS FROM MODEL PLANTS USING REFORMULATED AND OXYGENATED GASOLINE WITH MTBE ASSUMING HAP/VOC% OF 11.9[a] (tons/year)			
	Model Plant 1 MTBE Emissions	Model Plant 2 MTBE Emissions	Model Plant 3 MTBE Emissions	Model Plant 4 MTBE Emissions
BREAKOUT STATIONS				
Storage Vessels	8.4	10.6		
Fugitive Emissions	0.4	1.3		
Total Emissions	8.8	11.9		
BULK TERMINALS				

Truck Loading Racks	10.3	25.7	51.5	103.1
Storage Vessels	4.7	6.2	7.7	9.2
Fugitive Emissions	0.2	0.2	0.2	0.3
Total Emissions	15.2	32.1	59.4	112.6

[a] MTBE is 74 percent of total HAP emissions for this category.

D-6 estimates the maximum single HAP emissions occurring at each of the model plant facilities, potential major sources occur where the total HAP emissions exceed 10 tpy. As can be seen from the table, model plant 2 pipeline breakout stations would be classified as major source facilities and all bulk gasoline terminals model plant facilities would be classified as major sources. Based on this analysis, either large facilities or facilities which handle gasoline reformulated/oxygenated with MTBE will classify as major sources. Such facilities are expected to occur in attainment areas and in ozone and carbon monoxide nonattainment areas.

D.1.1 Fugitive Leaks

As presented and discussed in Appendix C, the equipment leak emission factors and equipment count/populations have been revised since proposal. National emission estimates for equipment leaks presented in Tables D-2 and D-3 are taken from Table C-5 in Appendix C. The EPA has determined that the factors supplied by industry represent a controlled situation because the data on which the factors are based are comprised predominantly of facilities that utilize a leak detection and repair (LDAR) program or a visual inspection program. The EPA does not have any data regarding current uncontrolled emission factors and so cannot determine the emission reductions generated by the monthly visual inspection program. As seen in Table D-1, emission reductions resulting from the visual inspection program are undetermined (UD) for both new and existing facilities.

D.1.2 Storage Vessels

As discussed in Sections 10.1 and 10.2, the storage tank emission factors have been recalculated using the latest estimation techniques described in Chapter 12 of AP-42 (IV-A-2) and the estimated nationwide RVP of gasoline has been reduced from 11.4 psia to 10.4 psia. The revised storage tank emission factors are summarized in Tables D-7 and D-8. At proposal, the emission reductions from existing storage vessels were calculated including only the emissions reduced due to rim seal retrofits.

However, the revised emission reductions include the reductions achieved by installing controlled fittings on all external

TABLE D-7. EMISSION FACTORS FOR PIPELINE BREAKOUT STATION STORAGE VESSELS[a,b]

Type of Emission	VOC Factor NonWinter	VOC Factor Winter	Units
Fixed-Roof Uncontrolled			
Breathing losses	33.5	47.2	Mg VOC/yr/tank
Working losses	433.3	564	Mg VOC/yr/tank
Internal Floating Roof			
Vapor-mounted rim seal losses	2.05	2.87	Mg VOC/yr/tank
Liquid-mounted rim seal losses	0.92	1.29	Mg VOC/yr/tank
Vapor primary and secondary seal	0.76	1.07	Mg VOC/yr/tank
Uncontrolled fitting losses[c]	2.36	3.31	Mg VOC/yr/tank
Controlled fitting losses[d]	1.61	2.25	Mg VOC/yr/tank
Deck seam losses	2.08	2.9	Mg VOC/yr/tank
Working losses	7.33×10^{-8}		Mg VOC/bbl throughput
External Floating Roof			
Standing Storage losses			
Primary seal[e]	14.0	19.61	Mg VOC/yr/tank
Secondary seal[f]	6.27	8.79	Mg VOC/yr/tank
Primary + secondary + fittings[g]	4.63	6.38	Mg VOC/yr/tank
Working losses	4.61×10^{-8}		Mg VOC/bbl throughput

[a] Emission factors calculated with equations from Chapter 12 of AP-42 (using the TANKS program) using a nonwinter RVP of 9.3 psi, a winter RVP of 12.8 psi, and a temperature of 60°F.

[b] Assumes storage vessels at pipeline breakout stations have a capacity of 8,000 m^3 (50,000 bbl), a diameter of 30 meters (100 feet), and a height of 12 meters (40 feet).

[c] Calculated assuming the "typical" level of control in the "TANKS" program.

[d] Calculated assuming the "controlled" level of control in the "TANKS" program.

[e] Assumes that the EFRT is equipped with a primary metallic shoe seal and uncontrolled fittings.

[f] Assumes that the EFRT is equipped with a shoe-mounted secondary seal and uncontrolled fittings.

[g] Assumes that the EFRT is equipped with a primary metallic shoe seal, a shoe-mounted secondary seal, and controlled fittings.

TABLE D-8. EMISSION FACTORS FOR BULK TERMINAL STORAGE VESSELS[a]

Type of Emission	VOC Factor Nonwinter	VOC Factor Winter	Units
Fixed-Roof Uncontrolled[b]			
Breathing losses	8.55	12.0	Mg VOC/yr/tank
Working losses	32.3	42.1	Mg VOC/yr/tank
Internal Floating Roof[b]			
Vapor-mounted rim seal losses	1.02	1.44	Mg VOC/yr/tank
Liquid-mounted seal losses	0.46	0.64	Mg VOC/yr/tank
Vapor primary and secondary	0.38	0.54	Mg VOC/yr/tank
Uncontrolled fitting losses[d]	1.01	1.42	Mg VOC/yr/tank
Controlled fitting losses[e]	0.69	0.97	Mg VOC/yr/tank
Deck seam losses	0.52	0.73	Mg VOC/yr/tank
Working losses	7.33×10^{-8}		Mg VOC/bbl
External Floating Roof[c]			
Standing Storage losses			
Primary seal[f]	11.4	15.98	Mg VOC/yr/tank
Secondary seal[g]	5.38	7.54	Mg VOC/yr/tank
Primary + Secondary +	3.49	4.88	Mg VOC/yr/tank
Working losses	4.61×10^{-8}		Mg VOC/bbl

[a] Emission factors calculated with equations from Chapter 4.3 of AP-42 (TANKS program) using a nonwinter RVP of 9.3 psia, a winter RVP of 12.8 psia, and a temperature of 60°F.

[b] Assumes fixed-roof and IFRT's at bulk terminals have a capacity of 2,680 m^3 (16,750 bbl), a diameter of 15.2 meters (50 feet), and a height of 14.6 meters (48 feet).

[c] Assumes EFRT's at bulk terminals have a capacity of 5,760 m^3 (36,000 bbl), a diameter of 24.4 meters (78 feet), and a height of 12.5 meters (40 feet).

[d] Calculated assuming the "controlled" level of control in the "TANKS" program.

[e] Assumes that the EFRT is equipped with a primary metallic shoe seal and uncontrolled fittings.

[f] Assumes that the EFRT is equipped with a primary metallic shoe seal and uncontrolled fittings.

[g] Assumes that the EFRT is equipped with a shoe-mounted secondary seal and uncontrolled fittings.

[h] Assumes that the EFRT is equipped with a primary metallic shoe seal, a shoe-mounted sec. seal and uncontrolled fittings.

floating roof tanks that are taken out of service to perform the rim seal retrofits. As seen in Table D-1, the emission reductions for existing storage tanks located at breakout stations are estimated at 446 Mg of HAP per year (430 Mg reduced by adding rim seals and 16 Mg reduced by adding controlled fittings to EFRT's). Similarly, emission reductions for existing storage tanks located at bulk terminals are estimated at 650 Mg of HAP per year (600 Mg reduced by adding rim seals and 50 Mg reduced by adding controlled fittings to EFRT's). As noted at proposal and shown in Table D-1, new gasoline storage tanks will be subject to NSPS subpart Kb requirements; therefore, the final rule will not achieve any emission reductions from new tanks.

D.1.3 Cargo Tank Leakage

The EPA's estimates of nationwide baseline emissions and emission reductions related to cargo tank leakage at new bulk terminals have been revised significantly since proposal. First, the proposed vacuum assist requirement has been deleted from the rule and replaced with a multi-level cargo tank certification and testing program similar to the one in California (see Sections 5.3 and 7.2). The estimated leakage emission factor for the loading of cargo tanks that are certified at the 1-inch decay limit is 8 mg/liter. Secondly, the controlled tank truck leakage factor has been revised from 10 percent volume leakage loss to 1.3 percent for tank trucks operating in areas where an annual vapor tightness testing program (at 3 inches allowable drop in pressure) is implemented. The new leakage emission factor for cargo tanks in the 3-inch testing program is 13 mg/l, as calculated in Section A.2 of this document. A computational error was discovered after proposal which led to an underestimation of the HAP emission reductions from existing cargo tank leakage. Correcting the error and considering the additional benefits of the revised certification and testing requirements, the nationwide HAP emission reduction for cargo tank leakage at existing terminals is 240 Mg of HAP per year.

D.1.4 Loading Rack Emissions

Due to a computational error discovered after proposal, the estimate of HAP emission reductions from loading racks has increased from 670 to 710 Mg per year.

D.2 NATIONWIDE COSTS OF THE REGULATORY ACTION

D.2.1 Equipment Leaks

Industry indicated that the costs associated with performing a visual inspection program to identify leaking equipment would be minimal since most facilities were already implementing such a program (IV-E-2). Using the data received from industry (IV-D-22, Appendix B), EPA estimated that approximately 81 percent of the industry is already implementing some type of visual inspection program. Therefore, it was assumed that 19 percent of the industry did not perform any type of visual inspection program to identify equipment leaks. The EPA assumed that the equipment at a bulk terminal can be visually inspected in approximately 2 hours and the equipment at a breakout station can be visually inspected in 3 hours. Assuming an average labor rate of $35 per hour, the nationwide annual cost to implement a monthly visual program at gasoline bulk terminals and pipeline breakout stations is calculated as follows:

<u>Bulk Terminals</u>

0.19 x 242 major sources x 2 hrs/monitoring x 12 monitorings/year x $35/hr = $38,600/yr.

Breakout Stations

0.19 x 20 major sources x 3 hrs/monitoring x 12 monitorings/year x $35/hr = $4,800/yr.

As shown above, the nationwide annual cost to implement a monthly visual inspection program is relatively insignificant. The EPA assumed that industry would not incur any capital costs to initiate such a program.

D.2.2 Storage Vessels

As discussed in Appendix B, storage vessel degassing and cleaning costs and the costs of controlled fittings were reevaluated, which increased the overall compliance cost for storage vessels. Tables B-21 and B-22 in Appendix B summarized the model tank and nationwide costs to bring all storage vessels at affected facilities to the NSPS subpart Kb rim seal requirements. Tables B-23 and B-24 presented costs for all such tanks to achieve compliance with the subpart Kb rim seal and fitting control requirements. Table D-1 combines this cost information in presenting the compliance costs for controlling all storage vessels to the level of the final rule. Existing storage vessels already having the required rim seals are not required to install controlled fittings under the final rule, so these impacts were not evaluated. Also, since new storage vessels at new and existing facilities are already required to satisfy the full NSPS subpart Kb requirements, impacts on new storage vessels were not calculated.

D.2.3 Cargo Tanks

As discussed in Section A.3 of Appendix A, EPA cannot discern a cost difference in implementing the new annual cargo tank certification and testing requirements at 1 inch pressure decay versus the proposal 3-inch pressure decay test. As a result, no additional cost impact was assumed to occur for owners or operators to meet the final cargo tank testing requirements discussed in Sections 5.3 and 7.2.

D.2.4 Loading Racks

The model plant costs for complying with the 10 mg/liter emission standard have not changed since proposal. However, the nationwide cost impacts have been reduced because 33 fewer bulk terminal sources are expected to be impacted due to the decrease in the RVP of gasoline, which causes fewer terminals to be considered major HAP sources. The number of pipeline breakout stations affected by this rulemaking (20 facilities) has not changed.

D.2.5 Reporting and Recordkeeping

The EPA's nationwide reporting and recordkeeping cost estimates were reevaluated after proposal. The revised nationwide annual cost for bulk terminal respondents to meet the reporting and recordkeeping requirements is estimated at $2,331,700, representing 66,620 hours of annual reporting and recordkeeping. The revised nationwide annual cost for pipeline breakout station respondents to meet the reporting and recordkeeping requirements is estimated at $40,910, representing 1,169 hours of annual reporting and recordkeeping. The overall cost for affected gasoline distribution facilities is 67,790 hours and $2,372,600 per year.

TECHNICAL REPORT DATA

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16. ABSTRACT

National emission standards for hazardous air pollutants (NESHAP) are promulgated for the gasoline distribution industry under authority of Section 112(d) of the Clean Air Act as amended in 1990. This background information document provides technical information and analyses used in the development of the final NESHAP and Agency responses to public comments on the proposed rule. The alternatives analyzed are to limit emissions of hazardous air pollutants (HAPs) from existing and new Stage I gasoline distribution facilities. Gasoline vapor emissions contain about ten of the listed HAPs. Stage I sources include bulk gasoline terminals and plants, pipeline facilities, and underground storage tanks at service stations. Emissions of HAP's from these facilities occur during gasoline tank truck and railcar loading, gasoline storage, and from vapor leaks from tank trucks, pumps, valves, flanges and other equipment in gasoline service.

17. KEY WORDS AND DOCUMENT ANALYSIS

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