

U.S. ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 60 and 63

[AD-FRL]

RIN 2060-AD94

National Emission Standards for Hazardous Air Pollutants:
Petroleum Refineries

AGENCY: U.S. Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: This final rule promulgates national emission standards for hazardous air pollutants (NESHAP) for petroleum refineries. This rule implements section 112 of the Clean Air Act (Act) and are based on the Administrator's determination that petroleum refineries emit organic hazardous air pollutants (HAP's) identified on the EPA's list of 189 HAP's. The petroleum refinery NESHAP requires petroleum refineries located at major sources to meet emission standards reflecting the application of the maximum achievable control technology (MACT), consistent with sections 112(d) and (h) of the Act. The petroleum refinery affected source is defined to include petroleum refinery process units, marine tank vessel loading operations, and gasoline loading rack operations classified under Standard Industrial Classification (SIC) code 2911 emission points located at

petroleum refineries. The petroleum refinery affected source and source category description are revised to reflect the inclusion of these emission points.

This action also amends two standards of performance for two stationary sources: standards of performance for equipment leaks of volatile organic compounds (VOC) in the synthetic organic chemicals manufacturing industry (SOCMI); and standards of performance for VOC emissions from petroleum refinery wastewater systems. The amended standards were previously promulgated under section 111 of the Act.

EFFECTIVE DATE: [Insert date of publication in the Federal Register here.] See the Supplementary Information section concerning judicial review.

ADDRESSES: Docket. Docket No. A-93-48, containing information considered by the EPA in development of the promulgated standards, is available for public inspection between 8:00 a.m. and 4:00 p.m., Monday through Friday except for Federal holidays, at the following address: U.S. Environmental Protection Agency, Air and Radiation Docket and Information Center (MC-6102), 401 M Street SW, Washington DC 20460; telephone: (202) 260-7548. The docket is located at the above address in Room M-1500,

Waterside Mall (ground floor). A reasonable fee may be charged for copying.

Response to Comment Document. The response to comment document for the promulgated standards may be obtained from the U.S. EPA Library (MD-35), Research Triangle Park, North Carolina 27711, telephone (919) 541-2777; or from the National Technical Information Services, 5285 Port Royal Road, Springfield, Virginia 22151, telephone (703) 487-4650. Please refer to "National Emission Standards for Hazardous Air Pollutants, Petroleum Refineries-Background Information for Final Standards, Summary of Public Comments and Responses" (EPA No-453/R-95-015b). The document contains: (1) A summary of all the public comments made on the proposed standards and the Administrator's response to the comments; and (2) a summary of the changes made to the standards since proposal. This document is also available for downloading from the Technology Transfer Network (see below) under the Clean Air Act, Recently Signed Rules.

Technology Transfer Network. The Technology Transfer Network is one of the EPA's electronic bulletin boards. The Technology Transfer Network provides

information and technology exchange in various areas of air pollution control. The service is free except for the cost of a phone call. Dial (919) 541-5472 for up to a 14,400 bps modem. If more information on the Technology Transfer Network is needed call the HELP line at (919) 541-5384.

FOR FURTHER INFORMATION CONTACT: For information concerning the final standards, contact Mr. James Durham, Waste and Chemical Processes Group, Emission Standards Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina, 27711, telephone number (919) 541-5672.

SUPPLEMENTARY INFORMATION: Judicial Review. National emission standards for HAP's for petroleum refineries were proposed in the Federal Register (FR) on July 15, 1994 (59 FR 36130). This Federal Register action announces the EPA's final decisions on the rule. Under section 307(b)(1) of the Act, judicial review of the NESHAP is available only by the petition for review in the U.S. Court of Appeals for the District of Columbia Circuit within 60 days of today's publication of this final rule. Under section 307(b)(2) of the Act, the requirements that are the subject of today's notice may

not be challenged later in civil or criminal proceedings brought by the EPA to enforce these requirements.

The following outline is provided to aid in reading the preamble to the final regulation.

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 - I. Background

Section 112(b) of the Act lists 189 HAP's and directs the EPA to develop rules to control all major and some area sources emitting HAP's. On July 16, 1992

(57 FR 31576), the EPA published a list of major and area sources for which NESHAP are to be promulgated.

Petroleum refineries were listed as a category of major sources. On December 3, 1993 (58 FR 83941), the EPA published a schedule for promulgating standards for the listed major and area sources. Standards for the petroleum refinery source category for sources not distinctly listed were scheduled for promulgation on November 15, 1994. The EPA is promulgating these standards under a July 28, 1995 court-ordered deadline.

II. Summary of Considerations in Developing the Rule

A. Purpose of Regulation

The Act was developed, in part,

to protect and enhance the quality of the Nations air resources so as to promote the public health and welfare and the productive capacity of its population [the Act, section 101(b)(1)].

Petroleum refineries are major sources of HAP emissions.

Individual refineries emit over 23 megagrams per year (Mg/yr) (25 tons per year (tpy)) of organic HAP's including benzene, toluene, ethyl benzene, and other HAP's. The HAP's controlled by this rule are associated with a variety of adverse health effects. The range of adverse health effects include cancer and a number of

other chronic health disorders (e.g., aplastic anemia, pancytopenia, pernicious anemia, pulmonary (lung) structural changes) and a number of acute health disorders (e.g., dyspnea (difficulty in breathing), upper respiratory tract irritation with cough, conjunctivitis, neurotoxic effects (e.g., visual blurring, tremors, delirium, unconsciousness, coma, convulsions). Table 1 presents the 11 most significant organic HAP's emitted from the petroleum refineries. Petroleum refineries also emit inorganic HAP's (e.g., hydrogen fluoride, hydrogen chloride). Inorganic HAP emissions from the emission points covered under this rule are low relative to organic HAP emissions. Emission points emitting inorganic HAP's are included in a separate source category under a separate schedule.

TABLE 1. SIGNIFICANT HAZARDOUS AIR POLLUTANTS FROM
PETROLEUM REFINERIES

| Hazardous Air Pollutant | |
|-------------------------|-------------------------|
| 2,2,4-Trimethylpentane | Methyl tert butyl ether |
| Benzene | Naphthalene |
| Cresols/cresylic acid | Phenol |
| Ethylbenzene | Toluene |
| Hexane | Xylenes |
| Methyl ethyl ketone | |

The catalytic cracking unit catalyst regeneration vent emits primarily metal HAP's, which would be controlled using particulate controls. Catalytic reformer catalyst regeneration vents emit hydrogen chloride, and sulfur plant vents emit carbonyl sulfide and carbon disulfide. Because of these compounds' unique characteristics, the EPA concluded that these emission points warranted separate consideration for control of inorganic HAP's. Because limited data are currently available, these emission points are included in a separate source category under a separate schedule.

The Regulatory Impacts Analysis (RIA) presents the results of an examination of the potential health and welfare benefits associated with air emission reductions projected as a result of implementation of the petroleum refinery NESHAP. Of the pollutants emitted by petroleum refineries, some are classified as VOC, which are ozone precursors. Benefits from HAP emission reductions are presented separately from the benefits associated specifically with VOC emission reductions.

The predicted emissions of a few HAP's associated with this regulation have been classified as possible,

probable, or known human carcinogens. Benzene and cresols are the two HAP's identified as carcinogens.

Benzene is classified as a class A or a known human carcinogen. Benzene is a concern to the EPA because long term exposure to this chemical causes an increased risk of cancer in humans, and is also associated with aplastic anemia, pancytopenia, chromosomal breakages, and weakening of the bone marrow.

Cresols are classified as class C or possible human carcinogens. For this HAP, there is either inadequate data or no data on human carcinogenicity. Therefore, while cancer risk is a possibility, there is not sufficient evidence to quantify the increased cancer risk to humans caused by these chemicals.

There are serious health effects reported from exposure to some of the noncarcinogenic HAP's. These serious health effects typically occur at higher levels of exposure than estimated for the regulatory baseline. Exposure to phenol is very toxic to animals and increases mortality, but there is little human data. Exposure to n-hexane can cause polyneuropathy (muscle weakness and numbness) in humans, and exposure to naphthalene is linked to cataracts and anemia in human infants. It is

also possible that there are less serious health effects in the regulatory baseline from exposure to these HAP's.

Emissions of VOC have been associated with a variety of health and welfare impacts. Volatile organic compound emissions, together with nitrogen oxides (NO_x), are precursors to the formation of tropospheric ozone.

Exposure to ambient ozone is responsible for a series of health impacts, such as alterations in lung capacity; eye, nose, and throat irritation; malaise and nausea; and aggravation of existing respiratory disease. Among the welfare impacts from exposure to ambient ozone include damage to selected commercial timber species and economic losses for commercially valuable crops such as soybeans and cotton.

Based on existing data, the benefits associated with reduced HAP and VOC emissions were quantified. The quantification of dollar benefits for all benefit categories is not possible at this time because of limitations in both data and available methodologies. Although an estimate of the total reduction in HAP emissions for various regulatory alternatives has been developed for the RIA, it has not been possible to identify the speciation of the HAP emission reductions

for each type of emission point. However, an estimate of HAP speciation for equipment leaks has been made. Using emissions data for equipment leaks and the Human Exposure Model (version 1), the annual cancer risk caused by HAP emissions from petroleum refineries was estimated.

Generally, this benefit category is calculated as the difference in estimated annual cancer incidence before and after implementation of each regulatory alternative. Since the annual cancer incidence associated with baseline conditions was less than one life per year, the cancer benefits associated with HAP reductions for the petroleum refinery NESHAP were determined to be low. Therefore, these quantified benefits are not part of the overall quantified benefits estimate for the analysis.

The benefits of reduced emissions of VOC from a MACT regulation of petroleum refineries were quantified using the technique of "benefits transfer." Because analysis by the Office of Technology Assessment from which benefits transfer values were obtained only estimated acute health benefits in ozone nonattainment areas, the transfer values can be applied to VOC reductions occurring only in ozone nonattainment areas. The range of benefit transfer values used in this analysis is from

\$25 to \$1,574 per megagram (Mg) (\$23 to \$1,431 per ton) of VOC with an average of \$800/Mg (\$727/ton) of VOC.

In order to quantify benefits from VOC emission reductions, the average value is multiplied by VOC emission reductions from petroleum refineries in ozone nonattainment areas. Estimated annual benefits for VOC reductions are \$108.8 million for selected regulatory alternatives. The quantified annual benefits exceed annual compliance costs by \$29.8 million (1992 dollars).

The promulgated NESHAP will reduce HAP emissions from petroleum refineries by 59 percent. Table 2 presents the national baseline emissions and emission reductions for petroleum refinery process vents, storage vessels, wastewater, and equipment leaks. The emissions

reductions for controlling gasoline loading racks and the marine vessel loading emission points are discussed in supporting material for the Gasoline Distribution (Stage I) and the Marine Vessel Loading Operations rules.

TABLE 2. NATIONAL PRIMARY AIR POLLUTION IMPACT IN THE FIFTH YEAR

| Source | Baseline emissions (Mg/yr) | | Emission reductions | | | |
|-------------------------------------|----------------------------|---------|---------------------|---------|-----------|-----|
| | | | (Mg/yr) | | (Percent) | |
| | HAP | VOC | HAP | VOC | HAP | VOC |
| Miscellaneous process vents | 10,000 | 109,000 | 6,700 | 85,000 | 67 | 78 |
| Equipment leaks | 52,000 | 189,000 | 40,000 | 146,000 | 77 | 77 |
| Storage vessels | 9,300 | 111,000 | 1,300 | 21,000 | 14 | 19 |
| Wastewater collection and treatment | 10,000 | 10,000 | a | a | a | a |
| Total | 81,300 | 419,000 | 48,000 | 252,000 | 59 | 60 |

^a The MACT level of control is no additional control.

B. Technical Basis of Regulation

National emission standards for major sources of HAP's established under section 112 of the Act reflect MACT or:

...the maximum degree of reduction in emissions of the HAP...that the Administrator, taking into consideration the cost of achieving such emission reduction, and any nonair quality health and environmental impacts and energy requirements, determine is achievable for new or existing sources in the category or subcategory to which such emission standard applies...[the Act section 112(d)(2)].

Prior to proposal, section 114 questionnaires, information collection requests (ICR's), and telephone surveys were used to obtain information on emissions, emissions control, and emissions control costs for petroleum refinery emission points. Section 114 questionnaires were sent out to nine large refineries, of approximately 130 existing petroleum refineries nationally, to obtain emissions and emissions control information for equipment leaks, wastewater, process vents, and storage vessel emission points located in a petroleum refinery. The ICR's were sent out to the refineries that were not sent section 114 questionnaires to obtain information on emissions control equipment and emissions for process vents, storage vessels, and equipment leaks emission points. A telephone survey of

equipment vendors was conducted to obtain leak detection and repair (LDAR) cost information.

Data and information were received for approximately 130 petroleum refineries. This information was used, in part, as the technical basis in determining the MACT level of control for the process units covered under this rule. In addition to information collected from industry, the EPA used information on refinery locations and processes available in the general literature. The EPA also used control technology performance and cost information developed under previous rulemakings for the petroleum and chemical industries, such as the petroleum refinery new source performance standard (NSPS), benzene NESHAP, and synthetic organic chemical manufacturing industry (SOCMI) standards. The EPA also considered existing State regulations and additional information received during the public comment period for the proposed rule in developing the final rule.

C. Stakeholder and Public Participation

In the development of this rule, numerous representatives of the petroleum refinery industry were consulted prior to proposal. Industry representatives have included trade associations, and refiners responding

to section 114 questionnaires, ICR's, and telephone surveys. Representatives from State agencies and the EPA regions were also consulted and participated in the development of the rule.

The standards were proposed and published in the Federal Register on July 15, 1994 (59 FR 36130). The preamble to the proposed standard describes the rationale for the proposed rule. Public comments were solicited at the time of proposal.

To provide interested persons the opportunity for oral presentation of data, views, or arguments concerning the proposed standards, a public hearing was offered at proposal. A public hearing was held in Research Triangle Park, North Carolina, on August 5, 1994. The hearing was open to the public and four persons presented oral testimony. The public comment period was from July 15, 1994 to September 13, 1994. Sixty-two comment letters were received. Commenters included industry representatives, States, environmental organizations, and others. The comments have been carefully considered, and changes have been made in the proposed standards when determined by the Administrator to be appropriate. A detailed discussion of these comments and responses can

be found in the Response of Comment Document, which is referenced in the ADDRESSES section of this preamble. The summary of comments and responses in the document serve as the basis for the revisions that have been made to the standards between proposal and promulgation. Section V of this preamble discusses the major comments that resulted in changes to the standards.

III. Summary of Promulgated Standards

The promulgated standard applies to petroleum refining process units as well as other colocated emission points that are part of a plant site that is a major source as defined in section 112 of the Act. The determination of potential to emit, and therefore major source status, is based on the total of all HAP emissions from all activities at the plant site. The applicability section of the regulation specifies what is included in the petroleum refining source category and defines the sources regulated by the NESHAP.

The general standards consist of compliance dates for new and existing sources, require sources to be properly operated and maintained at all times, and clarify the applicability of the NESHAP General Provisions (40 Code

of Federal Regulations (CFR) part 63, subpart A) to sources subject to subpart CC.

The affected source comprises the miscellaneous process vents, storage vessels, wastewater streams, and equipment leaks associated with petroleum refining process units, and marine tank vessel loading operations and gasoline loading racks classified under SIC code 2911 located at a refinery. The inclusion of marine tank vessel loading operations and gasoline loading racks in the definition of the petroleum refinery affected source and source category is a revision from the proposal. These emission points have been included as part of the petroleum refinery affected source and source category to permit an owner or operator of a petroleum refinery to average emissions among emission points collocated at the refinery to comply with the standards. These standards do not apply to distillation units located at pipeline pumping stations whose primary purpose is to produce fuel to operate turbines and internal combustion engines at the pipeline pumping stations. A summary of the specific provisions that apply to each of the emission points contained within a petroleum refinery affected source follows. All of the specified provisions for each of the

covered emission points allow for, or are based on and encourage, pollution prevention.

These standards do not address three vents that will be subject to future NESHAP standards. These are the catalyst regeneration vents on catalytic cracking units and catalytic reforming units (CRU's) and vents from sulfur recovery units (SRU's). Industry is concerned that standards for these three vents will require the use of control technologies designed to reduce non-HAP emissions and will preclude the use of alternatives that can achieve comparable HAP control at a lower cost. The EPA recognizes that standards should be structured on a performance basis wherever possible to ensure that industry is provided the flexibility to seek out and implement cost-effective controls. The EPA's existing standards for sulfur dioxide and particular matter emissions from new FCCU catalyst regenerator vents demonstrate such recognition. The allowable emissions were expressed in terms of the amount of coke burned off the catalyst in order to provide industry with the flexibility to comply through operational changes or through traditional end-of-pipe controls or a combination

of the two. The EPA has every intention to ensure that future rules also provide similar flexibility.

A. Miscellaneous Process Vent Provisions

Miscellaneous process vents include vents from petroleum refining process units that emit organic HAP's. Vents that are routed to the refinery fuel gas system are considered to be part of the process and are not subject to the standard. The miscellaneous process vent provisions define two groups of vents. Group 1 process vents are those with VOC emissions greater than or equal to 33 kilograms per day (kg/day) (72 pounds per day (lb/day)) for existing sources and 6.8 kg/day (15 lb/day) for new sources. Group 2 vents are vents with emissions below these levels.

The miscellaneous process vent provisions for new and existing sources require the owner or operator of a Group 1 miscellaneous process vent to reduce organic HAP emissions by 98 percent or to less than 20 parts per million by volume (ppmv), or to reduce emissions using a flare meeting the requirements of § 63.11(b) of the NESHAP General Provisions (40 CFR part 63, subpart A).

Monitoring requirements for Group 1 vents include an initial performance demonstration and monitoring of

control device operating parameters. The owner could also comply by reducing emissions from a Group 1 process vent to less than 33 kg/day (72 lb/day) for existing sources and 6.8 kg/day (15 day) for new sources, thereby converting it to a Group 2 process vent. No controls or monitoring are required for Group 2 process vents.

B. Storage Vessel Provisions

The storage vessel provisions define two groups of vessels: Group 1 vessels are vessels with a design storage capacity and a maximum true vapor pressure above the values specified in the regulation. Group 2 vessels are all storage vessels that are not Group 1 vessels. The storage vessel provisions require that one of the following control systems be applied to Group 1 storage vessels: (1) An internal floating roof (IFR) with proper seals; (2) an external floating roof (EFR) with proper seals; (3) an EFR converted to an IFR with proper seals; or (4) a closed vent system to a control device that reduces HAP emissions by 95 percent or to 20 ppmv. The storage provisions give details on the type of seals required. Monitoring and compliance provisions for Group 1 vessels include periodic external visual inspections of vessels and roof seals, as well as less

frequent internal inspections. If a closed vent system and control device is used for venting emissions from Group 1 storage vessels, the owner or operator must establish appropriate monitoring procedures. No controls or inspections are required for Group 2 storage vessels.

For existing sources, the final rule requires that fixed roof tanks with capacities greater than or equal to 177 cubic meters (m^3) (47,000 gallons (gal)) that store liquids containing more than 4 percent organic HAP with vapor pressures greater than 10.4 kilopascals (kPa) (1.5 pounds per square inch absolute (psia)) comply fully with the rule within 3 years. If an owner or operator must replace an existing fixed roof tank in order to comply with the rule, it would be reasonable for the State to grant an additional year to comply as authorized under section 112(i)(3)(B) of the Act (a total of four years). This additional time would allow time to design and construct tanks without disrupting refinery operations that could create additional emissions. Owners or operators of IFR or EFR tanks are allowed to defer upgrading of their seals to meet the NESHAP requirements until the next scheduled inspection and

maintenance activity or within 10 years, whichever comes first.

For new sources, the final rule requires that vessels with capacities greater than or equal to 151 m³ (40,000 gal), that store liquids containing more than 2 percent organic HAP with vapor pressures equal to or greater than 3.4 kPa (0.5 psia), and vessels with capacities equal to or greater than 76 m³ (20,000 gal) storing liquids containing more than 2 percent organic HAP with vapor pressures equal to or greater than 77 kPa (11.1 psia) comply with the level of control required by 40 CFR part 63, subpart G (including the controlled fitting requirements).

C. Wastewater Provisions

The wastewater provisions define two groups of wastewater streams. Group 1 streams are those that are located at a refinery with a total annual benzene loading of at least 10 megagrams per year (Mg/yr) (11 tpy) and are not exempt from control requirements under 40 CFR part 61, subpart FF (the benzene waste operations NESHAP or BWON). In general, streams are not exempt from 40 CFR part 61 subpart FF if they contain a concentration of at least 10 parts per million by weight (ppmw) benzene, and

have a flow rate of at least 0.02 liters per minute (L/min) (0.005 gallons per minute (gal/min)). Group 2 streams are wastewater streams that are not Group 1.

The wastewater provisions of the final rule refer to the BWON for both new and existing sources, which requires owners or operators of a Group 1 wastewater stream to reduce benzene mass emissions by 99 percent using suppression followed by steam stripping, biotreatment, or other treatment processes. Vents from steam strippers and other waste management or treatment units are required to be controlled by a control device achieving 95 percent emissions reduction or 20 ppmv at the outlet of the control device. The performance tests, monitoring, reporting, and recordkeeping provisions required to demonstrate compliance are included in the BWON. No controls or monitoring are required for Group 2 wastewater streams.

D. Equipment Leak Provisions

The equipment leak standards for the petroleum refinery NESHAP allow owners or operators of existing sources to choose between complying with equipment leaks provisions in 40 CFR part 60, subpart VV (NSPS for Equipment Leaks) or complying with a modified negotiated

regulation for equipment leaks presented in 40 CFR part 63, subpart H (Hazardous Organic NESHAP or HON equipment leaks). The differences in the NSPS equipment leak requirements and the HON equipment leak requirements are in the leak definitions and connector monitoring provisions.

Under either of the two options, existing refineries subject to the rule will be required to implement a LDAR program with the same leak definitions (10,000 parts per million (ppm)) and frequencies as specified in 40 CFR part 60, subpart VV within 3 years after promulgation of the petroleum refineries NESHAP. Refineries that choose to comply with the modified negotiated regulation would implement the Phase II leak definitions and frequencies at the end of the fourth year, and comply with Phase III requirements 5 ½ years after promulgation. Phase III defines a leak at a lower level, but allows less frequent monitoring for good performers. Although the modified negotiated regulation is not required in the final rule, the EPA believes that it would provide greater emission reductions and, in many cases, would be more cost effective than 40 CFR part 60, subpart VV and could even provide cost savings. Cost savings would occur because

it would reduce equipment leak product loss, and facilities with a low percentage of leaking valves would be able to monitor less frequently, thereby reducing monitoring costs.

New sources must comply at startup with the modified negotiated regulation; pumps and valves at new sources must be in compliance with the Phase II requirements at startup rather than Phase I. This is consistent with the negotiated rule (40 CFR part 63, subpart H).

E. Marine Tank Vessel Loading and Gasoline Loading Rack Provisions

The final refineries NESHAP requires marine tank vessel loading operations at refineries to comply with the marine loading NESHAP (40 CFR part 63, subpart Y) unless they are included in an emissions average. Gasoline loading racks classified under SIC code 2911 at refineries are required to comply with the 40 CFR part 63, subpart R loading rack provisions unless they are included in an emissions average.

F. Recordkeeping and Reporting Provisions

The final rule requires that petroleum refineries subject to 40 CFR part 63, subpart CC maintain required records for a period of at least 5 years. The final rule

requires that the following reports be submitted: (1) A Notification of compliance status report, (2) periodic reports, and (3) other reports (e.g., notifications of storage vessel internal inspections; startup, shutdown, and malfunction reports).

G. Emissions Averaging

The EPA is allowing emissions averaging among existing miscellaneous process vents, storage vessels, wastewater streams, marine tank vessel loading operations, and gasoline loading racks classified under SIC code 2911 located at a refinery. New sources are not allowed to use emissions averaging. Under emissions averaging, a system of emission "credits" and "debits" is allowed to determine whether a source is achieving the required emission reductions.

IV. Summary of Impacts

The impacts presented in this section include process vents, storage vessels, equipment leaks, and wastewater streams from petroleum refinery process units. Impacts for control of marine tank vessel loading operations and gasoline loading rack operations classified under SIC code 2911 located at refineries are presented in the

background documentation for 40 CFR part 63, subparts Y and R.

These standards will reduce nationwide emissions of HAP from petroleum refineries by 48,000 Mg/yr (53,000 tpy), or 59 percent by 1998 compared to the emissions that would result in the absence of standards. No adverse secondary air impacts, water or solid waste impacts are anticipated from the promulgation of these standards.

The national electric usage required to comply with the rule is expected to increase by 48 million kilowatt-hours per year, which is equivalent to approximately 77,500 barrels of oil.

The implementation of this regulation is expected to result in an overall annual national cost of \$79 million. This includes a cost of \$59 million from operation of control devices, and a monitoring, recordkeeping, and reporting cost of \$20 million. The monitoring, reporting, and recordkeeping cost has been reduced by 25 percent from proposal. Table 3 presents the national control cost impacts for petroleum refinery process vents, storage vessels, wastewater, and equipment leaks. The control costs for gasoline loading racks and marine

tank vessel loading operations are discussed in supporting material for the Gasoline Distribution (Stage I) and the Marine Vessel Loading Operations rules.

TABLE 3. NATIONAL CONTROL COST IMPACTS IN THE FIFTH YEAR

| Source | Total ^a capital costs ^b (\$10 ⁶) | Total ^a annual costs (\$10 ⁶ /yr) | Average HAP cost effectiveness (\$/Mg HAP) | Average VOC cost effectiveness (\$/Mg VOC) |
|---|---|--|---|---|
| Miscellaneous process vents | 21 (2) | 12 (1) | 1,800 | 140 |
| Equipment leaks | 142 (16) | 58 (17) | 1,500 | 400 |
| Storage vessels | 48 (1) | 8 (1) | 6,100 | 380 |
| Wastewater collection and treatment | c | c | c | c |
| Other recordkeeping and reporting | 2 | 1 | d | d |
| Total | 213 (21) | 79 (20) | 1,600 | 310 |

^a Numbers in parentheses are recordkeeping and reporting costs included in total annual cost and total capital cost estimates. For equipment leaks, activities associated with setting up and operating a LDAR program (e.g., tagging and identifying, monitoring, data entry, setting up a data management system, etc.) are not reflected in the equipment leak recordkeeping and reporting costs, but are included in the equipment leak total annual cost and total capital cost estimate.

^b Total capital costs incurred in the 5-year period.

^c The MACT level of control is no additional control.

^d Not applicable.

The EPA estimates that changes in the compliance times for storage vessels with floating roofs and changes to the process vents Group 1 applicability cutoff will provide substantial cost savings and emissions reductions for refineries. Estimates of degassing and cleaning storage tank costs provided by the refining industry indicate that premature (within 3 years of promulgation) degassing and cleaning activities would cost between \$34,000 and \$213,000 per floating roof tank depending on the type of material stored. If extrapolated to the entire refining industry for floating roof tanks, the cost savings from allowing floating roofs to comply at the next scheduled maintenance would be \$6.6 million per year.

The EPA determined that substantial HAP emissions occur when storage vessels are degassed and cleaned. Typically, storage vessels are inspected and maintained on a 10-year schedule, at which time tanks are degassed and cleaned. If a 3-year compliance schedule were required, storage vessels would be degassed and cleaned prematurely, resulting in substantial HAP emissions caused by the rule. These HAP emissions could not be balanced in less than 5 years for floating roof tanks by

the emission reduction achieved from complying with the rule. By changing the proposed rule to allow floating roof tanks to comply with the storage vessel requirements 10 years after promulgation of the rule or at the next scheduled inspection, the EPA estimates that 3,000 Mg/yr (2,700 tpy) of HAP, or 8,000 Mg (7,200 tpy) of HAP over 3 years, would be prevented from being emitted.

The existing source process vent applicability cutoff (33 kg of VOC/day (72 lb of VOC/day) per vent) will exclude 3,000 vents from requiring control at a total annual cost savings of \$4.5 million. The new source process vent applicability cutoff (7 kg of VOC/day (15 lb of VOC/day) per vent) will exclude 35 vents from requiring control at a total annual cost savings of \$25,000. The total annual cost reduction of these changes in the rule is a reduction of approximately \$11 million.

The economic impact analysis for the selected regulatory alternatives shows that the estimated price increases for affected products range from 0.24 percent for residual fuel oil to 0.53 percent for jet fuel. Estimated decreases in product output range from 0.13 percent for jet fuel to 0.50 percent for residual

fuel oil. Annual net exports (exports minus imports) are predicted to decrease by 2.3 million barrels, with the range of reductions varying from 0.21 million barrels for liquid petroleum gas to 0.91 million barrels for residual fuel oil.

Between zero and seven refineries, all of which are classified as small, may close due to the regulation. For more information, consult the "Economic Impact Analysis for the Petroleum Refinery NESHAP" in the docket (see ADDRESSES section of this preamble).

V. Significant Comments and Changes to the Proposed Standards

In response to comments received on the proposed standards, several changes have been made to the final rule. While several of these changes are clarifications designed to make the Agency's intent clearer, a number of them are significant changes to the proposed standard requirements. A summary of the substantive comments and/or changes made since the proposal are described in the following sections. Detailed Agency responses to public comments and the revised analysis for the final rule are contained in the BID and docket (see ADDRESSES section of this preamble).

A. Process Vents Group Determination

The proposed NESHAP would have required control of all miscellaneous process vents with HAP concentrations over 20 ppmv. This level was based on the fact that combustion control technologies can reduce organic emissions by 98 percent or to 20 ppmv, but cannot necessarily achieve lower concentrations. Several commenters suggested that other applicability criteria were needed to determine which process vents are required to apply control. They pointed out that the HON and State regulations use a total resource effectiveness (TRE) or emission rate cutoff to exclude small vents that have low emission potential and high costs from control requirements. The commenters contended that the MACT floor does not include control of such vents.

In response to these comments, the EPA examined potential control applicability criteria. The EPA reevaluated the miscellaneous process vents data base. The EPA's information on miscellaneous process vent streams was insufficient to establish an emission rate cutoff. This was because industry did not have sufficient information on the HAP and VOC content of vent streams requested by the section 114 questionnaires and

ICR's and it would have been impractical to obtain this information. Therefore, as suggested by a number of commenters, and after consultations with industry and others, the EPA decided to use State regulations.

The EPA evaluated the current level of control for miscellaneous process vents in eight States and two air districts that contain the majority of refineries and were expected to have the most stringent regulations. Of the refineries in the United States, the 12 percent that are subject to the most stringent regulations are located in three States. In these three States, miscellaneous process vents emitting greater than 6.8 to 45 kg/day (15 to 100 lb/day) of VOC are required to be controlled. The median applicability cutoff level for the 12 percent of U.S. refineries subject to the most stringent regulations is 33 kg/day (72 lb/day VOC). Thus, control of vents with VOC emissions greater than 33 kg/day (72 lb/day) is the MACT floor for existing sources and 6.8 kg/day (15 lb/day) is the MACT floor level of control for new sources. The primary organic HAP's at refineries are also VOC. Additionally, a VOC-based applicability criteria is most reflective of the current level of control required for miscellaneous process vents as the

majority of State regulations are expressed in terms of VOC. Therefore, the EPA has adopted these emission levels in the final rule to distinguish Group 1 from Group 2 vents. Group 1 vents are those that emit over 33 kg/day (72 lb/day) for existing sources and over 6.8 kg/day (15 lb/day) for new sources. Group 1 vents must be controlled, whereas Group 2 vents (which emit less than 33 kg/day (72 lb/day) for existing sources and less than 6.8 kg/day (15 lb/day) for new sources) are not required to apply controls under the final rule. The 33 kg/day (72 lb/day) and 6.8 kg/day (15 lb/day) applicability limits are to be determined as the gases exit from process unit equipment (including any recovery devices) and prior to any non-recovery emission control device.

B. Process Vent Impacts

At proposal, the EPA estimated that the baseline HAP and VOC emissions from process vents were 9,800 Mg/yr (10,780 tpy) and 190,000 Mg/yr (209,000 tpy), respectively. Several commenters contended that the impacts analysis for process vents should be redone because: (1) The data base used in the analysis contained several errors, and (2) the emission estimation

methodology was incorrect. The commenters asserted that these inaccuracies resulted in overestimates of emissions. Some of the commenters asserted that the data base flaws included: (1) A lack of data concerning the number, flowrates, and HAP concentrations of miscellaneous process vents, and (2) an erroneously high percentage of controlled vents because many uncontrolled vents were not reported. Some of the commenters contended that the emission estimation methodology was flawed because (1) It included wastewater and maintenance emissions, (2) emission factors were calculated from a HAP-to-VOC ratio that included reformer emissions, and (3) alkylation emissions and crude unit emissions were based on one refinery where vents were uncontrolled at the time of the questionnaire and are now controlled.

The EPA agrees with the commenters that the process vents emission impacts estimate has several assumptions that needed to be reanalyzed. The EPA also agrees that the data base used at proposal should be reevaluated to consider the commenters' concerns. Therefore, the EPA has reestimated the emissions and cost impacts of the process vents provisions using the commenters' recommendations.

The emissions at proposal were estimated using responses from only the section 114 questionnaires extrapolated to the entire refining industry. Because the section 114 questionnaires were sent to the largest companies, the data obtained from them skewed the results based on what the largest refineries did. The revised emissions were estimated using data from both the section 114 and ICR responses. The ICR questionnaires were sent to refineries not receiving the section 114 questionnaires. This additional data increased the number of vents in the data base by 1,300. The increase in vents resulted in a decrease in controlled vents from 40 percent to 24 percent. However, information on the HAP and VOC content of vent streams remained limited as no new data was provided by the ICR respondents. Additionally, no new HAP information was provided by industry after proposal of the rule.

Additionally, errors in the data base were corrected and non-miscellaneous process vents were removed from the data base (e.g., vents from wastewater, maintenance, catalytic reformer regeneration vents, etc). In the revised emission estimates, emissions from alkylation and crude units were estimated from a number of different

data points (not just one, as the commenters have stated). Additionally, the one data point the commenters have referred to has been changed to reflect the change in control status. The revised baseline miscellaneous process vents HAP and VOC emissions are 10,000 Mg/yr (11,000 tpy) and 109,000 Mg/yr (119,900 tpy), respectively.

The EPA agrees that the data on HAP concentrations is limited. However, no new data was supplied by the commenters. The EPA's revised emission estimates are based on technically sound methods and the best available information.

C. Equipment Leaks Compliance Requirements

The proposed rule for equipment leaks at existing sources was an above-the-floor option modeled after the HON negotiated rule for equipment leaks. The floor level of control for equipment leaks from existing sources was determined to be control equal to the petroleum refinery NSPS. The modified negotiated rule was chosen as an above-the-floor option because it was estimated to be cost effective. The option chosen in the proposed rule differed from the HON in that: (1) Existing sources were not required to monitor connectors, and (2) the leak

definitions were higher to reflect the different volatility of materials found in refinery process lines as opposed to SOCFI process lines. The proposed rule required one-third of the refinery to be in compliance 6 months after promulgation of the rule, two-thirds of the refinery to be in compliance 1 year after promulgation of the rule, and the entire refinery to be in compliance 18 months after promulgation of the rule.

Several commenters contended that the emissions and cost information used to determine the cost effectiveness of going from the floor level of control to the modified negotiated rule were inaccurate and did not consider recent changes to the equipment leak correlation equations for petroleum refineries. The commenters concluded that using the most recent information for refineries would show that it is not cost effective to go beyond the floor level of control.

The cost information used in the analysis was the best data available, and is based on surveys of vendors and established costs presented in previous projects. No new cost information was submitted by the industry. The equipment leak emission factors that are being used to estimate the emissions and emission reductions of the

rule were developed in 1980. These are the only complete and accurate emission factors available for this purpose. To accurately estimate emissions from equipment leaks, two sets of information are needed. These include the amount of emissions generated per piece of equipment leaking at a given concentration and the percent of equipment that are actually leaking at these concentrations. The 1980 study that was used to estimate the impacts of the refinery MACT rule used a consistent sampling methodology to address both of these factors based on sampling at uncontrolled refineries. The 1993 API study developed new information only on emissions per piece of leaking equipment using a different methodology. As stated in API's report, this information was developed from refineries in California for use with other information to estimate facility-specific equipment leak emissions. Thus, this study was not designed to provide information on industry average percent leaking equipment. Therefore, it was not possible to redefine average emission factors. To actually use this information, however, the EPA would need corresponding new information on the percent of equipment leaking. The EPA does not believe that it

would be appropriate to combine 1993 information with the 1980 data to develop new emission factors because sampling methodologies were different and because the 1993 study collected information from information from well-controlled facilities while the 1980 study collected information from uncontrolled facilities. However, the EPA agrees that new correlation equations developed for the refining industry indicate that the refinery factors may overestimate emissions by as much as a factor of two, which may make the modified negotiated rule option less cost effective. This cannot be accurately determined because the appropriate information to update average emission factors is not available. The EPA recognizes that enough uncertainty exists in the emission and cost estimates to question the results of the cost-effectiveness analysis.

In recognition of this uncertainty and to provide compliance flexibility, the EPA has changed the final rule to provide each existing refinery with a choice of complying with either: (1) The equipment leaks NSPS requirements (40 CFR part 60, subpart VV) or (2) a modified version of the negotiated rule (40 CFR part 63, subpart H). The NSPS represents the MACT floor for

existing sources. The modified negotiated regulation is the same as what was contained in the proposed petroleum refinery NESHAP except that the compliance dates have been extended for reasons described below. Although not required in the final rule, the EPA promotes use of the modified negotiated rule option because it is believed to provide considerable product, emissions, and cost savings to a refinery.

Under either option, existing refineries will be required to implement an LDAR program with the same leak definitions (10,000 ppm) and the same leak frequencies as contained in the NSPS by 3 years after promulgation. A refinery may opt to remain at this level of control and do the monitoring, recordkeeping, and reporting specified in the NSPS. This option allows refineries that are familiar with the NSPS to continue to implement that standard without needing to change their procedures.

Alternatively, a refinery may choose to comply with Phase I of the negotiated rule (10,000 ppm leak definition) 3 years after promulgation, comply with Phase II 4 years after promulgation, and comply with Phase III 5 ½ years after promulgation. Each phase has lower leak definitions for pumps and valves. In

Phase III, monitoring frequencies for valves are dependent on performance (percent leakers), providing an incentive (less frequent monitoring and reduced monitoring costs) for good performance. Refineries choosing to comply with the modified negotiated rule are subject to monitoring, recordkeeping, and reporting requirements of subpart H. The EPA has included this compliance alternative to add flexibility and opportunities for adjustment for differences among facilities.

The compliance dates for equipment leaks were revised to address commenter concerns that contended that small refineries and refineries in ozone attainment areas would be at a disadvantage if they were required to comply with the proposed equipment leak regulations because they would not have the experience to implement an equipment leaks control program within 6 to 18 months.

The EPA agrees that small refineries may not have the experience to implement an LDAR program for equipment leaks in a short timeframe without significant expense. The EPA also contends that other refineries that do not currently have LDAR programs may also have trouble implementing the rule in 6 to 18 months. In response to

these comments, the EPA has changed the final rule to require that existing refineries, regardless of size, comply with an LDAR program with the same leak definitions (10,000 ppm) and monitoring frequencies as the petroleum refinery NSPS within 3 years of promulgation of the rule. At the end of the third year, the entire refinery must be in compliance with the petroleum refinery NSPS level of control; there will not be interim deadlines during the 3-year period by which portions of the refinery are required to comply during this time. A refinery owner or operator who chooses to comply with the modified negotiated rule must then implement Phase II within 4 years and Phase III within 5 ½ years of promulgation. The total annual cost estimates for the rule have been revised in accordance with the changes made to the equipment leak requirements.

D. Storage Vessels

The proposed rule required existing storage vessels containing liquids with vapor pressures greater than or equal to 8 kPa (1.2 psia) to comply with storage vessel requirements within 3 years. For tanks that were already controlled with internal or external floating roofs, the proposed rule allowed operators to defer upgrading of

seals until the next scheduled maintenance with the following exceptions: (1) Fixed roof tanks, (2) EFR tanks with only a vapor-mounted primary seal, and (3) all tanks storing a liquid with a true vapor pressure greater than 34 kPa (5.0 psia).

Commenters to the proposed rule maintained that before additional emission controls (e.g., secondary seals) can be installed, tanks must be removed from service, degassed, and cleaned. Storage tanks are currently emptied and cleaned roughly every 10 years for inspection and maintenance. The commenters contended that removing storage tanks that already have floating roofs from service before scheduled maintenance would have adverse environmental impacts that could not be overcome by the emissions reductions from upgrading the seals on the tank. The commenters further stated that tank owners or operators would incur substantial costs as a result of degassing and cleaning a tank before scheduled maintenance. The commenters contended that a 3-year compliance schedule could not be met because there would not be enough trained and capable fabricators and contractors to support the tank modification work. Commenters stated that the reason was that the refinery

rule compliance period overlaps with the implementation of other EPA rules and that a 10-year compliance schedule would be consistent with other EPA rulemakings such as the HON and the benzene storage NESHAP.

The EPA agrees with the commenters that the HON and the benzene storage NESHAP allow floating roof tanks to achieve compliance in 10 years or at the time of the next scheduled degassing. Most existing floating roof storage vessels at refineries also fall under the 10-year compliance schedule. Therefore, these storage vessels will be inspected within 5 to 10 years after promulgation of the rule. This is consistent with industry practice.

In response to these comments, the EPA analyzed the emissions resulting from degassing and cleaning storage vessels using empirical mass-transfer models. The analysis indicated that degassing and cleaning of floating roof vessels generally results in substantial volatilization of HAP's to the air. These emissions could not be balanced in less than 5 years by the emission reductions achieved by controlling the tank to the requirements in the rule. Additionally, the degassing and cleaning information submitted by the refining industry indicated substantial costs for each

degassing and cleaning activity if required within 3 years after promulgation of the rule. Based on information provided by industry and the EPA's empirical analysis, the EPA determined that the proposed storage vessel provisions would, in many cases, result in increased overall emissions because of the extra degassing emissions.

The final rule allows owners or operators of storage vessels subject to the rule to defer installation of better seals on floating roof tanks storing any liquid until the next scheduled maintenance or within 10 years, whichever comes first. This change addresses the commenters' concerns about emissions and costs as well as their concern about the availability of trained fabricators and contractors to modify the tanks within a 3-year period. The final rule maintains the requirement to retrofit IFR tanks at existing sources with secondary seals that meet 40 CFR part 60 subpart Kb requirements because it is the MACT floor for IFR vessels.

Based on the EPA's analysis, the emissions from degassing and cleaning fixed roof tanks can be balanced within 1 year (justifying a 3-year compliance date) by the emission reductions achieved by controlling the tank

to the requirements in the rule. Therefore, the final rule maintains the proposed compliance times (within 3 years) for fixed roof tanks. The EPA believes that in certain situations, such as when replacement of a tank is required, it would be reasonable for States to grant an additional year to comply as authorized under section 112(i)(3)(B) of the Act. The additional year would provide time to design and construct the tanks without disrupting refinery operations which could cause additional emissions. The EPA will work with the industry and States to find ways to use the emissions averaging program to deal with cases where tanks have to be replaced or where it is extremely difficult or costly to install the required controls.

Several commenters contended that the Group 1 definition of 8 kPa (1.2 psia) in the proposed NESHAP was based on data requests in section 114 and ICR questionnaires that were misinterpreted by respondents. The commenters stated that the questionnaires did not specify whether respondents were to provide maximum true vapor pressures or average annual true vapor pressures. The commenters elaborated that because other data were provided to estimate emissions on an annual basis, it was

reasonable to assume that respondents provided average annual true vapor pressures instead of maximum true vapor pressures. The commenters concluded that vapor pressures based on the maximum monthly temperatures may be 0.3 psia higher than the average annual true vapor pressure. The commenters recommended that the EPA either change the applicability cutoff to 10 kPa (1.5 psia) maximum true vapor pressure to account for this difference or specify that the 8 kPa (1.2 psia) cutoff is the average annual true vapor pressure instead of the maximum true vapor pressure.

The EPA agrees with the commenters that because the questionnaires did not specify the type of vapor pressure, the respondents may have provided annual average true vapor pressures instead of maximum true vapor pressures. In order to reflect the uncertainty of the type of vapor pressure provided in the questionnaires, the EPA has decided to change the storage vessel applicability cutoff in the final rule from a maximum true vapor pressure of 8 kPa (1.2 psia) to 10 kPa (1.5 psia). An analysis of the storage vessel data base indicated that a change from 8.3 kPa (1.2 psia) to 10 kPa (1.5 psia) will not affect the impacts analysis.

Several commenters requested that a minimum HAP content be considered as well as a vapor pressure cut-off for storage vessels because some liquids may have very low HAP concentrations and high vapor pressures due to the volatility of non-HAP compounds in the material. The EPA agrees that several products, such as asphalt, have minimal HAP's that may have vapor pressures greater than 10 kPa (1.5 psia) if stored at elevated temperatures. To determine HAP weight percent applicability criteria, the EPA reviewed the MACT floor analysis for storage vessels to determine the HAP weight percents in controlled storage vessels at the best-controlled sources. The MACT floor for new sources is based on the best-controlled source, while the floor for existing sources is the average of the best-controlled 12 percent of sources (or 16 refineries). The HAP weight percent applicability criterion was determined using the same population of storage tanks used to determine the vapor pressure applicability cut-off (i.e., the best-controlled 16 refineries). The minimum HAP concentrations for materials stored in the tanks meeting subpart Kb at the 16 best-controlled sources ranged from 2 weight percent to 22 weight percent. The average HAP weight percent in

the liquids stored in these tanks is 4 percent. The best-controlled tanks contain liquids with a HAP weight percent in the liquid of 2 percent. Therefore, the HAP weight percent criterion for existing sources is 4 percent HAP in the liquid; the HAP weight percent for new sources is 2 percent HAP in the liquid.

E. Overlapping Regulations

Several commenters contended that the petroleum refinery NESHAP will lead to overlap with other existing and future regulations such as the 40 CFR part 60 NSPS, 40 CFR parts 61 and 63 NESHAP, and State and local regulations. Commenters stated that the overlap between regulations will lead to confusion, uncertainty, and frustration for sources and regulators.

The EPA has clarified the applicability of subpart CC as it relates to other NSPS and parts 61 and 63 NESHAP that apply to the same source in § 63.640 of the final rule.

The final rule clarifies the applicability of 40 CFR part 63, subpart CC storage vessel provisions to storage vessels at existing and new petroleum refinery sources subject to 40 CFR part 60, subparts K, Ka, or Kb. The specific provisions are structured such that each vessel

is subject to only the more stringent rule. For example, a Group 1 storage vessel at an existing refinery that is also subject to subpart K or Ka is required only to comply with the petroleum refinery NESHAP storage vessel provisions.

The final rule clarifies the applicability of 40 CFR part 63, subpart CC wastewater provisions by stating that a Group 1 wastewater stream managed in a piece of equipment that is also subject to the provisions of 40 CFR part 60, subpart QQQ is required only to comply with 40 CFR part 63, subpart CC. The final rule also clarifies that a Group 2 wastewater stream managed in equipment that is also subject to the provisions of 40 CFR part 60, subpart QQQ is required only to comply with subpart QQQ. Clarification of the applicable provisions for a wastewater stream that is conveyed, stored, or treated in a wastewater stream management unit that also receives streams subject to the provisions of 40 CFR part 63, subpart F has been included in the final rule.

There should not be any process vent applicability overlap between subpart CC and any other Federal rule.

Process vents regulated under the HON are not subject to the petroleum refinery NESHAP.

The EPA clarifies the applicability of subpart CC equipment leak provisions in the final rule by stating that petroleum refinery sources subject to subpart CC and 40 CFR parts 60 or 61 equipment leaks regulations are required to comply only with the petroleum refinery NESHAP (40 CFR part 63, subpart CC) equipment leak provisions.

The EPA has also included a Standard Industrial Classification (SIC) code definition for petroleum refining (2911) to the petroleum refinery process units definition in the final rule in order to clarify which provisions of the rule apply to storage vessels and equipment leaks. The EPA believes that the inclusion of the SIC code reference in the definition of refinery process unit will alleviate confusion about applicability of this rule (reducing potential confusion regarding process unit regulatory overlap) and other source categories scheduled for the development of NESHAP under the Act. The EPA has also added a list of pollutants covered under the rule to assist facilities in the

determination of whether emission points are covered under the rule.

Another issue raised by several commenters was the potential for overlap between the petroleum refinery MACT and other MACT standards such as the HON. These commenters requested that the EPA clarify the distinction between process units subject to the HON or other MACT standards and process units subject to the petroleum refinery MACT standard. These commenters thought that the description of refinery process units was too general and could include chemical processes subject to the HON or other MACT standards.

The final rule provides that 40 CFR part 63, subpart CC does not apply to units that are also subject to the provisions of the HON. The applicability of subpart CC versus the HON or other MACT standard to an emission point is determined by the primary product produced in the unit. The primary product is the product that is produced in the greatest mass or volume that the unit produces. For example, if a refinery operates a unit that produces upgraded feedstock for the alkylation unit and this unit also produces a small quantity (less than 20 percent) of the chemical methyl tert butyl ether

(MTBE), that unit is considered to be subject to the petroleum refinery MACT standard and not to the HON. In contrast, if a facility operated a process unit that produced MTBE as the primary product and also produced small quantities of a mixed hydrocarbon stream, the unit would be subject to the HON because the unit produces MTBE as the primary product and the HON applies to chemical manufacturing units that produce MTBE. The distinction between the units is the difference in the primary product produced in the different units. In the first case, the unit is integral to the petroleum refinery's operations and the MTBE is a by-product of the unit. In the second case, the unit's operation could be replaced by purchased MTBE and the operation is not integral to the petroleum refinery's operations.

The EPA believes that including the concept of primary use in the petroleum refining process unit definition clarifies the applicability of the petroleum refinery MACT standard, and that including the primary product concept in HON and other MACT standards will avoid the same emission point from the same process unit being subject to multiple MACT standards. The EPA also believes that by directly stating in the rule that

process units subject to the HON are not subject to this rule, the commenter's concerns over applicability issues have been addressed.

F. Source Category Definition

In the July 1994 notice of proposed rulemaking, the proposed rule preamble provided notice of and sought comment on the issues of a broad affected source definition and source category; source-wide averaging; and the relationship between the gasoline distribution affected source definition and source category and refineries. In the preamble of the proposed refinery rule, the EPA noted that it did not intend to include emission points that are subject to the gasoline distribution standard in the refinery source category, that all emission points within the refinery source category would be treated as one stationary source for purposes of the refinery standard, and that the EPA intended to permit averaging among all emission points within the source category except for equipment leaks.

Comments on both the gasoline distribution rule and the refinery proposal indicated that the Agency needed to clarify which rule applied to which emissions points and whether averaging would apply to collocated emission

points. Both proposed rules addressed similar emission points; for example, both proposed rules addressed storage tanks and equipment leaks where refineries were collocated with gasoline distribution operations. In the preamble accompanying the final gasoline distribution rule, the EPA indicated the intent to rely on SIC codes to distinguish between emission points at refineries covered by the gasoline distribution standard and those covered by the refinery standard. The Agency noted that the SIC code for particular equipment would indicate the department with managerial oversight responsibility for each emission point. However, the EPA specifically provided that this rule, if appropriate, would modify the gasoline distribution standard to incorporate SIC code limits.

Today's rule identifies petroleum refinery process units and the gasoline loading rack emission points by SIC code for purposes of identifying the appropriate control requirements. A broad source category and affected source definition increases the opportunity to use flexible compliance options such as emissions averaging. Because the control technology under today's rule for gasoline loading racks is the same as the

requirements under the gasoline distribution NESHAP, the required emissions reductions from gasoline loading racks would be at least as great as would have been required had gasoline loading racks been excluded from the petroleum refinery source category and affected source; due to the credit discount factors, overall emissions may be less than otherwise would be required if gasoline loading racks are included in an emissions averaging plan.

G. Emissions Averaging

The preamble to the proposed petroleum refinery rule requested comments on whether marine loading operations at refineries should be included in emissions averaging. The EPA also reopened the comment period for the proposed NESHAP for marine tank vessel loading operations (59 FR 44955) to request comment on whether marine terminals collocated at refineries should be moved to the petroleum refinery source category. In addition, as noted above, issues related to including gasoline distribution emissions in averaging at refineries were also raised in the proposed rule preamble.

During the comment period for the gasoline distribution NESHAP, commenters requested that gasoline

bulk terminals contiguous to a refinery be regulated by the petroleum refinery NESHAP. Several commenters on the proposed petroleum refinery NESHAP and proposed marine tank vessel loading operations NESHAP supported averaging of refinery process unit emissions with emissions from marine terminals and gasoline distribution operations that are located at refineries. The commenters cited more cost-effective emission reduction as the advantage of including these emission points in emissions averaging, and specifically commented that the costs per megagram emission reduction of the marine loading controls are high. These commenters also claimed that emission calculation procedures for loading are well established and that adding marine loading to the averaging provisions will not appreciably increase the complexity of enforcement. Other commenters opposed including marine loading and gasoline distribution emission points in emissions averaging. Some commenters claimed that these are separate source categories and that the Act does not permit averaging across source categories. Other commenters were of the opinion that the EPA has the flexibility to allow trading within a facility that includes units in different source

categories. These commenters argued that it is unnecessary to redefine the source category to include marine loading operations and gasoline distribution operations colocated at refineries.

In the final rule, the definitions of the petroleum refinery source category and affected source have been changed to include gasoline loading racks classified under SIC code 2911 (Petroleum Refineries) and marine tank vessel loading operations that are located at refinery plant sites. Because marine loading operations and bulk gasoline transfer operations located at refineries are supplying raw materials to, or transferring products from, petroleum refinery process units, they are logically considered to be part of the same source as the petroleum refinery process units. The EPA considers this definition to be the most appropriate definition and, as noted by several commenters, to present fewer implementation problems.

A gasoline loading rack classified under SIC code 2911 or a marine tank vessel loading operation that is located at a petroleum refinery may be included in an emissions average with other refinery process unit emission points. Because these operations are included as part of a single

source within one source category intersource averaging is not an issue.

In keeping with the EPA's stated goal of increasing flexibility in rulemakings, this decision has been made to provide more opportunities to average. This increases the opportunities for refiners to find cost-effective emission reductions from overall facility operations onsite. Costs and cost effectiveness of controlling a particular kind of emission point, such as marine loading, will vary depending on many site-specific factors. Emissions averaging allows the owner and operator to find the optimal control strategy for their particular situation.

The EPA is presently reviewing the emission averaging policy and considering whether any more flexibility can be provided while maintaining environmental protection. The issue of intersource averaging will be considered along with other aspects of the emissions averaging policy such as limitations on the number of points allowed in an average. The EPA believes that any decision to provide additional flexibility must be based on careful consideration of enforcement issues as well as equity in environmental protection. Given the complexity

of these issues, the EPA does not believe that the Refinery MACT standard is the appropriate place to address these issues. The EPA plans to examine the issue independently of any specific rulemaking. In this, the EPA plans to work closely with both the refining and chemical industries and other interested parties to determine if there are opportunities for increasing flexibility and reducing the burden associated with demonstrating compliance with the MACT rules while remaining within the law.

The EPA would like to clarify that the emissions averaging program was designed to result in equal or greater environmental protection while providing sources flexibility to reduce emissions in the most cost-effective manner. Specifically, allowing marine loading operations, and gasoline loading racks classified under SIC code 2911, located at a refinery to be included in emissions averages will result in equivalent or greater overall HAP emission reduction at each refinery. The averaging provisions are structured such that "debits" generated by not controlling an emission point that otherwise would require control must be balanced by achieving extra control at other refinery emission points

covered by the NESHAP. The averaging provisions also require that a source demonstrate that compliance through averaging will not result in greater risk or hazard than compliance without averaging.

Some commenters were concerned that including marine loading in averages could result in uncontrolled peak emissions. With regard to the commenters' concerns about peak emissions, the quarterly cap on the ratio of debits to credits is intended to limit the possibility of exposure peaks. Furthermore, because loading occurs fairly frequently, and emissions from an individual vessel filling or loading event are relatively small, such emissions are not expected to cause significant exposure peaks. Moreover, no evidence has been presented that emissions averaging would permit a very different mix of emissions to occur than would point-by-point compliance. That is, peaks of exposures from batch streams, storage, and loading operations should be equally likely under point-by-point compliance as under emissions averaging, so emissions averaging does not represent a less effective control strategy. Furthermore, in order to receive approval for an emissions average, the owner or operator is required to

demonstrate that the emissions average does not increase the risk or hazard relative to compliance without averaging.

H. Monitoring, Recordkeeping, and Reporting

Several commenters alleged that the recordkeeping and reporting requirements of the proposed rule were extremely burdensome. The commenters requested that the EPA reduce the monitoring, recordkeeping, and reporting burden associated with the proposed rule. Commenters also requested that provisions be added to the final rule to avoid duplicative reporting for equipment subject to multiple NESHAP and NSPS. Other commenters requested that flexibility to allow alternative monitoring, recordkeeping, and reporting be incorporated into the final rule.

The EPA recognizes that unnecessary monitoring, recordkeeping, and reporting requirements would burden both the source and enforcement agencies. Prior to proposal, the EPA attempted to reduce the amount of monitoring, recordkeeping, and reporting to only that which is necessary to demonstrate compliance. For example, at proposal almost all reports were consolidated into the Notification of Compliance Status and the

Periodic Reports. This was done to simplify and reduce the frequency of reporting. Sources also have the option of retaining records either in paper copy or in computer-readable formats, whichever is less burdensome. If multiple performance tests are conducted for the same kind of emission point using the same test method, only one complete test report is submitted along with summaries of the results of other tests. This reduces the number of lengthy test reports to be copied, reviewed, and submitted.

Site-specific test plans describing quality assurance in § 63.7(c) of 40 CFR part 63, subpart A are not required because the test methods cited in subpart CC already contain applicable quality assurance protocols. The quality assurance provisions in the individual test methods remain applicable and are not superseded by the nonapplicability of § 63.7(c) of subpart A. For continuously monitored parameters, periodic reporting is limited to excursions outside the established ranges and the in-range values are not required to be reported.

In response to the commenters, the EPA reevaluated whether monitoring, recordkeeping, and reporting requirements could be further reduced while maintaining

the enforceability of the rule. The EPA has made the following changes in the promulgated rule to further reduce the monitoring, recordkeeping, and reporting burden:

(1) The requirement to submit an Initial Notification has been eliminated;

(2) periodic reports are required to be submitted semiannually for all facilities that do not use emissions averaging (the proposal required quarterly reports if monitored parameters were out of range more than a specified percentage of the time);

(3) a reduction in the frequency for parameter monitoring and recording. The proposal required values of monitored parameters to be recorded every 15 minutes and all 15-minute records had to be retained for those days when excess emissions occurred. The final rule allows hourly monitoring and recording;

(4) recordkeeping and reporting provisions that eliminate duplicate reporting for equipment subject to multiple NESHAP and NSPS were added to the applicability section (§ 63.640) of the final rule. The additions specify which rule applies and overrides the less stringent NSPS or NESHAP. For State and local regulation

applicability determination, the final rule has been amended to state that the local regulatory authority (e.g., State or permitting authority) can decide how monitoring, recordkeeping, and reporting requirements can be consolidated, and can approve alternative monitoring, recordkeeping, and reporting requirements.

These reductions reduce the proposal monitoring, recordkeeping, and reporting burden by 25 percent. The EPA plans to continue to work with the industry as well as with other interested parties to identify further opportunities for reduction of the monitoring, recordkeeping, and reporting burden of the rule. The EPA will consider ways to eliminate overlapping requirements and to address any inconsistencies among the rules. The EPA will investigate the possibility of consolidating and simplifying the various rules while maintaining the same level of environmental protection. Assuming that the pilot project with the chemical industry is successful, the EPA expects to be able to complete the review of the Refinery rule monitoring, recordkeeping, and reporting requirements before the compliance date.

I. Subcategorization

Several commenters to the proposed petroleum refinery NESHAP requested that the EPA subcategorize refineries by size and/or location in an ozone attainment area. Other commenters stated that subcategorizing small refineries because of an arbitrary size exemption can result in an unfair competitive advantage. These commenters further elaborated that large refineries should not be penalized for an economy of scale achieved through its own effective competitiveness.

In response to these comments, the refinery data bases were subcategorized based on crude charge capacity. The refineries were also subcategorized by ozone attainment status and by refineries containing processes that are used to produce gasoline (such as catalytic cracking, coking, and catalytic reforming). Within each subcategory, the process vents, storage vessels, and equipment leaks data bases were sorted from most stringent control to least stringent. The MACT floor (average of the top 12 percent of sources) for each subcategory was identified.

The MACT floors for small refineries are not significantly different from the industry as a whole.

The floor for process vents is the same for small refiners as for the entire industry. The floor for storage tanks would increase the materials vapor pressure cutoff from 10 kPa (1.5 psia) to 11 kPa (1.7 psia), which would result in a minimal cost savings since there are few petroleum liquids in this volatility range. The floor for equipment leaks would reduce the monitoring frequency; however, small refiners would still incur the cost of setting up and implementing an LDAR program.

Based on the EPA's analysis and the comments received during the public comment period, a separate subcategory for small refineries has not been included in the final rule. This decision was based on there being no clear relationship between refinery size or design and emission potential.

J. Economic Analysis

Comments were received on both the methodology of the economic analysis and the potential impacts of the analysis results. The EPA's economic model focused on estimating changes in product price and quantity of production for several petroleum products. Once the effects on price and quantity were evaluated, other

impacts were estimated. The model the EPA used is predicated on neoclassical microeconomic theory.

The model assumed that those refineries with the highest per-unit control are marginal (i.e., near the margin between shutdown and continuing operation) in the post-control markets, and that they also have the highest underlying per-unit cost of production. This assumption may result in an overstatement of the adverse impacts, such as closure, since the assumed relationship between per-unit control cost and per-unit production cost may not hold for all refineries. For more information, consult the "Economic Impact Analysis for the Petroleum Refinery NESHAP" in the docket.

Most of the comments about the economic analyses methodology were focused on possible impacts on other parts of the petroleum industry other than refineries. The economic analysis for this rule, like most of the EPA's economic analyses, focuses on the impacts on the industry being regulated and does not calculate impacts to other industries indirectly affected unless those impacts are significant. In this case, the impacts to indirectly affected industries were not calculated since the impacts estimated for the petroleum refinery industry

were not significant, impacts to indirectly affected industries would likely be insignificant also.

K. Benefits Analysis

Comments noted that naphthalene is classified as a possible carcinogen, not a known carcinogen, and therefore should not be included in the risk analysis. Commenters also argued that the estimates for monetized VOC benefits were too high, since the VOC reductions claimed in the regulation would occur as a result of State Implementation Plans (SIP's) required by the Act. Other commenters wrote that the level of benefits from HAP emissions reduction was not of sufficient justification for pursuing the regulation.

When the rule was proposed, naphthalene was classified as a possible human carcinogen. Naphthalene is no longer classified as a possible human carcinogen and is not included in the risk analysis for the final rule.

To estimate the benefits of reducing VOC, the EPA used a 1989 study conducted by the Office of Technology Assessment (OTA). The study examined a variety of acute health impacts related to ozone exposure as well as the benefits of reduced ozone concentrations for selected agricultural crops. A number of factors were not

considered in the analysis, including chronic health effects and health impacts for attainment areas.

As to the comment about some of the benefits being attributable to VOC emission reductions brought about by implementing SIP's, the EPA attempted to include in the baseline all possible impacts from SIP implementation. Control of VOC in this rule will be incorporated into future SIP's by affecting their baselines, thus making the emission reductions needed to meet them less, and leading to lower costs for petroleum refineries to meet those SIP's. Therefore, control of VOC emissions in this rule will lead to lower costs to future SIP implementation. Also, the emission streams from petroleum refineries are primarily VOC, with a small fraction of VOC being HAP. Control of any petroleum refinery emission stream involves control of VOC as well as HAP. Thus, any benefits estimated to occur from a rule that controls VOC, though their control is of

secondary importance, should be included as benefits of the rule.

L. Emissions Data

Commenters raised concerns about the amount and quality of the data on HAP emissions, and the uncertainties in the emission estimates. Throughout the rulemaking, the EPA has been aware of these concerns. During the course of this rulemaking, the EPA requested information from the petroleum refining industry on emissions and emission control technologies. The industry provided sufficient information on the emission control technologies to determine the best controlled facilities, as required by section 112 of the Act. However, the information received on existing emission control levels was limited because it was not available. Thus, there is uncertainty in the refinery baseline emission estimates, and emission reductions and other benefits achieved from the emission controls required to comply with the rule. The EPA and the petroleum refinery industry are unable to reduce this uncertainty at this time. The Agency has characterized the costs and emission reductions of the requirements of this rule as accurately as possible. While there is a great deal of

qualitative information on the benefits of this rule, the uncertainty in the emission estimates and the monetary value that can be placed on the emission reductions limits the Agency's ability to directly quantify all the benefits of the refinery MACT rule. The EPA does know, however, that the controls required in this rulemaking are in widespread use in the refining industry and that they provide substantial emission reductions.

Under section 112(f) of the Act, the EPA must determine whether further control of refinery emissions is necessary to protect the health of the general public. This determination will require more accurate emission estimates than currently exist. The EPA has made a commitment to work cooperatively with industry to identify the data needed to improve the emission estimates and any other information that is required to determine the health risks that may remain after implementation of the refinery MACT rule.

VI. Changes to NSPS

The proposed changes to 40 CFR part 60, subparts VV and QQQ are promulgated with minor edits for clarity and consistency.

VII. Administrative Requirements

A. Docket

The docket is an organized and complete file of all the information considered by the EPA in the development of this rulemaking. The docket is a dynamic file, since material is added throughout the rulemaking development. The docketing system is intended to allow members of the public and industries involved to readily identify and locate documents so that they can effectively participate in the rulemaking process. Along with the proposed and promulgated standards and their preambles, and the BID containing the EPA's responses to significant comments, the contents of the docket will serve as the record in case of judicial review (section 307(d)(7)(A)).

B. Paperwork Reduction Act

The information collection requirements in this rule have been approved by the Office of Management and Budget (OMB) under the Paperwork Reduction Act, 44 U.S.C. 3501 et seq and have been assigned control number 2060-0340.

This collection of information has an estimated annual reporting burden averaging 320 hours per respondent and an estimated annual recordkeeping burden averaging

2,880 hours per respondent. These estimates include time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

This reflects a reduction of the proposal monitoring, recordkeeping, and reporting burden of 25 percent. The EPA plans to continue to work with the industry as well as with other interested parties to identify further opportunities for reduction of the monitoring, recordkeeping, and reporting burden of the rule. The EPA will consider ways to eliminate overlapping requirements and to address any inconsistencies among the rules. The EPA will investigate the possibility of consolidating and simplifying the various rules while maintaining the same level of environmental protection. Assuming that the pilot project with the chemical industry is successful, the EPA expects to be able to complete the review of the Refinery rule monitoring, recordkeeping, and reporting requirements before the compliance date.

Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Chief, Information Policy Branch; EPA; 401 M St., S.W. (Mail Code 2136); Washington, DC 20460; and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503, marked "Attention: Desk Officer for EPA."

C. Executive Order 12866

Under Executive Order 12866 (58 FR 5173 (October 4, 1993)), the Agency must determine whether the regulatory action is "significant" and therefore subject to OMB review and the requirements of the Executive Order. The Order defines "significant regulatory action" as one that is likely to result in a rule that may:

(1) Have an annual effect on the economy of \$100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities;

(2) create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;

(3) materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or

(4) raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order.

This action is a "significant regulatory action" within the meaning of Executive Order 12866. The EPA has submitted this action to OMB for review. Changes made in response to OMB suggestions or recommendations will be documented in the public record.

D. Regulatory Flexibility Act

Pursuant to the Regulatory Flexibility Act of 1980, 5 U.S.C. 601 et seq., when an agency publishes a notice of rulemaking, for a rule that will have a significant effect on a substantial number of small entities, the agency must prepare and make available for public comment a regulatory flexibility analysis (RFA) that considers the effect of the rule on small entities (i.e., small businesses, small organizations, and small governmental

jurisdictions). In assessing the regulatory approach for dealing with small entities in today's final rule, the EPA guidelines indicate that an economic impact should be considered significant if it meets one of the following criteria:

(1) Compliance increases annual production costs by more than 5 percent, assuming costs are passed on to consumers;

(2) compliance costs as a percentage of sales for small entities are at least 10 percent more than compliance costs as a percentage of sales for large entities;

(3) capital costs of compliance represent a "significant" portion of capital available to small entities, considering internal cash flow plus external financial capabilities, or

(4) regulatory requirements are likely to result in closure of small entities.

Data were not readily available to determine if criteria (1) and (3) were met or not, so the analysis focused on the other two. Results from the economic impact analysis indicate that between zero and seven refiners, all of which are classified as small, are at

risk of closure (refer to the "Economic Impact Analysis of the Regulatory Alternatives for the Petroleum Refineries NESHAP" in the Background Information Documents section). While this percentage of net closures is less than 20 percent of the total number of small refineries (88), it was deemed high enough for carrying out an RFA on that basis alone. Criterion (2), however, was satisfied. The compliance costs-to-sales ratio for the small refiners was more than 10 percent greater than the same ratio calculated for all other refiners.

There are four reasons why small entities are disproportionately affected by the regulation. The first is the fact that they tend to own smaller facilities, and therefore have smaller economics of scale. Because of the smaller economics of scale, per-unit costs of production and compliance are higher for the small refiners compared to others. Related to this is the fact that small refiners have less ability to produce differentiated products. This ability, called complexity, increases with increasing refinery capacity. A large refinery can respond to a relative increase in production costs for one product by increasing production

of a product now relatively cheaper to produce, an ability most small refiners rarely enjoy.

A second reason is they have fewer capital resources. Small refineries have less ability to finance the capital expenditures needed to purchase the equipment required to comply with the regulation. A third reason is the difference in internal structure. None of the small refiners are vertically or horizontally integrated, and in all but a few cases are not the subsidiary of a large parent company. The small refiners are typically independent owners and operators of their facilities, and most are owners of a single refinery. They do not possess the ability to shift production between different refineries and have less market power than their large competitors.

A fourth reason why smaller refiners experience greater economic impacts than other refiners is due to the small industry-level price increases (less than 1 percent in all cases). It is unlikely that small refiners will be able to recover annualized control costs by increasing product prices, since the large refiners will not be significantly impacted. As seen in the examination of criterion (2), the large refiners will not

be significantly affected from compliance with the regulation.

In calculating the number of closures, the assumption was made that those refineries with the highest per-unit control costs were marginal after compliance with the regulation. While this assumption is often useful in closure analysis, it is not always true. The assumption is consistent with perfect competition theory that presumes all firms are price-takers. If a refiner does have some monopoly power in a particular market, then it is possible a refiner experiencing some economic distress could continue to operate for some period while complying with the regulation. It is a conservative assumption that likely biases the results to overstate the number of refinery closures and other impacts of the proposed regulation.

To mitigate the economic impacts on small refiners, the Agency has considered whether to subcategorize the MACT floors for the various emission sources or to allow refiners more time to comply with the regulation. The Agency has decided not to include a separate subcategory for small refiners, but has decided to allow refiners more time to comply with various requirements for control

of equipment leak and storage vessel emissions (refer to section V, "Significant Comments and Changes to the Proposed Standards").

The definition of small refinery used in the analysis is 50,000 bbl per stream day production capacity. This differs from the definition of 75,000 barrels per stream current as of May 1, 1992, a definition announced by the Small Business Administration that day in the Federal Register (57 FR 18808).

E. Unfunded Mandates

Under section 202 of the Unfunded Mandates Reform Act of 1995 ("Unfunded Mandates Act"), signed into law on March 22, 1995, the EPA must prepare a budgetary impact statement to accompany any proposed or final rule that includes a Federal mandate that may result in estimated costs to State, local, or tribal governments in the aggregate, or to the private sector, of \$100 million or more. Under section 205, the EPA must select the most cost effective and least burdensome alternative that achieves the objectives of the rule and is consistent with statutory requirements. Section 203 requires the EPA to establish a plan for informing and advising any

small governments that may be significantly or uniquely impacted by the rule.

The EPA has determined that the action promulgated today does not include a Federal mandate that may result in

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estimated costs of \$100 million or more to either State, local, or tribal governments in the aggregate, or to the private sector. Therefore, the requirements of the Unfunded Mandates Act do not apply to this action.

List of Subjects

40 CFR Part 60

Administrative practice and procedure, Air pollution control, Environmental protection, Gasoline, Intergovernmental relations, Natural gas, Volatile organic compounds.

40 CFR Part 63

Air pollution control, Hazardous air pollutants, Petroleum refineries, Reporting and recordkeeping requirements.

Date

Carol M. Browner
Administrator

[____.____]