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Part II

Environmental Protection Agency

40 CFR Part 61

National Emission Standards for Hazardous Air Pollutants; Benzene Emissions From Chemical Manufacturing Process Vents, Industrial Solvent Use, Benzene Waste Operations, Benzene Transfer Operations, and Gasoline Marketing System; Final Rule

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 61

[AD-FRL-3706-1]

RIN 2060-AC68

National Emission Standards for Hazardous Air Pollutants; Benzene Emissions From Chemical Manufacturing Process Vents, Industrial Solvent Use, Benzene Waste Operations, Benzene Transfer Operations, and Gasoline Marketing System

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: National emission standards limiting emissions of benzene from industrial solvent use, benzene waste operations, benzene transfer operations, and the gasoline marketing system were proposed in the Federal Register on September 14, 1989 (54 FR 38083). The EPA proposed not to regulate the chemical manufacturing process vent source category.

This action promulgates the standards for benzene waste operations and benzene transfer operations that were proposed on September 14, 1989. These standards implement section 112 of the Clean Air Act (CAA) and are based on the Administrator's determination that benzene emissions from these source categories present a significant risk to human health. The intended effect of the standards is to require all existing, new, modified, or reconstructed sources to reduce emissions to a level which provides an ample margin of safety to protect public health.

For the reasons stated in section IV of SUPPLEMENTARY INFORMATION of this rule, the Administrator is withdrawing the standards proposed for the industrial solvent use and gasoline marketing source categories.

This action also serves as notice of the Administrator's final determination not to regulate the chemical manufacturing process vent source category.

DATES: *Effective Date:* March 7, 1990.

Judicial Review: Under Section 307(b)(1) of the CAA, judicial review of NESHAP is available only by filing a petition for review in the U.S. Court of Appeals for the District of Columbia Circuit within 60 days of today's publication of these rules. Under section 307(b)(2) of the CAA, the requirements that are the subject of today's notice may not be challenged later in civil or criminal proceedings brought by EPA to enforce these requirements.

Incorporation by Reference: The incorporation by reference of certain publications in these standards is approved by the Director of the Office of the Federal Register as of March 7, 1990.

ADDRESSES: *Dockets.* Docket No. OAQPS 79-3 (part I) contains information considered in determining health effects, listing, and regulating benzene. Docket Nos. A-89-03, A-89-05, and A-89-07 contain information considered in the decisions not to regulate chemical manufacturing process vents, industrial solvent use and the gasoline marketing system; Docket Nos. A-89-04 and A-89-06 contain supporting information used in the development of the standards for benzene transfer operations and benzene waste operations, respectively. These dockets are available for public inspection and copying between 8:30 a.m. and 3:30 p.m., Monday through Friday, at the EPA's Air Docket Section, Waterside Mall, Room M1500, 1st Floor, 401 M Street SW., Washington, DC 20460. A reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: For information on benzene emissions and regulations, contact either Mr. Doug Bell at (919) 541-5568, or Dr. Janet Meyer at (919) 541-5254, Standards Development Branch, Emission Standards Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711. For information concerning the health effects of benzene and the risk assessment, contact Mr. Scott Voorhees at (919) 541-5348, Pollutant Assessment Branch, Emission Standards Division (MD-13), at the above address.

SUPPLEMENTARY INFORMATION: The information presented in this preamble is organized as follows:

I. Acronyms

AML—Acute Myelogenous Leukemia.
API—American Petroleum Institute
ARAR—applicable or relevant and appropriate requirement
BID—background information document
BDAT—best demonstrated available technology
CAA—Clean Air Act
CERCLA—Comprehensive Environmental Response, Compensation, and Liability Act
CMA—Chemical Manufacturers Association
CRA—compression-refrigeration-absorption
CRC—compression-refrigeration-condensation
CTAC—Chemical Transportation Advisory Committee
CTG—control techniques guidelines
EB/S—ethylbenzene/styrene
EPA—Environmental Protection Agency
FDA—Food and Drug Administration
FID—Flame Ionization Detection
FWPCA—Federal Water Pollution Control Act
HEM—Human Exposure Model
ISC-LT—Industrial Source Complex Long-Term (dispersion model)
LDR—land disposal restrictions
LOA—lean oil absorption
MIR—maximum individual lifetime risk
NAAQS—National Ambient Air Quality Standards
NCP—National Contingency Plan
NDIR—Non-Dispersive Infrared Radiation
NESHAP—national emission standards for hazardous air pollutants
NIOSH—National Institute for Occupational Safety and Health
NSPS—new source performance standard
NTIS—National Technical Information Service
OMB—Office of Management and Budget
OSHA—Occupational Safety and Health Administration
OSW—Office of Solid Waste
OW—Office of Water
POTW—publicly owned treatment work
ppmw—parts per million by weight
PRA—Paperwork Reduction Act
RCRA—Resource Conservation and Recovery Act
RIA—Regulatory Impact Analysis
RFA—Regulatory Flexibility Analysis
SAB—Science Advisory Board
SARA—Superfund Amendment and Reauthorization Act
SBA—Small Business Administration
SIC—Standard Industrial Classification
SIP—State Implementation Plan
SRI—Stanford Research Institute
SWMU—solid waste management unit
TFE—thin-film evaporation
TSCA—Toxic Substances Control Act
TSDF—treatment, storage, and disposal facility
TSDR—treatment, storage, disposal and recycling facility
URE—unit risk estimate
VOC—volatile organic compound
VOL—volatile organic liquid

Federal Register / Vol. 55, No. 45 / Wednesday, March 7, 1990 / Rules and Regulations [illegible]

II. Summary of Final Standards and Impacts

A. Benzene Transfer Operations

Summary of Standards

The format for the final standard is a weight-percent reduction and a limitation of loading to only vapor-tight tank trucks, railcars or marine vessels. The final standard applies to all loading racks where benzene is loaded into tank trucks, railcars or marine vessels at each production facility and each bulk terminal. The standard exempts those facilities that load only liquids containing less than 70 weight-percent benzene, or at which less than 1.3 million liters of 70 or more weight-percent benzene are loaded annually, from the collection and control provisions of the standard. These affected facilities must file a report documenting the throughput and concentration of benzene loaded in the first year of the standard.

The standard requires those facilities that load 1.3 million liters per year or more of liquids containing 70 weight-percent or more benzene to equip each loading rack with a vapor collection system and to route emissions from the collection system to a 98 percent efficient control device. The standard also requires that the loading of 70 weight-percent or more benzene at affected facilities be limited to vapor-tight tank trucks, railcars, or marine vessels. These requirements are discussed below.

The final standard requires that each loading rack at which at least 1.3 million liters per year of liquids containing at least 70 weight-percent benzene are loaded be equipped with a vapor collection system to prevent the vapors displaced during loading from passing into the atmosphere uncontrolled, either directly or through another rack. Additionally, the standard requires that the loading of benzene be limited to those tank trucks, railcars, and marine vessels equipped with vapor collection equipment compatible with the vapor collection system at the loading rack, and to those times when the two vapor collection systems are connected. Further provisions of the standard are designed to ensure that the pressure during loading will not cause pressure-vacuum vents to open, and that inspections for leaks and repair of identified leaks are conducted in a timely manner.

The final standard requires that the owner or operator of each affected facility obtain a copy of the vapor-tightness documentation prior to the loading of a liquid containing 70 weight-percent or more benzene into any tank truck, railcar, or marine vessel. The test date on the documentation must be within the preceding 12 months, the affected facility must retain a copy of the test documentation, and the documentation must be updated at least once annually. The standard requires that tank trucks and railcars be tested for vapor tightness using method 27 of 40 CFR part 60, appendix A, and marine vessels be tested using method 21 of appendix A to document the vapor-tightness.

The standard further provides that if a marine vessel owner or operator cannot produce the appropriate documentation, the owner or operator of an affected facility may still load the vessel, if a vapor-tightness test meeting the requirements of method 21 is conducted during the final 20 percent of loading. A copy of this test must be kept with the vessel, and a copy must be retained in the affected facility's documentation file. If the vessel fails the vapor-tightness test, the facility retains documentation that the vessel failed the test, and the owner or operator of the facility may not load the vessel again until documentation of repairs, or proof that repairs cannot be completed unless the vessel is dry-docked, is provided. In the case where repairs cannot be completed unless the vessel is dry-docked, the standard requires these repairs be made the first time the vessel is dry-docked. The standard also requires that the vapor-tightness test be performed during the final 20 percent of loading during the first loading subsequent to documented repairs. If this test is successful, the documentation is retained in the affected facility's file, and would exempt the vessel from further testing for a full year.

The standard also provides an additional vapor-tightness test in § 61.304(f) that may be used in lieu of test method 21. This test involves pressurizing the vessel with dry air or an inert gas and determining the pressure change over time. The advantage of this test is that no benzene will be in the tank, and therefore cannot be emitted to the atmosphere during testing.

In lieu of the vapor-tightness documentation, marine vessels may be loaded at negative pressure, i.e., with a benzene product tank below atmospheric pressure. Under § 61.302(e)(1), vessels loaded at negative pressure would be considered to be vapor-tight for the purposes of this standard.

The final standard requires that all vapors collected during loading of liquids containing 70 weight-percent benzene or more be routed to a control device capable of reducing benzene emissions to the atmosphere by 98 weight-percent. The 98 percent value is based on the typical performance of an incinerator or a flare, which are universally applicable to facilities expected to be subject to this standard. Available test data indicate that properly designed, operated, and maintained incinerators or flares can achieve at least a 98 weight-percent reduction of organic compounds. Although the standard is based on the use of an incinerator or flare, any control device may be used as long as a 98 weight-percent reduction is achieved.

The standard contains provisions for performance testing and monitoring of specific parameters for flares, boilers, process heaters, incinerators, steam generating units and carbon adsorption systems. If an owner or operator wishes to use a control device other than those specifically mentioned for compliance purposes, the standard allows the owner or operator to submit information to the Administrator describing the operation of the control device and those parameters that would indicate proper operation and maintenance of the device. The control device must be able to produce a 98 weight-percent reduction in the benzene emissions routed through it.

Records of all performance tests and monitoring results must be maintained for at least two years and be readily available for inspection. The standard requires that the vapor-tightness documentation for all tank trucks, railcars, and marine vessels be maintained in a permanent file and be available for inspection. Additionally, the standard requires the information in the file be updated at least once annually. The standard also requires quarterly reports of the following information: (1) Each exceedance of monitored parameters, (2) all periods when the vent stream is diverted from the control device, (3) all periods when a steam generating unit or process heater was not operating, when the control device used is a steam generating unit or a process heater, (4) if a flare is used as a control device, all periods when the pilot flame was absent, and (5) all times when maintenance is performed on car-sealed valves, when the car seal is broken, and when the car-sealed valve position is changed. The initial quarterly report would be filed within 90 days of the effective date of the standard, or 90 days after the startup date, if the startup date is after the effective date of the standard.

The standard requires that all tank truck and railcar loading racks at each affected facility be in compliance with the standard within 90 days of the effective date of the standard, or obtain a waiver of compliance as provided for in § 61.11 of the General Provisions. The final standard requires marine vessels to be in compliance by February 28, 1991. The one-year general waiver for marine vessels is necessary for the installation of controls.

Summary of the Environmental, Health, and Energy Impacts

Benzene emissions from this source category will be reduced from 4,500 megagrams/year at baseline to an estimated 270 megagrams/year, a reduction of approximately 94 percent. The residual incidence of leukemia from exposure to benzene emissions after application of this standard is estimated to be approximately 0.02 case/year, and the MIR is predicted to be approximately 4×10^{-5}. This can be compared with an incidence of 1 case/year and a MIR of 6×10^{-3} under baseline conditions.

Potential environmental impacts of this standard depend on the control device selected by each facility to attain compliance. Incinerators and flares are not expected to produce any wastewater or solid waste impacts. However, if carbon adsorbers are used, some minor wastewater and solid waste impacts can be expected from desorption of the carbon beds with steam, and then the final disposal of spent carbon. Because it is not known how many benzene transfer facilities will employ carbon adsorbers, rather than incinerators or flares, to comply with the standard, the wastewater and solid waste impacts of this standard cannot be quantified at this time. However, in light of existing regulatory controls, regulations being developed under other acts such as RCRA, and those regulations being considered for benzene waste, these impacts are expected to be small. No changes in energy use are predicted.

Summary of the Cost and Economic Impacts

National capital costs of control associated with achieving the standard are $167 million (in 1987 dollars). The nationwide annual cost is $30 million/year (in 1987 dollars). No major adverse economic impacts are anticipated as a result of these standards.

B. Gasoline Marketing System

The Administrator is withdrawing the standards proposed for the three gasoline marketing source categories. Since publication of the proposed rule in September 1989, EPA has evaluated the public comments and reexamined the proposed regulation of these source categories. After extensive review of facts relevant to these categories, EPA concludes that application of the NESHAP policy described in the September 14, 1989, rule for various source categories of benzene (54 FR 38044) does not mandate establishing NESHAP for the gasoline marketing source categories in order to protect public health because the baseline emissions are already within a safe range, and additional controls are unnecessary to provide an ample margin of safety.

As described in the proposal, the baseline MIR for each source category is as follows: 5×10^{-5} for bulk gasoline terminals; 1×10^{-5} for bulk gasoline plants; and 5×10^{-6} for service station storage tanks. Accordingly each of these source categories falls below the presumptive acceptable risk benchmark of approximately 10^{-4} MIR.

The EPA did not rest its acceptable risk judgment on these numbers alone. In addition, the incidence reduction for each of the categories would be very low, in the range of 0.03 to 0.07 case/year. Finally, EPA estimates that without regulation the vast majority of the population exposed to these sources is already protected to a level of 10^{-6} or lower.

In considering whether further regulation would be necessary in order to provide an ample margin of safety, EPA reviewed the control costs and emission reductions associated with a number of alternative control levels for each source category. For the three categories, capital cost would be approximately $1 billion, with annualized costs of $130 million. In addition, EPA considered qualitative information on risk distribution, the number of relevant facilities and their proximity to residential areas, and the potential population at risks greater than 10^{-6}. The details of those alternatives are explained fully in section IV–D–5 of this notice.

In determining that the existing emission levels for bulk gasoline terminals provide an ample margin of safety, EPA considered the fact that incidence reduction for the alternatives proposed would be relatively small. It was also recognized that the majority of the risk reduction would occur in the population exposed at risks below 10^{-6}. The cost of the alternative control measures were judged to be high relative to achievable risk reduction. Finally, it was recognized that as all new and modified facilities must meet the NSPS, the risk and emissions from this source category will be reduced over time.

Likewise, for bulk gasoline plants for the control options considered, EPA found a small incidence reduction at a high relative cost, and the vast majority of the population exposed to risks below 10^{-6}.

For service station storage vessels, although specific estimates of persons exposed at different risk levels could not be developed, the incidence reduction was considered small. The cost of additional control was considered disproportionately high, relative to the small health benefits.

For these reasons, as described in detail in section IV, EPA determined that for all three source categories of gasoline marketing, the baseline emissions provided an ample margin of safety.

It should be noted that the decisions not to regulate these source categories under section 112 at this time does not preclude controls on benzene emissions occurring through different means in the future. For example, EPA plans within the next several months to issue an Advance Notice of Proposed Rulemaking for the control of air toxics, including benzene specifically, through gasoline and diesel reformulation. In addition, several proposed amendments to the CAA, if enacted, would authorize additional benzene controls. For example, the Administration's proposed amendments to the CAA include a major new initiative on alternative fuels under which the Administrator would set performance standards for clean-fuel vehicles designed, among other things, to reduce toxic air emissions, such as benzene emissions. The Administration's proposed amendments would also require that service station owners in certain parts of the country install systems for Stage II gasoline vapor recovery of emissions including benzene emissions from the refueling of vehicles. Finally, the Administration's proposed amendments would authorize a study and regulation of air toxic emissions from mobile sources. Thus, further benzene controls may be provided for under a new CAA, as well.

C. Benzene Waste Operations

Summary of Standards

Applicability. The final standards for benzene waste operations are applicable to owners or operators of chemical plants, petroleum refineries, and coke by-product recovery plants. The standards also apply to owners or operators of TSDF that receive wastes from chemical plants, petroleum refineries, or coke by-product recovery plants. The standards require that all benzene-containing wastes generated by chemical plants, petroleum refineries, and coke oven by-product plants be managed to reduce benzene emissions unless it is demonstrated that the amount of benzene in the waste is below specified levels.

Certain wastes are specifically excluded from all aspects of the standards. These are: In-process recycle streams, segregated stormwater runoff, and process offgases.

The regulatory approach used in the final standards is illustrated in Figure 1. Each facility subject to the standards must perform an initial determination of the total amount of benzene contained in the wastes managed at the facility. This determination may be made through waste testing or through "knowledge of the waste" that is documented by the owner or operator. Any benzene in waste streams containing less than 10 percent water is excluded from this determination.

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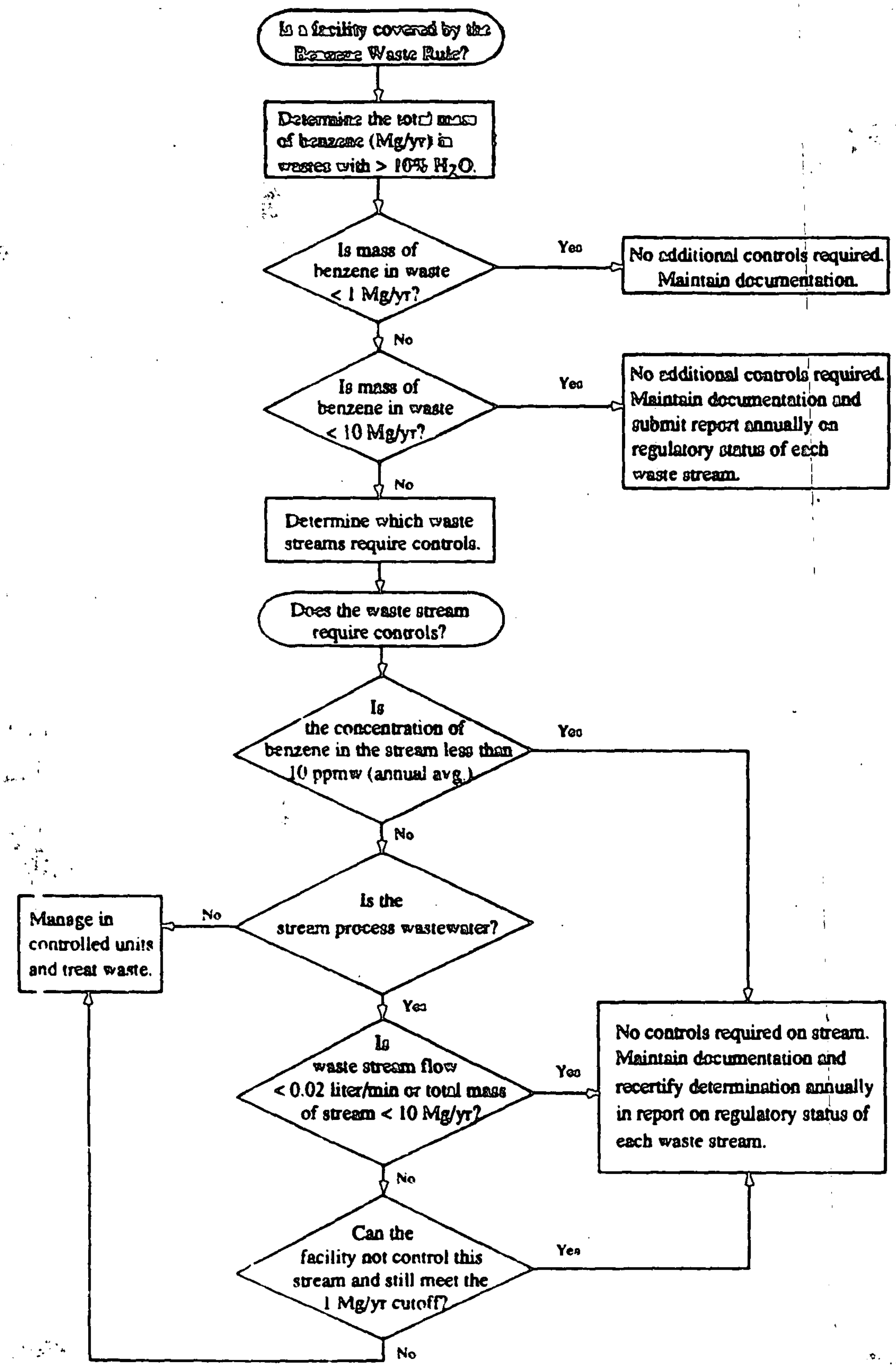

Figure 1. Regulatory approach for benzene waste operations.

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If the initial determination shows the total benzene in the waste is less than 10 megagrams/year, no benzene controls are required by the standards. Owners or operators of facilities where the total benzene in the waste managed is less than 1 megagram/year must submit a report and maintain a record of the initial determination. No further action to comply with the standards is required of these facilities unless a process change occurs that could cause the amount of benzene in the waste managed to increase to 1 megagram/year or more, in which case a repeat determination is required. Owners or operators of facilities that contain 1 megagram/year or more total benzene in their wastes must submit an initial report describing the regulatory status of each waste stream, maintain a record of the documentation on which the report is based, and update and resubmit the report annually. Owners and operators of facilities where the amount of benzene in the waste managed is 10 megagrams/year or greater must comply with the specific equipment, operational, and performance requirements set forth in the standards.

Specific Equipment, Operational, and Performance Requirements. All benzene-containing waste streams must be treated prior to discharge from the facility and units in which the waste is managed before treatment must be equipped with air emission controls. Waste streams exempted from control (in addition to those identified earlier that are not covered by these standards) are (1) waste streams demonstrated to have a concentration of benzene less than 10 parts per million on an annual average basis, and (2) waste streams with a flow rate less than 0.02 liters per minute or a total mass of waste less than 10 megagrams/year. Knowledge of the waste or waste testing may be used to demonstrate that a waste stream meets either of these exemption requirements. An additional option is provided in the final rule by which other process wastewater streams may be exempt from control even though they contain greater than 10 parts per million of benzene. Under this option, an owner or operator must treat a sufficient number of process wastewater streams such that the total benzene in both the untreated and treated process wastewater is less than 1 megagram/year. Treated process wastewater streams must meet the treatment requirements specified by this rule.

Under the final rule, treatment technologies that remove benzene from the waste must either (1) reduce the concentration of benzene in the waste to a level less than 10 parts per million, or (2) reduce the concentration of benzene in the waste by 99 percent or greater. Stream stripping, TFE, waste incineration, or other treatment technologies may be used to meet this requirement. Waste incineration and other treatment technologies involving waste destruction must destroy 99 percent or greater of the benzene in the waste. Engineering calculations or waste testing may be used to demonstrate initial compliance with these performance requirements. Monitoring of process parameters indicative of treatment device performance is also required to indicate that the device is properly operated and maintained to meet these standards. Several other equivalent treatment alternatives are identified in the standards based on the waste treatment requirements of other regulatory programs that should meet or exceed the level of air emission protection provided by these standards. Dilution is not allowed as a means of complying with the treatment requirements of the standards. However, mixing of waste streams to facilitate treatment is allowed, provided that the provisions of the standards applicable to waste mixing are met.

Units in which wastes are managed prior to treatment must be controlled for air emissions as follows: Tanks, surface impoundments, and oil-water separators must be equipped with a cover (such as a fixed roof or enclosure) vented to a closed vent system and control device. Containers must be covered and submerged fill loading must be used for pumpable wastes. Containers in which waste treatment is performed must also be vented to a closed vent system and control device. Individual drain systems must be completely closed and equipped with a closed vent system and control device. As an alternative, individual drain systems can comply with both the control requirements of the NSPS for petroleum refinery wastewater systems (40 CFR part 60, subpart QQQ) and control junction boxes either by installing water seals to isolate the junction boxes or by venting the junction box to a closed vent system and control device. Control devices must be designed and operated to remove or destroy 95 percent of the organics in the vent stream. Either engineering calculations or emission testing may be used to demonstrate initial compliance with this performance requirement. Monitoring of control devices is also required to indicate that the devices are being properly operated and maintained. Covers and closed vent systems must be operated with "no detectable emissions," which means the instrument reading using EPA Method 21 must be below 500 parts per million above background. Measurement for detectable emissions must be conducted initially and annually. Visual inspections of covers must be conducted initially and quarterly.

Reporting and Recordkeeping Requirements. Within 90 days of today's date, owners or operators of facilities subject to these standards must complete the initial determination of the amount of benzene managed at each facility and also determine which waste streams must be controlled. The results of these determinations must be included in an initial report, to be submitted to EPA or the appropriate designated authority within 90 days of today's date, that describes the regulatory status of each waste stream. A record of these determinations must be maintained at each facility, including complete documentation to support a conclusion that controls are not required on a facility or waste stream. Facilities that must install controls to meet the requirements of the standards must complete installation and begin operating the control equipment within 2 years of today's date. The 2-year waiver of the compliance deadline is deemed necessary for installation of controls.

No additional reports are required for facilities that manage waste containing less than 1 megagram/year of benzene. The owner or operator of each facility that manages waste containing 1 megagram/year or more of benzene must annually update and resubmit to EPA or the designated authority the report describing the regulatory status of each waste stream at the facility.

Facilities that manage wastes containing 10 megagrams/year or more of benzene must include in their operating record the design specifications of all control equipment installed to meet these standards. Facilities that are required to monitor control device or treatment device performance must also document the parameters monitored and maintain a record of monitoring results, including a record of when the monitored parameters exceed acceptable levels. Facilities required to measure for detectable emissions or make visual inspections must maintain a record of all occurrences when detectable emissions or problems are detected and what corrective action is taken. Facilities at or above the 10 megagrams/year benzene in waste level must also submit a quarterly report to EPA or the designated authority certifying that all required inspections have been carried out and documenting when control device or treatment device performance, as indicated by monitoring results, were outside of prescribed limits during the quarter.

Summary of Environmental, Health, and Energy Impacts

The final standards will reduce baseline benzene emissions of 6,000 megagrams/year to 450 megagrams/year, a 93 percent reduction. Emissions of other VOC present in the wastes will also be reduced; however, this reduction could not be quantified because of limited data on the other constituents and their concentrations. The estimated baseline incidence for leukemia from wastes containing benzene would be reduced from approximately 0.6 to 0.05 case/year. The maximum risk would be reduced from approximately 2×10^{-3} at the baseline to approximately 5×10^{-5} by the final standards.

Summary of Cost and Economic Impacts

The total nationwide capital cost of the final standards is estimated at $250 million (1986 dollars), primarily based on the use of steam stripping, TFE, waste incineration, and controls for tanks. The total annual cost is estimated at $87 million/year (1986 dollars). Approximately 140 (35 percent) of the 398 facilities in the benzene data base are estimated to be subject to the control requirements of this regulation and are expected to incur the majority of these costs.

D. Industrial Solvent Use

Based on new site-specific emission information, the proposed standards for rubber tire manufacturing facilities and for pharmaceutical manufacturing process vents are being withdrawn. For both categories, the information received since proposal showed emissions and risks were substantially lower than previously estimated and very few people were estimated to be exposed to risks greater than 1×10^{-6}. In light of this new information, EPA reassessed the proposed decision and determined that the existing emission levels provided an ample margin of safety. In addition, due to existing SIP and NSPS, EPA decided not to set standards to mandate the existing level of controls.

E. Chemical Manufacturing Process Vents

The EPA is reaffirming its decision not to regulate these sources.

III. Background

A. Regulatory/Legal Framework

In 1977, the Administrator announced his decision to list benzene as a hazardous air pollutant under section 112 of the CAA (42 FR 29332, June 8, 1977). Benzene was determined to be a hazardous air pollutant because of its carcinogenic properties. A hazardous air pollutant is defined in section 112(a)(1) of the CAA as

> * * * an air pollutant to which no ambient air quality standard is applicable and which * * * may reasonably be anticipated to result in an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness.

Section 112(b)(1)(B) of the CAA requires EPA to establish emission standards for a hazardous air pollutant "at the level which in [the Administrator's] judgment provides an ample margin of safety to protect the public health from such hazardous air pollutant."

The listing of benzene as a hazardous air pollutant led to the publication of proposed standards for benzene emissions from maleic anhydride process vents, EB/S process vents, benzene storage vessels, and benzene equipment leaks in 1980 and 1981. After receipt of comments from industry and members of the public, EPA published a final rule setting an emission standard for benzene equipment leaks on June 6, 1984 (49 FR 23498). On that date, EPA also withdrew its proposed standards for maleic anhydride process vents, EB/S process vents, and benzene storage vessels (49 FR 23558). The withdrawal was based on the conclusion that both the benzene health risks to the public from these three source categories, and the potential reductions in health risks achievable with available control techniques were too small to warrant Federal regulatory action under section 112 of the CAA. Also on that date, EPA published a proposed standard for benzene emissions from coke by-product recovery plants (49 FR 23522).

On July 28, 1987, the U.S. Court of Appeals for the District of Columbia Circuit remanded to EPA an emissions standard for vinyl chloride which had also been promulgated under section 112 of the CAA (the *Vinyl Chloride* decision). In this decision, the court concluded that EPA had improperly considered cost and technological feasibility without first making a determination of acceptable risk based exclusively on health considerations. In light of this decision, EPA requested, and the court granted, a voluntary remand of the June 6, 1984, benzene equipment leaks NESHAP and the three withdrawals. The EPA also decided to reconsider the 1984 proposal for coke by-product recovery plants. In reviewing these previous decisions for compliance with the *Vinyl Chloride* decision, EPA reevaluated the assumptions and methodology it has used in making section 112 regulatory determinations. The EPA decided that substantial input from the public and all interested organizations should be solicited in formulating a strategy on how to execute the requirements of section 112 of the CAA in future rulemakings. Consequently, the EPA published in the Federal Register on July 28, 1988 (53 FR 28496) four proposed policy approaches for making section 112 regulatory decisions and published alternative proposed standards for benzene emissions from maleic anhydride plants, EB/S plants, benzene storage vessels, benzene equipment leaks, and coke by-product recovery plants. The resulting EPA policy for developing NESHAP was promulgated following consideration of public comments on those four proposed policy approaches.

On February 7, 1989, the U.S. Court of Appeals for the District of Columbia Circuit responded to a Natural Resources Defense Council (NRDC) petition which had sought to compel the EPA Administrator, within the 180-day time frame embodied in section 112 of the CAA, to propose emission standards for a variety of benzene source categories, none of which had been included in the Court of Appeals remand.

The District Court subsequently ordered EPA to publish in the Federal Register on or before August 5, 1989, either a notice of proposal not to regulate, or a notice of proposed regulations establishing NESHAP limiting emissions of benzene from the following sources: Chemical manufacturing process units, including ethylene plants, chlorobenzene plants, nitrobenzene plants, linear alkylbenzene plants, cyclohexane plants; waste disposal from chemical manufacturing; industrial solvent usage; and bulk terminals, bulk plants, and gasoline service stations (including the filling of gasoline service station tanks by gasoline tank trunks, but not including the refueling of motor vehicles at gasoline service stations). The court amended its order on May 8, 1989, to require EPA to issue its proposal by August 31, 1989, and final decisions by February 27, 1990. The proposal notice was signed on August 31, 1989, and published in the Federal Register on September 14, 1989 (54 FR 38083). The notice also included the Administrator's determination not to regulate the chemical manufacturing process vent source category. The notice proposed regulations for benzene transfer operations, industrial solvent use, benzene waste operations, and three gasoline marketing system sources categories.

Simultaneous with the notice of proposed rulemaking of September 14, 1989, was publication of the final rulemaking notice for benzene emissions from maleic anhydride plants, EB/S plants, benzene storage vessels, equipment leaks, and coke by-product recovery plants (54 FR 38044). That final rulemaking contains a detailed description of the legal framework for regulation under the *Vinyl Chloride* decision and the policy approach developed by EPA for establishing NESHAP within that framework.

Today's regulations are based on the policy approach described in the September 14, 1989, final notice (54 FR 38044). Following is a brief description of that policy. In protecting the public health with an ample margin of safety under section 112, EPA strives to provide maximum feasible protection against risks to health from hazardous air pollutants by (1) protecting the greatest number of persons possible to an individual lifetime risk level no higher than approximately 1 in 1 million and (2) limiting to no higher than approximately 1 in 10 thousand the estimated risk that a person living near a plant would have if he or she were exposed to the maximum pollutant concentrations for 70 years. Implementation of these goals is by means of a two-step, standard-setting approach, with an analytical first step to determine an "acceptable risk" that considers all health information, including risk estimation uncertainty, and includes a presumptive limit on maximum individual lifetime risk (MIR) of approximately 1 in 10 thousand. A second step follows in which the actual standard is set at a level that provides "an ample margin of safety" in consideration of all health information, including the number of persons at risk levels higher than approximately 1 in 1 million, as well as other relevant factors including costs and economic impacts, technological feasibility, and other factors relevant to each particular decision. Applying this approach to the benzene source categories in today's notice results in controls that protect over 99 percent of the persons within 50 kilometers (km) of these sources at risk levels no higher than approximately 1 in 1 million.

A principle that accompanies these numerical goals is that while EPA can establish them as fixed numbers, the state of the art of risk assessment does not enable numerical risk estimates to be made with comparable confidence. Therefore, judgment must be used in deciding how numerical risk estimates are considered with respect to these goals. Uncertainties arising from such factors as the lack of knowledge about the biology of cancer causation and gaps in data must be weighed along with other public health considerations. Many of the factors are not the same for different pollutants, or for different source categories.

B. Public Participation

The preamble to the proposed standards discussed the availability of the background documents pertaining to the health effects of benzene and previous regulatory development efforts for each source category. Public comments were solicited at the time of proposal, and copies of the Federal Register notice and brief summaries of the requirements of the proposed standards were distributed to interested parties.

The opportunity for a public hearing was provided to give interested persons a forum for the oral presentation of data, views, and arguments concerning the proposed standards. However, a public hearing was not requested. During the public comment period which was from September 14 to November 13, 1989, EPA received over 180 comments among the 5 dockets. All comments were carefully considered, and when determined to be appropriate by EPA, have served as the basis for changes made to the proposed standards.

IV. Significant Comments, Responses, and Changes

A. Legal Comments and Responses

Comment: A number of commenters stated that the length of time allowed for submission of comments was inadequate, and that it should be extended.

Response: This rule was proposed on September 14, 1989, as a result of a February 16, 1989, order issued by the U.S. District Court for the District of Columbia Circuit in *Natural Resources Defense Council, Inc.*, v. *EPA*, Case No. 83–2951, requiring EPA to regulate or issue decisions not to regulate a number of source categories of benzene on a fixed schedule. An additional order, amending the February 1989 order so as to increase the time allowed for promulgation of the regulations, required EPA to issue final rules by February 27, 1990. In order to meet that court ordered deadline and also respond fully to public comments, it was necessary for EPA to receive all comments on the proposal by November 13, 1989. An extension of the comment period, as requested by the commenters, would have jeopardized the EPA's ability to respond adequately to the comments and to meet the court's deadline and therefore was impossible to grant. However, EPA agrees with the commenters that a longer period for submission and evaluation of comments would have been preferable.

Comment: One commenter stated that cancer risks greater than 1-in-1,000,000 cannot be considered "safe" under the *Vinyl Chloride* decision (*Natural Resources Defense Council, Inc.* v. *EPA*, 824 F.2d at 1146 (D.C. Cir. 1987)). The commenter argued that EPA has stated, regarding pesticides, that a 1-in-1,000,000 cancer risk is not *de minimis* and cited *Alabama Power* v. *Costle*, 636 F.2d at 323 (D.C. Cir. 1978) and *Public Citizen* v. *Young*, 831 F.2d at 1108 (D.C. Cir. 1987).

Response: The EPA does not interpret "safe" for purposes of Section 112, as limited to *de minimis* risk as described in *Alabama Power* and *Public Citizen*. The *Vinyl Chloride* decision, which governs the EPA's NESHAP decision-making process, while going into great detail in discussing the concepts of both "acceptable risk" and "ample margin of safety," never mentioned the concept of *de minimis* risk. What the court did say was that Congress exhibited no intent to require EPA to prohibit emissions of all nonthreshold pollutants, and citing the Supreme Court decision in *Industrial Union Dept., AFL–CIO* v. *American Petroleum Institute*, 448 U.S. 607 (1980) stated that "safe does not mean risk-free," 824 F.2d at 1153.

The *Vinyl Chloride* court decision declined to restrict the Administrator to any particular method of determining what constitutes an acceptable risk, but explained simply that he must decide what risk is acceptable in the world in which we live. Thus, the determination is discretionary. In this rulemaking the Administrator has found risk levels of approximately 10^{-4} to be presumed "safe" within the meaning of *Vinyl Chloride*.

The EPA disagrees with the commenter's contention that the *Public Citizen* case demonstrates that "acceptable risk" is limited to *de minimis* risk. *Public Citizen* involved an FDA statute prohibiting use of any food coloring additive "found * * * to induce cancer in man or animal," 831 F.2d at 1109. The FDA in that case argued that a *de minimis* exception, allowing use of the challenged additives when the cancer risks involved were trivial, could properly be read into the statute. The court, however, while acknowledging that the cancer risks were indeed trivial, held that the statute imposed an absolute ban once a finding of carcinogenicity had been made, and therefore no *de minimis* exception could be employed.

The situation in *Public Citizen* involving a "no-risk" statute is markedly different from the facts of the *Vinyl Chloride* case, where the court declined to equate "safe" with "risk-free," 824 F.2d at 1153. Indeed, the *Vinyl Chloride* court specifically used examples of activities having acceptable levels of risk "in the world in which we live," but which exceed the *de minimis* concept described in *Alabama Power*. Thus, unless the *Vinyl Chloride* decision is read to broaden the *de minimis* concept from triviality to a level which is acceptable in the world in which we live, the dicta in *Public Citizen* is an apparent misconstruction of the en banc *Vinyl Chloride* opinion. Furthermore, *Public Citizen* did not deal with a statute requiring a determination of a "safe" level, and therefore cannot reasonably be compared to section 112 of the CAA, and the court's analysis of risk in the *Vinyl Chloride* opinion.

Finally, the *Vinyl Chloride* court's citation of *Alabama Power* does not constitute adoption of the *de minimis* concept. As stated above, the *Vinyl Chloride* decision makes no mention of the *de minimis* concept, and cites *Alabama Power* following a discussion of risks found acceptable by the Supreme Court in *Industrial Union* which clearly exceeded *de minimis*. Therefore, at most *Alabama Power* was apparently cited as an example of a risk level, which would, of course, be considered acceptable. Obviously, the enumeration of other, higher, risks precludes the interpretation that the court was equating the *de minimis* concept with "safe" or "acceptable" in *Vinyl Chloride*.

Comment: A number of commenters argued that the proposed regulations for benzene waste operations were written too broadly, exceeded the court mandate, and therefore included more source categories than necessary or appropriate. The majority of these commenters argued that oil and gas exploration and production facilities should not be included in the benzene waste rule. Two commenters stated that in order to comply with the D.C. District Court's order the waste rule need cover only waste disposal from chemical manufacturing and refineries. One commenter stated that the waste rule should be narrowed to exclude marketing.

Response: The EPA agrees that, as proposed, the benzene waste regulations could have been interpreted as applying to more source categories than intended. As a result, EPA issued a clarification notice in the Federal Register on December 15, 1989 (54 FR 51423) stating that the proposal had been intended to apply only to benzene waste from chemical plants, petroleum refineries, coke by-product recovery plants, and commercial hazardous waste treatment, storage, and disposal facilities. The final rule is consistent with this clarification and responsive to the comments requesting a narrowing of the coverage of the waste regulations.

Comment: One commenter stated that if the Administrator finds that emissions of a pollutant from a given source category are already below levels that provide the public an ample margin of safety because of existing regulation, no new standards need be adopted in order to comply with section 112. The commenter further argued that EPA has broad discretion to decide which source categories for a listed pollutant warrant regulation.

Response: The EPA agrees with the commenter that if existing regulations do indeed, in the judgment of the Administrator, provide an ample margin of safety to protect the public health, then section 112 does not require new standards to be adopted under section 112. The EPA also agrees that within the limitations of section 112, requiring that the public be protected with an ample margin of safety, EPA has discretion to determine which source categories of emissions of a listed pollutant warrant regulation.

Comment: Some commenters took the position that because Congress is considering amendments to the CAA which include revisions to section 112, EPA should not issue further NESHAP regulations until Congress has enacted new legislation. One commenter suggested deferring the benzene waste operations regulation so that requirements for hazardous waste facilities could be considered concurrently with the requirements being developed under RCRA (section 3004(n)).

Response: At the time this response was drafted Congress was still working at committee level on bills designed to amend the CAA including section 112. Because of the court ordered deadline for promulgation of this rule, EPA was unable to withhold action for purposes of the RCRA requirements or until Congress had completed revisions to the CAA. The EPA had no way of knowing when, whether, or in what final form the pending bills would become law.

Comment: Three commenters argued that the benzene transfer operation rule governing vapor control for marine loading should not be promulgated until after the Coast Guard has promulgated final safety regulations which would be applicable to this area. The Coast Guard regulations were proposed in October 1989. The commenters suggested that EPA and Coast Guard coordinate their rulemakings, and perhaps enter into a Memorandum of Understanding providing that a vapor tightness test be included in the Coast Guard annual certificate of inspection process.

Response: The Coast Guard proposed the safety regulations in question on October 6, 1989. The EPA has been in contact with the Coast Guard to discuss the compatibility of the proposed safety regulations with the EPA rule. It is anticipated that the Coast Guard will promulgate a final rule sometime in 1990, which will be some time before the compliance deadline for the EPA rule. Therefore, sources affected by the EPA rule will be aware of the Coast Guard requirements before they need be in compliance with the EPA rule. If there are inconsistencies, the two agencies will work to resolve them as they occur. However, as EPA is promulgating this rule in response to a court ordered deadline, EPA is unable to postpone promulgation of these regulations.

Comment: A number of comments were filed relating to the issue of the appropriate compliance times for various parts of the rule. Two commenters took the position that instead of the 1- and 2-year compliance deadlines included in the proposal for bulk plants under subpart EE, EPA should allow 3 to 5 years for this source category. Several commenters argued that with respect to bulk terminals under subpart DD, the compliance deadlines should be extended 3 to 6 years because of the difficulty anticipated in obtaining equipment. In contrast, one commenter stated that the proposed December 31, 1992, compliance deadline for bulk terminals with existing vapor processing systems was unlawful because EPA has no authority to extend a compliance date beyond the 90-day deadline specified in section 112, except by issuing source-specific extensions of no more than 2 years. One commenter argued that instead of requiring compliance by existing storage vessels at larger service stations within 1 year, 2 years should be allowed.

Response: In general, section 112 regulations become effective upon promulgation (42 U.S.C. 7412(b)(1)(C)). However, with respect to existing sources, section 112 regulations become effective 90 days after promulgation. Section 112 allows a waiver of this 90-day compliance deadline for sources which require additional time in order to install controls necessary to meet the new standard. This waiver allows up to 2 years for compliance. The regulations promulgated today contain a number of provisions requiring the addition of new controls, and in many cases will require these new controls to be added to large numbers of sources. As a result the Administrator has determined that for some parts of this rule an industry-wide waiver of between 1 and 2 years is necessary to enable the sources to obtain and install the necessary equipment. However, the waiver period is specifically limited by the statute to 2 years and thus EPA is unable to extend the compliance deadlines beyond 2 years from promulgation of the rule (42 U.S.C. section 7412(c)(1)(B)(ii)).

Comment: One commenter argued that EPA has no authority to regulate waste under the CAA.

Response: Section 112 of the CAA provides EPA with authority to regulate hazardous air pollutants, which are defined as air pollutants "which in the judgment of the Administrator cause, or contribute to air pollution which may reasonably be anticipated to result in an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness" (42 U.S.C. section 7412(a)). Once the Administrator has included such a pollutant on the section 112 list of hazardous air pollutants he is required to promulgate air emission standards for that pollutant within 1 year (42 U.S.C. section 7412(b)(1)(B)).

In this case benzene has been listed as a hazardous air pollutant and EPA was required to promulgate regulations governing benzene emissions from a number of source categories including waste by February 1990. Thus, EPA is not only complying with the clear mandate of the CAA to regulate air emissions of hazardous air pollutants, but also is responding to a court order specifically including waste.

Comment: One commenter stated that the EPA's proposal to withhold delegation of authority to the States to make determinations of equivalency of alternative means of emissions limitation contravenes the CAA [section 112(d)(1)].

Response: The policy of EPA is to encourage delegation of implementation and enforcement of NESHAP to States to the maximum extent practicable. The EPA permits delegation to a State of all the Administrator's authorities under 40 CFR part 61, except any which require rulemaking in the Federal Register to implement or where Federal overview is the only way to ensure national consistency in the application of standards (see 40 CFR 61.12(d)). Section 301(a) of the CAA prohibits the Administrator from delegating his rulemaking authority. Implementation decisions generally are made by the State, while EPA makes only those decisions that have the potential to alter the intent of the standard or result in divergent application in different regions of the country. Historically, most of the NESHAP authorities have been delegated. Authorities that are not delegated to States under section 112 generally include the following areas: equivalency determinations, alternative test methods, and decisions where Federal oversight is needed to ensure national consistency. Approval of alternatives to any design, equipment, work practice, or operational standard is accomplished through rulemaking and is adopted as a change to the individual subpart. Approved test methods or changes to methods are also proposed and subsequently promulgated in the Federal Register. These authorities shall be retained by the Administrator and not delegated to a State.

Comment: One commenter alleged that both the EPA's marine vapor recovery proposal and the Coast Guard safety proposal raise issues with respect to international trade.

Response: The commenter points to no specific international code or convention provisions, or to any international trade agreement which is violated by these regulations. Section 112 of the CAA provides EPA with authority to regulate air emissions of hazardous air pollutants within the United States. Marine facilities within the United States are subject to section 112 to the extent that hazardous air pollutants are present. The EPA has no knowledge of a conflict between this authority and any international agreements. Comments regarding the Coast Guard regulations must be submitted to the Coast Guard.

B. Policy- and Administrative-Related Comments and Responses

Comment: Several commenters argued that the decisions in these proposed rules and in the September 14, 1989, final rules (53 FR 38044) presented a grossly inconsistent pattern of cost-benefit analyses. To illustrate this point, many of the commenters specifically compared the cost-effectiveness and risk levels of the decisions for the gasoline marketing source categories with the other benzene decisions. These commenters stated that the costs for bulk gasoline terminal controls ($2.4 billion/cancer case avoided) and for service stations ($500 million/cancer case avoided) were not reasonable and questioned whether there was a need to regulate these sources under section 112 where the risks are low. The commenters further stated that the costs of these controls greatly exceeded the costs for controls for standards rejected by EPA (EB/S process vents—$100 million/cancer case avoided, coke by-product recovery plants—$500 million/cancer case avoided, and benzene storage vessels—$100 million/cancer case avoided) and that EPA was not consistent in its decisions to regulate. One commenter argued that inconsistent decisions must inevitably be viewed as arbitrary.

Response: The EPA does not agree with the commenters that the benzene decisions are arbitrary and inconsistent. Rather, EPA views the decisions as reflecting consideration of all relevant health risk, technological and other measures including unquantifiable qualitative information. As explained in the September 14, 1989, Federal Register notice (53 FR 38044), in protecting public health with an ample margin of safety under section 112, EPA strives to provide maximum feasible protection against risks to health from hazardous air pollutants by (1) protecting the greatest number of persons possible to an individual lifetime risk level no higher than approximately 1×10^{-6} and (2) limiting to no higher than approximately 1×10^{-4} the estimated risk that a person living near a plant would have if he or she were exposed to the maximum pollutant concentrations for 70 years. Implementation of these goals is by means of a two-step standard-setting approach, with an analytical first step to determine an "acceptable risk" that considers all health information, including risk estimation uncertainty, and includes a presumptive limit on MIR of approximately 1×10^{-4}. A second step follows in which the actual standard is set at a level that provides "an ample margin of safety" in consideration of all health information, including the number of persons at risk levels higher than approximately 1×10^{-6}, as well as other relevant factors including costs and economic impacts, technological feasibility, and other factors relevant to each particular decision, such as uncertainties of specific assessments.

A principle that accompanies that policy and its numerical goals is that judgments must be used in deciding how the risk estimates and the estimates of the other factors like cost are considered with respect to these goals. The EPA believes that the uncertainties within assessments for different source categories can appropriately result in different decisions on acceptable risk and the appropriate level of control to provide an ample margin of safety. The EPA sees this as appropriate use of its expert judgment. In addition, EPA rejects the position that only quantified information can be considered in the decisions and that all ample margin decisions must conform to some "bright-line" cost-effectiveness ratio. To do this would be to ignore the state of the art of all these analyses and to assume all estimates are of comparable quality and confidence. Such decisions would also be unsound and inconsistent.

Regarding the commenters comparisons of benzene decisions, EPA would like to note that the control cost and incidence reduction obtained only present part of the basis for the decision. To correctly compare decisions among source categories, the commenters need to also consider: (1) The relative change in the number of people estimated to be at risk levels greater than 1×10^{-6}, and the number of people at maximum risk; (2) the change in the maximum risk, (3) the biases and uncertainties in the cost analysis and in the risk assessment, (4) whether the projected reductions are technically feasible, and (5) the associated benefits resulting from incidental control of other pollutants. When such comparisons are made, it is not possible to establish a simple or specific decision process. Rather, EPA believes it is most appropriate to determine the relative weight of the many factors that can be considered in selecting an ample margin of safety for each specific source category. This occurs mainly because technological and economic factors (along with the health related factors) vary from source category to source category. With regard to the gasoline marketing source categories, EPA is withdrawing the proposed standards for those source categories as discussed previously and in section IV–D–5 of this preamble.

Comment: A number of commenters argued that EPA has inappropriately cited additional potential public health benefits from the cocontrol of VOCs and other "air toxics" to justify controls on benzene emissions. The commenters argued that as EPA has neither made the risk findings required by section 112 for listing the unidentified VOCs and air toxics nor listed them as hazardous air pollutants under section 112, EPA cannot regulate them under that section. In addition, some commenters pointed out that EPA has indicated that controls such as those proposed in this rule have already been imposed in nonattainment areas and thus little if any further ozone reductions will be achieved in those areas. The EPA has not demonstrated that further reductions in VOCs in attainment areas will even have any significant health benefits. The commenters argued that further VOC reductions, if required, should be achieved through the SIP process. In addition, several commenters argued that VOCs cannot be regulated under section 112 as they are not pollutants to which no ambient air quality standard is applicable.

In contrast, one commenter argued that because of long-range transport, regional haze, and greenhouse effects, EPA cannot consider VOC cocontrol to be of lesser value in attainment areas than in nonattainment areas.

Response: For all benzene source categories, decisions on whether to require additional control to provide an ample margin of safety were based on an evaluation of all relevant health, technological, and economic information. In every case, decisions to require further control were based on judgments that the reductions in benzene exposures and risks would result in additional health protection and judgments that on balance the costs of regulation to society were reasonable. In decisions on the gasoline marketing source categories (and on other source categories), EPA mentioned cocontrol of VOC in the proposal only as an additional benefit resulting from control and not as the reason for imposing control requirements.

Because of commenters' concerns that judgments in the ample margin decisions were unduly affected by consideration of cocontrol benefits, EPA reexamined the decisions for the gasoline marketing system. The control alternatives considered at proposal were used in this reexamination. In this, EPA considered the quantitative risk estimates, the expected emission and risk reductions from application of controls, the control costs, technical feasibility, economic impacts, and the uncertainties of these estimates. In particular, it was recognized that the cancer incidences and population associated with various risk levels could not be estimated and that there would be a great deal of uncertainty in judgments on health benefits.

For each of the gasoline marketing source categories, EPA concluded that the reductions in incidence and MIR are small. It is expected the vast majority of the current exposures and incidence reductions would be associated with the large population exposed to risk levels below 10^{-6}. The costs of achieving these reductions have, in general, increased since proposal and are relatively high. Although there are additional benefits expected from these controls, these costs are disproportionately large in comparison to the small additional risk reduction achieved. The EPA is, therefore, withdrawing the proposed standards for the gasoline marketing system. The basis for this withdrawal is discussed in detail in response to technical comments on Gasoline Marketing System (see section IV–D–5 of this notice).

Comment: Several commenters restated their comments on previous benzene rulemakings that the EPA's assumption of continuous exposure led to grossly inflated assessments of the MIR. In the commenters' opinion the MIR estimates have no basis in scientific fact and represent a poor foundation for public policy. To support this position, two commenters cited criticism by the SAB of the dispersion and exposure modeling methods used in the risk calculations. These commenters restated their previous recommendations that alternative assumptions of 15 to 35 years and 4 to 22 hours of exposure per day be used. The commenters advocated that EPA provide a mechanism through which regulated industrial sectors or facilities could establish that the MIR worst case conditions do not apply.

One of these commenters submitted supplemental comments after the close of the comment period, contending that EPA addressed a number of exposure issues differently in the promulgated radionuclide NESHAP (December 15, 1989; 54 FR 51654) than in the proposed benzene NESHAP (September 14, 1989; 54 FR 38083). The commenter recommended that EPA reevaluate the benzene exposure estimates using site-specific analyses and less than lifetime exposure assumptions for the MIR, as was done in the radionuclide NESHAP analyses.

Response: The EPA recognizes that there is a wide range of views on the risk assessment methodologies and assumptions that are used in this analysis. In particular, EPA is aware that many commenters, including the SAB, disagreed with the EPA's decision to use 70-year exposures in calculating maximum individual risk. However, EPA makes this assumption as a matter of policy and believes that this is the correct method for doing risk assessments for NESHAP.

The EPA believes that the estimates of risk for the benzene source categories are based on the most current scientific knowledge and on sound scientific judgment. In some instances, inferences were required due to uncertainties in areas where there is no scientific consensus. The EPA incorporated these judgmental positions (science policies) into the benzene risk assessment based on an evaluation of the currently available information and on the regulatory mission of EPA to protect public health. Although there are uncertainties associated with the methods and assumptions used in the benzene risk assessment, EPA considers the analysis to represent a reasonable and appropriate approach to the estimation of potential health risks. The risk assessment conducted by EPA is consistent with the principles and procedures described in the 1986 Guidelines for Carcinogen Risk Assessment (September 24, 1986; 51 FR 33992) and Guidelines for Exposure Assessment (September 24, 1986; 51 FR 34042). These guidelines were developed by scientists in EPA, and were extensively reviewed by the public and by expert scientists in industry, academia, environmental groups, and other governmental agencies.

Regarding the commenters' specific concern about the exposure duration, EPA recognizes that most people will not actually live their entire life in the same location. Nevertheless, EPA makes this assumption as a matter of policy and does not believe that it diminishes the validity of its risk assessments. The EPA has made this assumption for several reasons. First, EPA is attempting to estimate the MIR, and it is completely possible that an individual could live in the same place for his or her entire life. Use of different assumptions could lead, in some cases, to underestimating the actual maximum risk. Second, the difference that would occur from assuming a shorter exposure period is not very significant. Such changes would only reduce the MIR by a factor of 2 or 3.

Moreover, EPA has used the 70-year exposure duration assumption consistently in Section 112 decisions on radionuclide sources and on benzene sources. The commenter is apparently under a misperception regarding the role of less than lifetime exposure assumptions in the radionuclide decisions (54 FR 51654). In this rulemaking, EPA considered exposure duration as one variable in a preliminary uncertainty analysis of risk for a limited number of facilities. This analysis showed that, when the variability of all factors is considered, risks calculated using 70-years exposure duration represents essentially median values.

While it is true that some of the radionuclide risk assessments were based on site-specific analyses, not all of these assessments were done in this manner. For source categories with a large number of sources (e.g., 135 uranium fuel cycle facilities), site-specific analyses were impractical and model plant analyses were used. In these cases, the risk estimates were developed for hypothetical individuals and populations representative of the sites. The benzene source categories are analogous to the radionuclide source categories with a large number of sources. The risk assessments for benzene sources were done using a similar approach. Thus, EPA does not agree that exposure issues were treated in fundamentally different ways.

Furthermore, since no site-specific emission data, source configuration information or meteorological data were available, it would be inappropriate to adjust the MIR to the maximum where residences are actually located, as advocated by the commenter. To require that one or more residences exist at the point of modeled maximum concentration places undue emphasis on the capability of the model to predict that a specific concentration will occur at a specific location. The EPA regards the models as accurate to the extent that the predicted maximum concentration can be expected to occur in the vicinity of the plant.

The EPA also considers the risk-based waiver program requested by several commenters to be inconsistent with the NESHAP policy. The acceptability of risks is judged under section 112 considering all health and risk information and is not determined solely on the basis of one particular risk parameter. In the second step decisions, EPA considers whether to reduce risks further considering all the health information, technological feasibility, costs and economic impacts, uncertainties of all the assessments, and other relevant factors. Consequently, the standards do not correspond to a single risk level, and it is not possible to define equivalent protection.

Comment: Several commenters disagreed with the EPA's determination that Regulatory Impact Analyses, as required by Executive Order 12291, and Regulatory Flexibility Analyses, as required under the Regulatory Flexibility Act, were not needed for the proposed regulations. Several commenters do not believe that EPA has satisfied the requirements of Executive Order 12291 because the costs associated with the proposed rule far exceed the $100 million threshold criteria contained in the Order. According to these commenters, EPA must consider the proposed rule, particularly the gasoline marketing and waste operations proposals, a major regulation which requires an evaluation of all control costs. Several commenters also requested EPA to prepare an RFA for the proposed regulation as required by the Regulatory Flexibility Act. The commenters did not agree with the EPA's conclusion that the proposed rule would not have a significant economic impact on a substantial number of small businesses. One commenter asserted that EPA had overlooked the "potential, and additive, impacts of the many provisions of the rule." Of particular concern to several commenters were the monitoring requirements for the benzene waste provisions when combined with the gasoline marketing requirements, which together would force closure of some small production wells and service stations. Therefore, the commenters believe EPA is obligated to perform an RFA to consider the costs associated with all of the other technical and administrative provisions of the proposed rule.

Response: The EPA's assessment that RIA's and RFA's were not necessary for any of the proposed rules was based on the EPA's information and assessments at the time of proposal. The EPA interprets the commenters' difference of opinion as primarily arising from the commenters' interpretation of the impacts of the proposed benzene waste regulation. As explained in detail in response to comments on the benzene waste operations rule, EPA did not intend to regulate under that rule sources like service stations and production wells and EPA has narrowed the scope of the rule. In addition, the monitoring, recordkeeping, and reporting requirements for sources that are regulated have been substantially reduced. Based on these changes, and the fact that regulated industries contain few small entities, EPA considers an RFA unnecessary for the benzene waste operations rule.

The proposed regulations for the gasoline marketing source categories are being withdrawn; however, EPA disagrees with the commenters that the proposed regulations for the gasoline marketing system should be considered one rule and that EPA failed to consider the interactive effects of the three rules. The EPA considers that these rules were properly evaluated as separate rulemaking actions and thus, no RIA was necessary. However, to fully consider whether an RFA was necessary, EPA considered the interactive effects of the three proposed rules. The EPA evaluated the combined effect of the bulk terminal or bulk plant controls in considering the cost impact of the service station standard. It was on this basis that EPA determined the percentage cost increase was less than 0.2 percent.

C. Risk Assessment Comments and Responses

Comments received by EPA on issues of risk assessment for this rulemaking were, in many cases, similar to comments which were addressed in the final rulemaking for benzene emissions from maleic anhydride plants, EB/S plants, benzene storage vessels, benzene equipment leaks, and coke by-product recovery plants [September 14, 1989 (54 FR 38044)] and in the BID for the final rulemaking. Therefore, some responses to those similar comments are restated for this rulemaking. Some additional detail may be found in the BID (EPA Publication No. EPA-450/3-89-31) for the September 14, 1989, final rulemaking.

The commenters expressed views primarily in two areas: (1) The development of the quantitative risk estimate (i.e., unit risk estimate) for benzene, and (2) the exposure assessment. The major comments and the EPA's responses are summarized below.

1. Unit Risk Estimate

Comment: A number of comments were received concerning the selection of the most appropriate epidemiological data for use in deriving the URE for benzene. These commenters maintained that the data from Rinsky (1987) are the most appropriate for quantitative risk calculations.

Response: The EPA does not dispute the contention that in many respects the Rinsky study offers better data for quantitative risk estimation. This does not alter the fact, however, that although there is a great abundance of exposure data after 1950, there is still a dearth of exposure data from the period before 1950. The uncertainties that underlie assumptions made about what those levels were prior to 1950 have produced a variety of quantitative risk estimates that vary over a wide range. The authors of the study have repeatedly stressed this point to the many interested groups that have used these data. It is questionable to assume, as did one trade association, that benzene levels were extremely high in 1940 (based upon suggested occupational standards that had no regulatory force) and that only gradual reductions in exposure took place in the absence of any major effort to control airborne emissions. Furthermore, uncertainties about the blood count data, which were outlined in a previous EPA memorandum (Docket No. OAQPS 79-3, Part 1, Item XII-B-1), preclude the use of such data as compelling evidence that airborne levels fell during the period prior to 1950. Nothing in this latest submission by the trade association has caused EPA to reconsider its conclusions about the uncertainties of the exposure data during that period.

Comment: One trade association maintained that consideration of dermal and pre-employment exposure would reduce the potency estimate.

Response: As noted in correspondence from Rinsky (Docket OAQPS 79-3, Part I, XII-B-1), the issue of dermal exposure was addressed in the NIOSH study. Dermal exposure is considered very important in determining total benzene exposure when exposure to air concentrations is around the recommended NIOSH occupational standard of 0.1 parts per million. However, Rinsky considered absorption by dermal exposure to be insignificant at the assessed pliofilm facility in comparison to the high air concentrations estimated for the NIOSH analysis. Exposures to benzene outside the department studied were addressed by conducting a case control study where both cases and controls had an equal opportunity for exposure to benzene outside the rubber hydrochloride department.

The EPA agrees that pre-employment exposure could reduce risk estimates if data were available to verify this. If these exposure data are available, EPA would like to have them for review.

Comment: One trade association defended the use of latency in their risk assessment model by indicating that both EPA and the trade association developed approaches to estimate latency from radiation data. The trade association expressed interest in collaborating with EPA to obtain better data on latency.

Response: The EPA's criticism of the trade association's use of latency concerns the specific way it is defined and used in the model. Latency is defined by the trade association as the period of time from when a *malignant cell* is born to the time when death from leukemia occurs, in contrast to the term used in epidemiologic studies where latency is usually defined as a time period from the beginning of exposure to the onset of cancer. The EPA understands that it is operationally necessary for the trade association to define latency period in this way in order to make their mathematical model biologically meaningful: namely, to avoid the assumption that occurrence of a single leukemia cell is equivalent to leukemia death. As pointed out previously by EPA (Docket No. OAQPS 79-3, Part I, Item XII-B-1), however, this introduces a biological inconsistency and mathematical inappropriateness into the procedure.

Comment: One trade association and another commenter maintained that blood count data do not correlate well with the Rinsky exposure estimate but correlate well with the estimate by Crump and Allen (1984), suggesting that the exposure estimate by Crump and Allen is more reasonable and should be used for quantitative risk calculation. The commenters compared the Crump and Allen and the NIOSH exposure estimates, and recommended that the Crump and Allen estimates be used because they correlated well with blood cell count data from the 1940's (Kipen, et al., 1988, 1989).

Response: The evidence provided by these commenters to justify the use of the Crump and Allen exposure estimate is disputed by Rinsky (Docket No. OAQPS 79-3, Part I, Item XII-B-1). Given the uncertainty associated with the Crump and Allen exposure estimate, EPA feels that both the Rinsky and Crump and Allen exposure estimates should be considered in risk assessment. There are two exposure estimates for the Rinsky cohort: Rinsky's and Crump and Allen's. Since there are no industrial hygiene data taken prior to 1946, benzene exposure for a given job prior to 1946 must be assumed. Rinsky assumed that for a given job the exposure levels were the same before 1946 as they were in 1946 when some exposure data existed, since there were no major technological changes or improvements in production or control of benzene emissions within the plants. Crump and Allen adjusted the exposure level before 1946 upward from the existing exposure data by multiplying the ratio of prevailing occupational standards at the two different time periods. The argument that the Crump and Allen exposure estimate is superior to the Rinsky exposure estimate is based on an observation that the Crump and Allen estimates have a high correlation with rising peripheral blood counts (higher white blood cell counts are associated with lower exposure estimates), while no correlation is found for the Rinsky estimate. However, Rinsky (1989) has noted that averaged white blood counts rose in both exposed and unexposed employees over time, which may have been due to changes in diagnostic methods, techniques or interpretations. Furthermore, a potential for bias exists because of a company policy that led to the removal of employees with low white blood cell counts from exposure (Kipen et al., 1988). This would tend to bias mean estimates of white blood cell counts upward with time. It is difficult to make a judgment whether Rinsky's or Crump and Allen's exposure estimate is more appropriate using the blood count data as the sole determinant because of a poor statistical representation of the population that was monitored for blood evaluation. Given the difficulty in evaluating the comparable merit of both the Rinsky and the Crump and Allen exposure estimates, EPA feels that both estimates should be considered in the risk assessment.

Comment: Two commenters expressed concern that in the September 14, 1989, final benzene rule (54 FR 38044) and BID, EPA used the term "artifactual" to describe a correlation developed from studies by Kipen, et al. (1987) that associates rising peripheral blood counts with decreasing benzene exposure levels. The commenters stated that EPA had not done any analysis to support this conclusion and was, in fact, relying on comments submitted by Rinsky, the author of studies which had only recently been completed in preparation for submission for publication by NIOSH.

Response: The EPA agrees that the term "artifactual" should have been attributed to Rinsky, and regrets the inadvertent misstatement. The new analysis prepared by NIOSH which forms the basis for Rinsky's assessment was based on data to which EPA has not had access. Interpretation of the data is currently under discussion by Hornung, Ward, Morris, and Rinsky at NIOSH and Kipen, Cody and Goldstein with the University of Medicine and Dentistry of New Jersey. This, however, does not alter EPA's position on the exposure issue which is clarified in the preceding response.

Comment: Several commenters stated that AML is the only type of leukemia caused by benzene. It was argued that only data on AML and aplastic anemia can be used for risk assessment because these are the only relevant disease endpoints observed in the Rinsky study.

Response: The EPA disagrees with the inference that AML is the only type of leukemia caused by benzene simply because it is more frequently seen in epidemiologic studies. There is substantial evidence from case reports and epidemiologic studies that benzene causes all major cell types of leukemia as well as lymphomas and other diseases (Docket No. OAQPS 79-3, Part I, Item XII-B-1). This is consistent with the observation that other leukemogens (e.g., radiation, oncogenic viruses, alkylating agents and anti-neoplastic drugs) cause cancers in different cell types. There is insufficient evidence to discount the association of benzene with leukemia types other than AML. In addition to leukemia, several studies (described in July 28, 1988, 53 FR 28493) have noted increases in other cancers, most notably lymphosarcoma and multiple myeloma.

The EPA disputes the notion that only AML and aplastic anemia can be used in risk calculation from the Rinsky study. For some unknown reason, the statistically significant excess of multiple myeloma found by the authors was overlooked in the analysis by one trade association. The EPA position on this issue has been extensively discussed in an EPA memorandum (Docket No. OAQPS 79-3, Part I, Item XII-B-1).

Comment: Several commenters maintained that the epidemiological and biological data for benzene are more consistent with a quadratic low-dose extrapolation model rather than with the linear model used by EPA. One trade association suggested that linear and quadratic terms should be used in the dose-response model, and that EPA should not discourage advances in risk assessment that could lead to a more accurate assessment of benzene's potency.

Response: The EPA does not agree with the comment that the demonstration of a nonlinear dose-response relationship in the observed data is a sufficient basis to argue that the shape of the dose-response curve is nonlinear at untested low-dose levels. The EPA's view is that linear low-dose extrapolation is preferred, unless low-dose data and/or mechanism of action or metabolism data show otherwise. The EPA also believes that it is premature to assume a threshold effect for benzene due to the lack of understanding about the mechanism of carcinogenic action. The EPA has elected to use the linear nonthreshold assumption for the benzene dose-response assessment because as a matter of science policy, EPA prefers to use assumptions which will provide risk estimates which are not likely to be exceeded given the lack of understanding about the mechanism of carcinogenic action. This choice of models results in an upper bound (i.e., because of the linear assumption) estimate of leukemia risk to the exposed population.

The EPA encourages the development of new approaches that have a potential to improve quantitative risk assessment. Before these approaches can be adopted, however, there must be consensus about the nature and validity of the improvement. While the trade association's effort to incorporate more biological information into risk assessment is commendable, its proposed benzene risk estimates cannot be considered an improvement over the existing EPA risk estimates because it contains several noteworthy deficiencies, including the use of an inappropriately formulated mathematical model.

2. Exposure Assessment

Comments on the EPA's assessment of human exposure to benzene emissions address three principal areas: (1) The analytical assumptions underlying the assessment; (2) the choice of atmospheric dispersion models; and (3) the matching of predicted concentrations with exposed populations.

Comment: A number of commenters took issue with the EPA's assumption that people living in the vicinity of benzene sources were exposed continuously, for a 70-year lifetime, to predicted long-term ambient benzene levels. Commenters maintained that few individuals would be expected to live in the same location for their entire lives, and that the EPA's assumption did not provide for the fact that people spent a much greater proportion of their time indoors rather than outdoors. Comments suggested alternative assumptions ranging from 15 to 35 years based on plant life and duration of residency estimates, and 4 to 22 hours of exposure per day based on the time individuals spend outdoors.

Response: The EPA recognizes that the assumption of 70 years of continuous exposure constitutes a simplification of actual conditions and represents, in part, a policy judgment by EPA, but feels that this assumption is preferable to the alternatives suggested. Although emissions of benzene from industrial sources would reasonably be expected to change over time, such changes cannot be predicted with any certainty. In lieu of closing, plants may elect to replace or even expand their operations and subsequently increase their emissions. The 70-year exposure duration represents a steady-state emissions assumption that is consistent with the way in which the measure of carcinogenic strength (URE) is expressed (i.e., as the probability of contracting cancer based upon a lifetime (70 years) exposure to a unit concentration).

The EPA agrees that the U.S. population is highly mobile and spends a proportionally greater amount of time indoors than outdoors. However, adjusting the exposure assumptions to constrain the possibility of exposure to benzene emissions implies that exposure during the periods inside or away from the residence are zero. In addition, a less-than-lifetime assumption would also have a proportional impact on the estimated MIR, suggesting that no individual could be exposed for 70 years. On balance, EPA believes that the present assumption of continuous exposure is consistent with the stated purpose of making plausible, if conservative, estimates of the potential health risks. It is the EPA's opinion that this assumption, while representing in part a policy judgment by EPA, continues to be preferable to the alternative suggested, in view of the shortcomings of such alternatives.

Comment: Some commenters maintained that EPA's choice of dispersion models and selection of modeling parameters and input data caused the benzene risks to be overestimated. Specifically, commenters recommended the use of an area source model such as the ISC-LT model over the HEM for estimating MIR from benzene emission sources.

Other commenters criticized the assumption of flat terrain characteristic of the HEM model and maintained that this would result in an underestimation of the health risks.

Response: The EPA agrees that the use of more sophisticated dispersion models, where justified, would result in more accurate concentration estimates. The EPA does not agree, however, that the substitution of a model such as the ISC-LT would result in substantial changes in the estimated risks or that the changes would be only in a downward direction. In addition, the use of more sophisticated predictive models is often precluded by the input data requirements, particularly where a large number of emitting sources, or emission points within the sources, are being assessed. The EPA does not generally utilize more sophisticated dispersion models unless the input data are of sufficient quality to ensure that the model's outputs are of better quality than those available from the screening model in the HEM. For the benzene sources covered in this rulemaking, EPA believes that the use of the HEM screening model was an appropriate choice.

The effect of terrain on the estimation of exposure may vary from site to site. For any one site, the flat terrain assumption may tend to over- or underestimate exposure. In general, the effect of complex terrain is less for emissions released relatively close to the ground than for elevated process vent emissions that have the potential to impact on hillsides or be affected by building downwash. The EPA agrees that for sources located in complex terrain where the surrounding topography is at a higher elevation, exposure may be underestimated; however, the effect may vary by plant and may be relatively small given the low release heights of most of the modeled benzene sources covered in these rulemakings.

Comment: Several comments on the benzene exposure analysis, particularly the matching of exposure with population, pertained to the level of analysis and the need for more and better data. Several commenters expressed concern that the EPA's frequent assumption of plant fencelines being a uniform 200 meters from the plant center tended to overestimate maximum risk. Suggestions included the use of more source specific information including actual locations of residences and plant boundaries, and more recent census data.

Response: The EPA has used the 200 meter fenceline assumption routinely to facilitate comparison of the MIR among sources and source categories. Changes in this assumption have very little impact upon estimates of population risk (annual incidence) but can significantly affect the MIR since this measure of risk is normally predicted close to the plant. Individual plant boundary information, however, is not readily available and is often difficult to obtain. Sensitivity analyses indicate that while the 200 meter assumption may result in an overestimate of the exposure (and thus MIR) in some cases, there are also cases where the exposure may be underpredicted.

The choice of less sophisticated analyses and the need for simplifying assumptions most often results from the lack of source-specific data. The collection of such data, which would facilitate more detailed assessments, is usually prohibitively expensive. The EPA believes that, in such circumstances, assumptions such as the 200 meter fenceline are a reasonable and appropriate surrogate.

The use of maximum off-site concentration is an alternative but also requires determination of actual or estimated plant boundaries and does not address the issue of habitability. To require that one or more residences exist at the point of modeled maximum concentration, however, places undue emphasis on the capability of the model to predict that a specific concentration will occur at a specific location. The EPA regards the models as accurate to the extent that the predicted maximum concentration can be expected to occur in the vicinity of the plant. The EPA concludes that while a rough check of the habitability of the area may be advisable, insistence on the verification of residences at the specific concentration point is not technically defensible.

Comment: One trade association suggested that the matching of exposure with population in the benzene assessment would be improved by incorporating daily human activity patterns similar to the modeling approach taken in the development of EPA's NAAQS.

Response: The EPA has consistently taken the position that the models used to estimate exposure and risk should be commensurate with the quality and amount of data available. The NAAQS Exposure Model (NEM) has been used by EPA exclusively for criteria air pollutants. Extensive national monitoring networks are established for these criteria air pollutants that facilitate the identification and evaluation of microenvironments representative of daily activities. Comparable data are not available for benzene and the gathering of such data for the much larger universe of toxic pollutants would be infeasible.

In addition, the health effects associated with exposure to the criteria pollutants are different from those attributable to benzene. In the criteria pollutant program there is a greater emphasis on the potential for effects from shorter term exposure and a greater need to evaluate the potential for such exposures. Cancer, in contrast, is generally viewed as a chronic disease in which cumulative dose is the principal factor in risk estimation.

While EPA agrees that the incorporation of human activity data would represent an analytical improvement, this increase in sophistication and expense is not commensurate with the presently available data, the nature of the effects evaluated, and the underlying uncertainties in estimating cancer risks from exposure to benzene.

Comment: One commenter stated that it is inappropriate to use HEM results to derive absolute values of risk, citing the HEM User's Manual which states that HEM results should be used only for comparisons with similar substances and scenarios for decision making.

Response: Because of the assumptions and uncertainties in the dose/response assessment and exposure assessment (see July 28, 1988 **Federal Register** notice

(53 FR 28496) for a complete description of these uncertainties), the EPA's estimates of risks cannot be construed as absolute measures of the true risk burden to the benzene-exposed population. Rather, the quantitative risk assessment is best viewed as a relative estimate of the likelihood of cancer associated with benzene emissions from one industrial source category or compared to another benzene source category, or for comparison of estimates of emissions and risk associated with alternative emission reduction strategies within one source category.

The EPA used discrete estimates of risk or estimated risk ranges to characterize the risk that would remain after implementation of each control strategy. These residual risk impacts were, for comparison purposes, presented as discrete numbers or ranges. In judging the acceptability of risks and whether to require additional control, however, EPA recognized the uncertainties associated with the risk estimates and considered this information in making the benzene determinations. The choice and use of presumptive risk benchmarks, in the same way, included consideration of the associated scientific and technical uncertainties. Although the development of such benchmarks suggests that the magnitude of the estimated risk does play a role in the decision process, this role is tempered by the associated uncertainties and is consistent with the general conclusion that the estimates are best used for comparative purposes.

D. Technical Comments, Responses, and Changes Since Proposal

1. Benzene Emissions from Chemical Manufacturing Process Vents

Comment: Several commenters supported the proposed negative determination for this source category. One commenter, however, argued that this decision was inconsistent with the decisions on the gasoline marketing source categories because the projected risk reductions and control costs are not meaningfully different between the two groups of source categories. The commenter thought EPA had failed to justify the inconsistency and to explain why it has not required all sources to use 98 percent efficient controls.

Response: The EPA considers the decision for process vents to be consistent with the other decisions for benzene sources, including the gasoline marketing source categories. As presented in the Federal Register notice which announced the decisions on the policy approach (54 FR 38044), decisions on acceptable risk are based on a broad set of risk measures and information; decisions on ample margin of safety consider this health information and additional factors such as technical feasibility, the emission reduction achieved, the additional health protection provided, the cost, the potential economic impact, and other relevant factors. Consequently, judgments are based on consideration of qualitative and quantitative information and are not determined by any single factor.

In considering whether to require additional control to provide an ample margin of safety, EPA examined: the potential reductions in the number of people at risk levels greater than 1×10^{-6}; the reduction in the MIR and incidence; the control cost; coreductions of other pollutants; possible biases and uncertainties in all the estimates; and the feasibility of achieving further reductions. As discussed in the proposal notice (54 FR 38089–38090), EPA decided that the additional control levels provide essentially the same level of health protection. As no commenters submitted information or reasons that indicated the estimates presented at proposal were incorrect, EPA still considers the alternative control levels to provide essentially the same level of health protection. The costs of these additional controls, thus, are still high considering the small reductions in risk and incidence achieved. For the above reasons, EPA is reaffirming its decision not to regulate these sources.

2. Benzene Transfer Operations

The major comments and responses are summarized in this preamble. Additional details for some responses are contained in the docket for these standards, which is referred to in the ADDRESSES section of this preamble. Also, some minor comments are responded to in memoranda to the docket. In response to the public comments and as a result of the EPA's reevaluation, several changes have been made to the standards since proposal.

Section 61.300 has been modified to clarify that only loading racks which load liquids containing 70 or more weight-percent benzene are subject to the collection and control requirements of the standard.

The proposed date of February 1, 1991, for compliance of marine vessels with the standard has been changed, in § 61.300, to February 28, 1991, to be consistent with the expected date of promulgation of Coast Guard standards.

The allowable back pressure requirement for marine vessel vapor collection systems in § 61.302(j) has been changed from 0.5 to 0.8 times the relief set pressure to be consistent with the value expected to be promulgated in the final Coast Guard safety standards.

Sections 61.302(h), 61.302(i), 61.304(d), and the definitions of "vapor-tight tank truck" and "vapor-tight railcar" in § 61.301 have been modified to require that tank trucks and railcars loaded with benzene are not operated at higher pressures than those at which they were tested and shown to be vapor tight, that pressure measurement instruments capable of measuring up to that test pressure be used for testing with Method 27, and that vacuum-pressure vents in vapor collection service do not open at less than the maximum operating pressure.

The specifications for flares in § 61.302(c) have been modified to cite the NSPS General Provisions on flares (40 CFR 60.18). The proposed limitation of maximum velocity to 18.3 cubic meters/second has been deleted.

Language in the proposed regulation which required flow indicators on each vent stream going to the control device has been revised as follows: If there are no diversion lines from the control device, no flow indicators will be required, but a piping diagram must be provided. If there are diversion lines, all valves on the diversion lines must be car-sealed closed and all valves on lines directly to the control device car-sealed open. The owner or operator may then choose either to monitor the seals monthly for breakage or install and monitor a flow indicator capable of recording the presence of flow in the diversion lines.

The proposed requirement for monthly leak inspections of the vapor collection system and control device has been changed to require inspections consistent with the equipment leaks regulation in 40 CFR part 61, subpart V.

The units of P_{lo} in § 61.304(f), a section describing the requirements for one of the test methods for marine vessel vapor tightness, have been corrected.

The proposed carbon adsorber requirements in § 61.303(d), 61.305(a)(4) and 61.305(b)(5) have been clarified and simplified. Those sections now require: Reporting of "R," the recovery efficiency of the carbon adsorber determined during the performance test, and all supporting test data and calculations; monitoring of the concentration of organic compounds (rather than benzene concentration) in the carbon adsorber outlet gas stream; and reporting of all 3-hour periods of operation during which the average organic compound reading was 20 percent greater than the average reading during the most recent performance test which demonstrated compliance.

General

Comment: One commenter opposed the exclusion of coke by-product recovery plants from the benzene transfer operations regulation. The commenter believed that the proposed controls for the benzene producers and terminals are also technologically feasible for coke by-product recovery plants and are mandated by the *Vinyl Chloride* decision. Another commenter believed that EPA should reevaluate its estimate of benzene emissions from transfer operations and the corresponding risks, and reconsider whether regulation of this source category was indeed necessary. The commenter also believed that the control cost of $30 million/year for the proposed regulation was much greater than those for other regulations of this type.

Response: The issue of the estimation of emissions and risks from the transfer operations source category is dealt with in the response to a subsequent, more detailed comment on this topic. Because the baseline MIR from this source category is approximately 6×10^{-3}, and is above the presumptive level of about 1×10^{-4}, it is unacceptable. Therefore, it was necessary to propose a regulation requiring controls such that risk would be reduced to an acceptable level. The EPA considered several alternatives to achieve this acceptable level, and judged that the health risk associated with incineration (i.e., 98 percent control) of benzene transfer emissions at producers and terminals to be acceptable. The benzene throughputs of the coke by-product plants are relatively small compared to those of producers and terminals. The baseline MIR from emissions at coke by-product recovery plants was 4×10^{-5}. If coke by-product recovery plants were regulated at the same level of control as the benzene producers and terminals, the MIR for this source category would be reduced from 4×10^{-5} to 7×10^{-6}, and the annual incidence from 0.02 to 0.009. Most (about 90 percent) of the incidence reduction would be associated with exposures to risk levels below 1×10^{-6}. The number of people estimated to be exposed to risk levels greater than 1×10^{-6} at baseline for coke by-product recovery plants is approximately 40,000. The control of benzene transfer emissions at coke by-product recovery plants was not necessary in order to achieve an acceptable risk.

In the ample margin of safety decision, EPA considered the costs of more stringent control alternatives including control of benzene emissions at coke by-product recovery plants. As discussed in the proposed rulemaking notice (54 FR 38091), the cost of regulating coke by-product recovery plants was disproportionately great compared to the small additional emission and risk reduction it would achieve. The EPA decided that 98 percent control of benzene transfer emissions from terminals and producers would protect the public with an ample margin of safety.

Comment: Five commenters believed that EPA's estimates of benzene emissions from transfer operations were overstated. The commenters pointed out several factors in EPA's analysis of emissions that they believed contributed to the overstatement: (1) The assumption that all of the benzene produced was shipped by either railcar or marine vessel ignored the fact that a large portion of the benzene produced is transferred by pipeline, which results in essentially no emissions; (2) EPA's method of scaling 1983 plant capacities up to 1988 levels was based on a factor of 3.07 representing the ratio between 1988 and 1983 industry capacities, which the commenters believed was 3 times too high; (3) EPA's estimate that 50 percent of the benzene produced was loaded to marine vessels, instead of 80 percent, caused emissions to be overestimated because the saturation factor for marine vessels is only half that for railcars; (4) the assignment of average capacities to production facilities whose actual capacities were unknown exaggerated true industry capacities; (5) the assumption that only one source was controlled was not accurate. One of the commenters stated that these factors caused emissions to be overestimated by a factor of four.

Response: Available data on transport methods for benzene, amount of benzene loaded to each type of transport vessel, emissions from each type of loading, and controls currently in use were limited. Emission estimates for this source category were based on information developed by EPA in 1983 and then updated to 1988 industry capacities with the limited information available. The EPA's goal was to estimate the magnitude of emissions and risk for this source category and to provide a reasonable worst case analysis to adequately characterize the MIR. The EPA believes that although there are uncertainties associated with the emission and risk estimates, these estimates are sufficient to support regulatory development. In the proposal notice, EPA acknowledged uncertainties in the data, but stated its belief that reasonable assumptions were made in light of the available data. These uncertainties were considered in the judgment of whether the risks are acceptable and whether to require, in providing an ample margin of safety, a level of control more stringent than the level associated with acceptable risks.

The EPA agrees with the commenters that some aspects of the proposal estimates were erroneous. The EPA considered making appropriate adjustments to the emission estimates and concluded that such an effort would not be a productive use of the limited time available under the court schedule and the limited resources. One consideration in this judgment was the existence of other uncertainties that would counterbalance the overestimates pointed out by the commenters. Thus, a comprehensive reevaluation would not result in a change in the regulatory decisions. Specific considerations in this assessment are described below.

Regarding the first point made by the commenters, none of the benzene producers contacted by EPA for current information mentioned pipeline transfer. The personnel who contacted benzene producers asked about total benzene transferred off site annually, and what percentage of that total was transferred by tank truck, railcar, and marine vessel. No specific information was given that would have alerted EPA to the significance of pipeline transfers. The commenters who mentioned this point did not supply any detailed industry-wide data that would allow EPA to change its estimates of the amount of benzene going through the various modes of transfer. In addition, EPA feels that its analysis provides a realistic worst case scenario given that there is no requirement that the present proportions of benzene transferred by the different modes would stay at those levels.

The scaling factor of 3.07 mentioned in the second point made by the commenters was based on the ratio of 1988 total U.S. benzene capacity to 1983 total U.S. capacity. The EPA obtained its estimates of the 1983 and 1988 industry capacities on values listed in the "Directory of Chemical Producers—United States" published by the SRI. In response to the commenter's point, EPA rechecked these values, and, after contacting the SRI, learned that the 1983 capacity had erroneously been listed as $2,406 \times 10^{3}$ metric tons instead of $2,406 \times 10^{6}$ gallons (see Docket No. A-89-04, Item IV-E-1). The conversion of $2,406 \times 10^{6}$ metric tons led to an underestimate of the 1983 capacity. Based on the corrected information, the ratio of 1988 to 1983 capacity is approximately 1.

Regarding the commenters' third point, EPA was aware during development of this standard that the saturation factor, and hence the emission factors, for tank trucks and railcars is double that for marine vessels, and that the assumption that 50 percent of benzene production is loaded into railcars would tend toward overestimation if the assumption was incorrect. The EPA examined several scenarios regarding what proportions of benzene production were loaded to different types of vessels. The scenario of 50 percent of benzene loaded to railcars was intended to provide a realistic worst case which could be used to estimate maximum possible risks from this source category. There is nothing to assure that the percentage of benzene transfers to marine vessels would stay at the 80 percent level claimed by one commenter, or that this is even representative of general transfer operations throughout the industry.

In response to the commenters' fourth point, EPA believes that the average capacity used was realistic. In developing an assumed average capacity to assign to those facilities whose 1983 capacity was unknown, EPA first calculated the average of the capacities of the 43 plants for which there were 1983 data. However, that average capacity of 42,000,000 gallons of benzene per year was deemed unrepresentatively high because those facilities for which EPA had data were considered to be the largest facilities. Instead, EPA used an average capacity of 24,000,000 gallons per year, obtained by dividing the sum of the capacities for the 43 plants that had 1983 data by the total of 74 facilities. Although the 24,000,000 gallons per year may be an over- or under-estimate for any individual facility, EPA believes that on the whole, it is realistic.

Regarding the commenter's last point, only one facility contacted for current information reported using controls. The EPA could not contact all facilities, and had no basis for assuming controls were in place at those facilities not contacted.

In considering the points made by the commenters about the emission estimates, EPA still believes that there are many uncertainties in the data which could cause emissions, and hence risks, to be either over- or under-estimated on the whole. Although the commenters pointed out only factors which they believed contributed to overstatement of emissions, EPA believes that one factor possibly contributing to understatement is the consolidation of operations since 1983 and increased throughput at remaining facilities. Thus, emissions and risks for facilities transferring benzene could be higher than estimated. EPA believes that, considering all biases which tend to over- and under-estimate emissions, the actual level of benzene emissions from this source category is close to what has been estimated.

In conclusion, it is EPA's judgment that the estimates of emissions from benzene transfer operations given in the proposal notice are still its best estimates, that they represent a reasonable worst case, and therefore adequately characterize risks from this source category.

Applicability and Exemptions

Comment: Two commenters favored increasing the cutoff in the regulation (§ 61.300(c)), which exempts transfer facilities that load less than 1.3 million liters of benzene/year. One commenter requested that the exemption be increased to include facilities that load less than 5 million liters of benzene/year, stating that 1.3 million liters of benzene/year is less than a full load on one of this company's smallest tank barges. Another commenter believed that the EPA's selection of 1.3 million liters/year was arbitrary, and suggested that a cutoff equivalent to 2.4 million liters/year might be more cost effective.

Response: The applicability cutoff of 1.3 million liters of benzene loaded annually was based on the smallest annual throughput of benzene loaded at production facilities and terminals in the data base developed by EPA for assessing emissions and risks from this source category. It was EPA's intention to exclude only those facilities which load small quantities such as, at most, several tank trucks or railcars per year. Emissions, and thus risks, are proportional to the amount of benzene loaded and not significantly dependent on the size of the barge loaded. Thus, to exclude small barges from complying with the regulation when they may actually handle a significant amount of the benzene could result in a failure to control a potentially significant source of risk.

Comment: Three commenters suggested that a minimum benzene concentration should be included in the definition of benzene so that facilities loading liquid materials containing trace or small amounts of benzene would not be subject to recordkeeping and reporting requirements. One commenter pointed out that under the current definition of benzene, facilities that load materials such as crude oil, fuel oil, toluene and xylene would be subject to the recordkeeping requirements although the facilities do not contribute significantly to benzene emissions. The commenters suggested modifying the regulations so that liquid materials containing less than 10 weight-percent benzene would not be subject to the recordkeeping and reporting requirements, and that materials containing more than 10, but less than 70 weight-percent benzene would be subject to the reporting and recordkeeping requirements, but not the control standards.

Another commenter stated that the regulation's [§ 61.300(b)] exemption of affected facilities which load material containing less than 70 weight-percent benzene was arbitrary and inconsistent with other proposals in the same notice. The commenter pointed out that EPA had decided to regulate benzene-containing wastes with traces (10 ppm or 0.001 percent) of benzene, and gasoline (at most, 6 percent benzene). The commenter urged the extension of the transfer rules to mixtures with comparably low percentages of benzene.

Response: It was EPA's intention that transfer operations for streams containing less than 70 weight-percent benzene be subject to reporting and recordkeeping requirements only, while loading of streams containing 70 weight-percent or more benzene be subject to control as well as reporting and recordkeeping requirements. This approach was taken because available information suggests that transfers of materials containing less than 70 weight-percent benzene would not be a major source of benzene emissions due to the small quantities transferred. In the development of the proposed regulation, EPA found that nearly all transfers of benzene involved materials containing approximately 100 percent benzene except transfers at the coke by-product recovery plants, which usually involve mixtures of approximately 73 percent benzene. None of the commenters provided information that demonstrates or even suggests that there are significant benzene emissions from transfers of materials containing less than 70 weight-percent benzene.

Comment: Two commenters stated that the language of Section 61.300(a) and the definition of benzene in the proposed regulation could be interpreted in such a way as to subject all loading racks at a facility to the standard if only one rack is used in loading a material which contains 70 weight-percent or more benzene or more. The commenters recommended that § 61.300(a) be reworded to clearly exclude all loading racks not intended to be covered.

One of the commenters suggested that EPA reword § 61.302 to clarify that vapor-tight requirements apply only to loading racks when they are loading a liquid containing 70 weight-percent or more benzene.

Response: The EPA agrees that the proposed regulation could be misinterpreted to require control at all racks loading benzene-containing liquids, regardless of the weight-percent of benzene in the liquid. Section 61.300 of the final regulation has been modified to clarify that only loading racks which load liquids containing 70 weight-percent or more benzene are subject to the collection and control requirements of the standard. In addition, the previously included definition of benzene has been deleted.

Comment: Several commenters believed that not enough time is allowed by the proposed regulation for transfer facilities to come into compliance, explaining that substantial engineering work may be required to design acceptable vapor recovery systems, time delays in ordering and receiving custom design equipment may occur, safety problems exist with vapor-tight systems on marine vessels, and pre-construction permits, if required, take time. One commenter stated that a minimum of 2 years would be required to attain compliance, and pointed out that the General Provisions of the NESHAP regulations provide for a waiver of up to 2 years for existing sources subject to a standard when approved by EPA. Several commenters recommended that installation of vapor control systems should be required only after the Coast Guard safety standards have been promulgated. Compliance dates of 5 years, 3 years, 2 years and 1 year after promulgation of the Coast Guard standards were suggested by the commenters.

Response: The EPA wishes to clarify its intention that tank truck and railcar loading racks be in compliance with the regulation 90 days after promulgation, as specified by the NESHAP General Provisions of § 61.12, and that marine vessel loading racks be in compliance with the standards by February 28, 1991.

Section 112(c)(1)(B)(i) of the CAA requires that compliance for existing sources be achieved within 90 days of promulgation. The Act allows EPA to grant waivers of compliance for up to 2 years if such a period is necessary for installation of controls. The compliance dates provided in the standard reflect the EPA's judgment that an industry-wide waiver of 1 year is necessary to comply with the standards for marine vessel loading racks. However, because vapor collection and control systems are already available for tank trucks and railcars, it is believed that a waiver is not necessary for these sources.

During development of the proposed benzene transfer operations regulation, EPA was well aware of the safety standards being developed by the Coast Guard. The February 28, 1991, date specified in § 61.300(d) of the final regulations is intended to allow an adequate compliance period in which to take the proposed Coast Guard standards into consideration. At the time this notice was prepared, the date was changed to be consistent with the current Coast Guard projected schedule for promulgation. The EPA believes that this compliance period allows adequate time for affected facilities to review these regulations, and considering the standards proposed by the Coast Guard, design, purchase, and install appropriate vapor control systems. In the case of an individual affected facility which may have difficulties in the design of such a system, or in obtaining the necessary equipment or services necessary to meet the compliance schedule provided in the standard, EPA can consider the application for a waiver of up to 2 years, as provided for in section 112(c)(1)(B)(ii) of the CAA, as the appropriate course of action.

Comment: One commenter requested that promulgation of the regulation be postponed until the API safety study on vapor recovery systems is completed and concerns about the potential explosion hazards associated with transfer vapor recovery systems are resolved.

Several other commenters urged that the proposed regulations for marine vessel loading racks be consistent with, and safe as determined by, the Coast Guard standards. One commenter recommended waiting until the proposed Coast Guard standards are finalized before finalizing the benzene transfer NESHAP to ensure that these concerns are addressed. Another commenter favored the addition of safe vapor recovery systems at barge loading facilities, but requested a regulation that would receive mutual support from EPA, the Coast Guard, and OSHA.

Response: The EPA understands the commenters' concerns about safety. The EPA is aware of the API study, and anticipates that the study will demonstrate the feasibility of systems which meet Coast Guard requirements and which can be applied to the larger diameter pipes that must be used in marine loading. The EPA is allowing marine vessel loading racks until February 28, 1991, to come into compliance; this date is 1 year after the currently projected promulgation date for the Coast Guard standards. The EPA believes that this allows sufficient time for the API test to be completed and for any problems to be discovered. The EPA also believes that equipment to address the vapor recovery safety concerns should be available from manufacturers by that date. In any case, section 112(c)(1)(B)(ii) of the CAA allows any facility subject to a regulation to request a waiver of up to 2 years to come into compliance.

Standards

Comment: One commenter believed that a standard in terms of percent reduction for benzene emissions from benzene transfer operations would be an unfair and inappropriate way to judge compliance with the standard. The commenter stated that equipment vendors have extreme difficulty guaranteeing an efficiency percentage for control. The commenter also stated that given an amount of benzene loaded and a control device efficiency, the amount of benzene emitted by the control device would vary greatly with temperature conditions because of the effect on benzene vapor concentration. The commenter gave examples of situations where, depending on ambient conditions, a control device with a higher efficiency could be emitting a greater mass of benzene than one with a lower efficiency, even given the same amount of benzene loaded.

To be more fair, the commenter recommended revising the standard so that the benzene emission limit would be related to the volume of benzene transferred, and suggested a standard of 5 milligrams benzene emitted per liter of benzene loaded. The commenter gave some example calculations to show that, on the average, a 98 weight percent control efficiency would still be achieved. The commenter cited the use of this format of standard in the existing bulk gasoline terminals NSPS and the proposed bulk gasoline terminals NESHAP, and stated that this format of standard had proven itself to be fair and easily measured.

Response: The operations covered under the bulk gasoline terminals NSPS and the proposed bulk gasoline terminals benzene NESHAP both involve the loading of gasoline, a substance with fairly uniform concentration levels of benzene, at fairly constant loading rates and throughputs. These factors made it relatively easy to develop standards in the concentration format advocated by the commenter. In contrast, the proposed benzene transfer NESHAP covers operations involving far more variant conditions. The vessels covered do not all have the same loading rate, and the benzene concentration emitted can vary with the concentration of benzene in the material loaded and with the materials carried previously by the vessel. These considerations make it difficult to identify a particular mass of benzene emitted per unit of benzene loaded which could be used as a standard that would achieve the goal of protecting public health. In addition, EPA currently does not have any data upon which to base such a standard. Therefore, EPA believes that the percent emission reduction format of the standard is the best approach for regulating this source category.

Comment: Three commenters believed that the regulation's restriction [§ 61.302(j)] of the amount of back pressure allowed during loading to 0.5 times the relief set pressure would unnecessarily restrict marine vessels from operating within the safe working pressures for which they were designed. The commenters maintained that this relief set pressure limit would necessitate the use of a blower to move vapors through the emission control device, and that the blower would create a safety hazard due to its potential as an ignition source. They suggested EPA revise § 61.302(j) to require that the maximum normal operating pressure of a marine vessel's vapor collection equipment not exceed 0.85 or 0.9 times the relief set pressure of the pressure-vacuum systems.

Response: The allowable back pressure of 0.5 times the relief set pressure was taken from the proposed Coast Guard safety standards, in order to be consistent with those standards. As a result of communication with the Coast Guard, the Coast Guard recommended changing the allowable back pressure requirement to 0.8 times the relief set pressure, as in their final standards. Therefore, to be consistent with the Coast Guard's recommendation, the pressure requirement of § 61.302(j) has been changed to 0.8 times the relief set pressure of the pressure-vacuum vents.

Comment: Three commenters stated that operating a marine vessel below atmospheric pressure conflicts with current Coast Guard standards on safety. Two of the commenters explained that blowers used to create pressures below atmospheric pressure would be an ignition source. The commenters stated that one means of protection against ignition specified by the Coast Guard is to enrich vapors above the upper explosion limit prior to the ignition source, and then to keep the vapors above atmospheric pressure after enrichment. The commenters concluded that this posed a conflict, since the suction side of the blower in this case would be below atmospheric pressure. The third commenter stated that operating under a vacuum makes leaks more difficult to find, and, if air is leaking into the system, could cause vapor control inefficiencies. Another commenter stated that loading should be allowed at slight vacuum or slight pressure.

Response: The EPA is not requiring that vessels operate below atmospheric pressure, but recognizes that there would be no leakage from a vessel that operates below atmospheric pressure. The regulation provides three alternatives for demonstrating vapor tightness in marine vessels: use of the test method in § 61.304(f) which involves pressurization of the vessel with dry air or an inert gas; testing of a marine vessel during the last 20 percent of loading using method 21, 40 CFR part 60, appendix A; or loading of the vessel with the benzene product tank at below atmospheric pressure.

The Coast Guard does set limits on the operating pressures relative to the negative and positive pressure settings on the pressure relief vents. However, the proposed Coast Guard standards do not preclude a vessel from operating below atmospheric pressure.

Comment: Three commenters believed that the gauge pressure limits normally applied to petroleum or nonpressure tank trucks had erroneously been applied to chemical tank trucks and railcars. The commenters stated that chemical tank trucks and railcars are able to withstand much higher pressures, and that limiting the gauge pressure to 4,500 pascals during loading would require extensive retrofitting of railcar loading racks, and would result in delays in loading. One commenter suggested that the regulation incorporate a 75 pounds per square inch gauge (618 kilopascals) maximum pressure rating on railcars. Another commenter suggested that the regulation be reworded to require that vapor collection and benzene loading equipment of tank trucks and railcars be designed and operated to prevent gauge pressure in the truck or car from exceeding 0.9 times the relief set pressure of the safety relief device during loading. This commenter stated that EPA would also have to modify the measurement device requirements in § 61.304(d)(1), the "vapor-tight tank truck" or "vapor-tight railcar" definition in § 61.301, and the testing procedure (Method 27) in § 61.302(d). The commenter stated that Method 27 deals with vapor tightness of gasoline delivery tank trucks and is not appropriate for chemical tank trucks. The commenter provided descriptions of different types of tank trucks, including pressure information, to support this.

Response: The EPA agrees that the upper pressure limit of 4,500 pascals would be too restrictive for vessels designed to carry loads at higher pressures. The intent of § 61.302(h) and (i) is: (1) To ensure that tank trucks and railcars which are tested and shown to be vapor tight at a given pressure are not operated during loading to exceed that pressure, and (2) to ensure that pressure-vacuum vents in the vapor collection systems do not open at less than the maximum operating pressure, thereby causing vapors to be vented to the atmosphere rather than to the collection system and control device. Therefore, EPA has made the following changes to the regulation to clarify this: (1) The definition of "vapor-tight tank truck" or "vapor-tight railcar" in § 61.301 has been modified such that the tank undergoing the vapor-tightness test will be pressured to a minimum of 4,500 pascals. Also, a pressure measurement device which is capable of measuring pressures above the initial pressure at which the test is done will be required to be used with Method 27; (2) § 61.302(h) has been modified to require that truck and railcar tanks be operated so that the pressure in the tank will not exceed the pressure at which the tank was tested and shown to be vapor tight; (3) § 61.302(i) has been modified to require that no pressure-vacuum vent in a vapor collection system for tank trucks or railcars shall begin to open at a pressure less than the maximum pressure at which the tank truck or railcar is operated; and (4) § 61.304(c)(1) has been modified to require a pressure measurement device capable of measuring above the initial pressure at which the railcar or tank truck was pressured to and shown to be vapor tight during the most recent vapor-tightness test.

Thus, when a vapor-tightness test is performed on a railcar or tank truck, it should be decided what the maximum pressure during benzene loading operations will be, and then the tank should be pressured to that level at the start of the test. Method 27 is to be used for the vapor tightness test, with Method 27's P_i being the pressure at the start of the test and the pressure loss ΔP being 750 pascals, as specified in § 61.301 under the definition of "vapor-tight railcar" or "vapor-tight tank truck". The EPA believes that these changes will allow the flexibility to use tanks at any pressure suitable for loading and transporting benzene while not compromising vapor tightness or the collection and routing of vapors to control devices.

Documentation and Responsibility for Ensuring Vapor Tightness

Comment: Several commenters disputed the provision of the transfer regulation to make loading facilities responsible for documenting marine vessel vapor tightness, and believed that the vessel owner or operator should be accountable for the condition of his vessel. One commenter stated that loading facility owners or operators are not trained or qualified to perform tests on marine vessels. One commenter questioned how EPA intended to enforce this provision when neither the provision, nor transfer facilities which are not vessel owners, would have jurisdiction or power to require vessels to comply. The commenter also protested the cost of conducting the vapor-tightness test at the dock, stating that these costs had not been adequately addressed in the economic analysis and that EPA was asking terminals to do the government's enforcement work without being paid. The commenter recommended allowing terminals to rely on any authorized documentation that a vessel submits since, if such documentation were invalid or fraudulent, it would be the vessel owners or operator and not the terminal that would be in violation of the law.

Response: Section 61.302(e) does not require affected facilities to be responsible for documenting marine vessel vapor tightness. The responsibility of the affected facility is to load only those vessels which provide appropriate vapor-tightness documentation. The loading facility may refuse to load a vessel which has no vapor-tightness documentation, or may elect to load a nondocumented vessel, if a vapor-tightness test is performed during loading or if it can be shown that repairs needed to achieve vapor tightness are technically infeasible without dry-docking the vessel. The provisions requiring the facility to retain copies of vapor-tightness documentation, and/or test results, are intended to prevent a vessel which has failed its most recent test from loading again without first completing repairs.

Testing costs are typically very small (<1 percent) relative to capital costs associated with the control equipment. A rough estimation was developed for a Method 21 test for vapor tightness. The estimate when compared to the $168,000 retrofit cost for the barge is less than 1 percent of the total capital cost. Therefore, EPA does not believe that the cost of conducting the vapor-tightness test, if necessary, will have a significant adverse economic impact on facility owners or operators.

Affected facilities may rely on any documentation submitted by a vessel, as long as the documentation contains the items listed in § 61.305(h).

Comment: One commenter asked whether a marine vessel should be unloaded if it fails the vapor-tightness test in the last 20 percent of loading at the dock. The commenter also asked who would be required to complete the documentation for a test at the dock which showed no leaks, and by when this documentation must be completed. Specifically, the commenter asked if the vessel operator could complete it later and send it to the terminal.

Response: The standard does not require that a vessel which fails the vapor-tightness test be unloaded when the testing is completed, only that the failure be documented. This is reasonable because the test is performed during the final stages of loading, and unloading would in itself result in increased air emissions. Such a vessel may not be subsequently loaded until the owner or operator provides documentation that the leaks identified in the test have been repaired or that repair is technically infeasible without dry-docking the vessel.

The EPA believes that it is appropriate for the documentation of either a failed or a successful vapor-tightness test to be completed by whomever conducts the test. This documentation is to be completed at the end of the test prior to the vessel's departure, because the standard requires that the affected facility retain a copy of the test documentation on file (see § 61.305(h)). Documentation of repairs necessitated by a failed test should also be completed when the repairs are completed. This documentation should be provided when the vessel is next loaded subsequent to repairs. The EPA is requiring that the vessel be retested for vapor tightness during the first loading after the documented repairs have been completed to ensure that the vessel is vapor tight.

A sentence has been added to § 61.302(e)(2)(ii)(B) of the final regulation, clarifying that unsuccessful tests are to be documented and copies of the documentation provided to the owner or operator of the affected facility. This requirement was already specified in § 61.305(h) under the recordkeeping and reporting requirements for affected facilities. The wording of § 61.302(e)(2)(ii)(A) has also been modified to clarify that the documentation should be completed prior to departure of the vessel.

Comment: One commenter pointed out that the owner or operator of an affected facility would have no way of knowing whether a vessel had failed more than one vapor tightness test in the preceding 12 months. The commenter asked who would require the vessel operator to present such documentation.

Response: It is the responsibility of the owner or operator of an affected facility to obtain the documentation of vapor-tightness for each vessel it loads, or conduct a vapor-tightness test during loading and document the results.

Section 61.305(h) requires an affected facility to maintain a documentation file which reflects the current status for each vessel it services. Therefore, a vessel docking can have only one of three possible statuses; (a) no documentation (or documentation older than 12 months) of current vapor tightness, (b) documentation of a failed vapor tightness test, or (c) documentation of a successful vapor-tightness test performed within the last 12 months. In the case of (a), the affected facility may load the vessel if either documentation of a successful vapor-tightness test conducted within the last 12 months is provided, or a test is conducted and documented during loading. The documentation would be added to the affected facility's file for that particular vessel. In the case of (b), the affected facility may load the vessel if documentation of a successful vapor-tightness test subsequent to repair is provided, if repair documentation is provided and a vapor-tightness test is conducted during the loading procedure or repair is technically infeasible without dry-docking the vessel. The affected facility would retain a copy of the test documentation in its file for that vessel. A successful test after repair would document vapor tightness for the next 12 months. In the case of (c), the affected facility may load or unload the vessel with no further testing for 12 months from the test date.

Comment: One commenter suggested amending § 61.302(e)(2) of the proposed regulation to accept the Coast Guard's VOC tightness certification in order to eliminate the additional paperwork burden caused by the vapor-tightness documentation requirement. Another commenter suggested that EPA enter into a memorandum of agreement with the Coast Guard to require that the vapor-tightness test be included in the annual certificate of inspection issued by the Coast Guard. A third commenter proposed that the Coast Guard be designated the regulatory authority to certify vapor tightness of marine vessels.

Response: The EPA has considered the comments regarding the involvement of the Coast Guard in documenting marine vessel vapor tightness. The EPA considered it inappropriate for the Coast Guard to be responsible for testing which is required under regulations pursuant to the CAA. In this rulemaking, EPA is requiring affected facilities to load only vessels having documentation of vapor tightness. The final standard provides both a method by which to establish vapor tightness, and a means to acquire and update documentation. If a vapor tightness test meeting the requirements of method 21 of 40 CFR part 60, appendix A, or of § 61.304(f), has been conducted and recorded in a document which contains the information required by section 305(h), a copy of such documentation will be considered adequate.

Comment: One commenter requested clarification as to whether the repair documentation referred to in the regulation was another document in addition to the vapor-tightness documentation.

Response: The repair documentation required in § 61.302(e)(2)(iii) is a separate document from the vapor-tightness documentation required after a vapor-tightness test has been conducted in compliance with § 61.302(e)(2)(ii). An unsuccessful vapor-tightness test is documented to alert all parties that repairs will be necessary. If a marine vessel has failed a previous vapor-tightness test, the owner or operator of the vessel must provide the affected facility with documentation that the leaks have been repaired, or that repair is technically infeasible without dry-docking the vessel, before the affected facility may load the vessel.

The repair documentation does not substitute for vapor-tightness documentation. The repair documentation can only assure that repairs have been effected, and only a vapor-tightness test can document that vapor tightness has been achieved. For this reason, § 61.302(e)(2)(iii) requires that a vapor-tightness test be performed during the first loading after repairs have been made and documented. This subsequent test, completed successfully, assures that vapor tightness has in fact been restored by the repairs.

Emission Control Technology

Comment: One commenter stated that tank truck vapor collection systems are not as advanced as tank truck loading systems. The commenter asserted that establishing a constant 98 weight-percent collection efficiency would be very difficult because many operations usually involve top-loading, and the tank truck collection systems are not closed systems, but instead utilize a collection device placed at the manway opening.

Response: The EPA believes the commenter has inappropriately interpreted the 98 weight-percent reduction as applying to the collection system. The standard specifies that a 98 weight-percent reduction in benzene be achieved by the control system. This reduction efficiency is measured across the control device, i.e., the 98 percent reduction occurs after collection at the control device itself. The EPA has established design specifications for the collection systems, which are evaluated separately from the performance specifications for the control device.

Comment: Two commenters expressed concern about the requirement to not exceed the maximum flare velocity of 18.3 meters/second, and believed that the limitation on the maximum flare velocity is not supported by information or data used to develop the standard. One commenter believed that this requirement will preclude the use of some existing flares when complying with the standard, and recommended that the flare velocity requirement be deleted. The other commenter recommended incorporating by reference the flare provisions in the NSPS General Provisions (40 CFR 60.18).

Response: The EPA agrees with the commenters' points and has modified § 61.302(c) of the final regulation to specifically cite the NSPS General Provisions on flares.

Comment: Two commenters advocated that EPA require controls for emissions from benzene loading operations to be at least 95 percent efficient, instead of 98 percent as proposed. One commenter stated that it may be desirable in some cases to recover the benzene through the use of a carbon adsorber, condenser, or pressure swing adsorber, which typically have 95 percent control efficiencies for benzene. The commenter pointed out that §§ 61.305 (a)(4), (b)(5), and (b)(6) of the proposed regulation explicitly contemplate the use of carbon adsorption systems to comply with control requirements. Another commenter recommended giving incentives to install vapor control devices that are capable of recovering and recycling the vent stream back to the process by allowing them to operate at 90 percent efficiency. The commenter believed that such recovery type control devices are more in line with current pollution prevention efforts than the typically used end-of-the-pipe destruction type control devices, and would, in the case of benzene transfer operations, still provide an ample margin of safety. The commenter provided information on installation, operation and cost of a recovery type control device used at one of his facilities.

Response: The EPA understands and agrees with efforts to recover and recycle benzene instead of using end-of-the-pipe destruction type control devices. However, the intent of the proposed regulation is to ensure that an ample margin of safety is provided to individuals exposed to benzene emissions from transfer operations. The EPA examined the option of using 95 percent efficient carbon adsorbers for all sources and found that this did not control emissions with an ample margin of safety. An acceptable level of risk and an ample margin of safety is provided by 98 percent control. The EPA did explicitly contemplate the use of carbon adsorbers in §§ 61.305 (a)(4), (b)(5) and (b)(6) because it was recognized that some carbon adsorbers can achieve a 98 percent efficiency. In addition, EPA wanted to allow the flexibility to use either thermal incineration or carbon adsorption for control.

Note: Section 61.305(b)(6) of the proposed regulation has been deleted in the final regulation, as discussed in the response to another comment.

Comment: One commenter stated that § 61.302(1) was confusing and unnecessary, and recommended it be deleted. The section provides that a facility owner or operator wishing to use an alternative means of emission control may apply to the Administrator for a determination that the alternative means of emission limitation can achieve the required reduction. The commenter pointed out that the standard is a performance standard, and does not specify any particular control device that must be used to meet the standard.

Response: The EPA agrees with the commenter that the requirement in the proposed § 61.302(1) is unnecessary. Therefore, the proposed § 61.302(1) has been deleted in the final standard.

Note: A new § 61.302(1) has been added, but it contains an unrelated requirement.

Test Methods and Monitoring

Comment: Two commenters believed that leak testing with soap should be considered as an alternative test method to method 21 for the demonstration of vapor tightness of marine vessels. One commenter stated that the soap screening method has been accepted and used by the Coast Guard for testing weld integrity during repairs to tankers and barges for many years. Another commenter believed that method 21 was time-consuming and did not offer any advantages over other leak detection methods. This commenter further stated that the soap test often identified leaks emitting less than the method 21 10,000 parts per million threshold.

Response: Soap screening could conceptually be used as an alternative tightness test to that of method 21. However, the temperature of the component, physical configuration and relative movement of parts often interfere with bubble formation. A standard written procedure would need to be developed which would ensure uniform practice of this method, which would address these problems, and which would include quantification of soap screening results in a manner similar to that of method 21 (i.e., how large would a bubble have to be before it was interpreted as indicating a leak on the level of 10,000 parts per million by volume measured using method 21). Any facility may apply to use soap screening as an alternate method under § 61.13, which allows for alternative testing methods.

Comment: One commenter believed the requirement of flow indicators on stream flow vents to control devices was unnecessary. The commenter suggested that flow indicators only be required on any line that would be a diversion away from the control device.

Response: The EPA considers it very important that vent streams are continuously vented to the control device. The primary intent of the flow monitoring requirement was to provide a means for indicating when vent streams were bypassing the control device. The EPA has reevaluated the use of flow indicators in light of the commenter's point and other information received since proposal. The final standard now requires an engineering report that describes the piping arrangement for venting the affected emission streams to the control device. If any valves are present in the line between the source and the control device, the rule requires them to be car-sealed open (see § 61.301 of the final regulation for a definition of "car-sealed"). In addition, all valves that allow emissions to bypass the control device are required to be car-sealed closed. The monitoring requirements have been revised now that this engineering report is required. An owner or operator may elect to follow one of two methods for monitoring the vent system. One method would require monthly inspection of the valves to inspect the car seals, the reporting and recordkeeping of any time the car seals are broken, and reporting and recordkeeping of any time the valve position has changed. The other method would require installation of a flow indicator, which gives an indication of flow/no flow, at the closest downstream point of each valve that is required to be car-sealed closed. The owner or operator is required to record all periods of flow (which indicates a portion of the emission stream is bypassing the control device) and report such periods of flow quarterly.

Comment: One commenter stated that the performance testing for all controls other than flares is confusing, and that the long testing period would be difficult to manage. The commenter gave the example that even his company's largest barges would be loaded within 2.5 hours at maximum loading rates. The commenter suggested revising the observation period requirement to no less than 2 hours, saying that this should be adequate to obtain representative sampling of the system.

Response: Performance testing of air emission controls has been required to ensure that the control system is operating according to specification, therefore achieving the emission reduction for which it was installed. The testing period was intended to span several loading events, because the collection and control systems being tested will be started up and shut down frequently in their normal operation.

Comment: Several commenters objected to the regulation's (§ 61.302(k)) requirement of monthly inspection of the vapor collection systems and the control device during loading. One commenter stated that quarterly leak inspection was sufficient. Another commenter pointed out that this requirement was more stringent than the Subpart V provisions (40 CFR part 61). Since the personnel at an affected facility that are responsible for monitoring under subpart V would be responsible for monitoring under subpart BB, EPA must ensure consistency in the monitoring requirements between the two regulations.

Response: The EPA has reexamined the proposed monthly monitoring requirement of § 61.302(k) and the annual monitoring requirement of subpart V, and finds that annual monitoring would provide the necessary assurance that the vapor collection systems and control devices are being properly operated and maintained. Accordingly, this section of the regulation has been modified to require that inspection of the vapor collection system and control device conform to the standards of 40 CFR part 61, subpart V, § 61.242-11 (e) and (f).

Comment: One commenter stated that the requirement in the proposed § 61.304(e)(3) to record the pressure every 5 minutes during the performance test was excessive and unwarranted, and recommended that it be changed to every 5 minutes during the first 30 minutes of operation, and thereafter, every 30 minutes until completion of the test.

Response: The EPA disagrees with the commenter regarding the necessity to record the pressure every 5 minutes during the performance test. The more conservative approach would be to require a continuous recording monitor in order to ensure that the highest instantaneous pressure is in fact recorded. Barring a continuous recorder, recording at 5 minute intervals will at least indicate if pressure fluctuations are approaching 0.8 times the relief set pressure of the pressure-vacuum vents.

Comment: One commenter was unsure if the equation which was part of the vapor-tightness test described in § 61.304(f) had the proper units and whether the test method itself was valid. The commenter stated that the measurement unit "inches of water absolute" should be "pounds per square inch absolute (psia)." The commenter stated that it appeared that EPA was trying to model this method after the CTAC suggestions to the Coast Guard during a recent proposed rulemaking. Ultimately, the Coast Guard did not use this equation in their rulemaking. The commenter was unsure if the method had ever been tested, and requested that the industry be allowed additional time to collect data prior to finalizing this requirement in order to ensure that it is achievable.

Response: The EPA did model the vapor-tightness test method of § 61.304(f) after the CTAC suggestions. The Coast Guard did not use these equations in their proposed standards because those standards are safety-oriented and the small amount of leakage that would be detected by the vapor tightness test would not be a safety issue. However, these leaks are of concern from an air emission standpoint. The test method contained in § 61.304(f) is very similar to Method 27 for testing vapor tightness of gasoline delivery tanks, which has been tested and used previously in the bulk gasoline terminals regulation (40 CFR part 60, subpart XX). The units of P_{ia} in § 61.304(f)(4) have been corrected to pounds per square inch absolute.

Comment: Two commenters objected to the carbon adsorber requirements for continuous monitoring of benzene concentration. One commenter believed that these requirements were more expensive than those for flares and incinerators, and that this would bias owners and operators against installing carbon adsorbers. Another commenter believed that the carbon adsorber monitoring requirements would be extremely difficult to carry out because of the low levels of benzene and the sensitivity and maintenance requirements of the necessary equipment.

One of the commenters also stated that it would be impossible for carbon adsorber units with single vents to demonstrate 95 percent benzene removal when the unit is running with no vapor inlet flow, even though benzene emissions during those times would be very low. The commenter also believed that there was no justification for requiring a 3-day rolling average emissions report for carbon adsorbers with separate vents when only a 3-consecutive cycle average was required for those systems with a common vent.

Response: The EPA's intent in the proposed standard was to have affected facilities using carbon adsorbers monitor an indicator of benzene concentration; the intent was not to require monitoring of the actual benzene concentration. However, EPA has reconsidered the format of the proposed carbon adsorber requirements and has made the following changes in the final standard in order to clarify and simplify the requirements: (1) Section 61.303(d) has been changed to require the use of a device that continuously records the concentration of organic compounds rather than benzene in the outlet gas stream; (2) section 61.305(a)(4) has been modified to require only reporting of the control efficiency as determined in the performance test, and of supporting data and calculations; and (3) section 61.305(b)(5) has been changed to require only that a facility report all 3-hour periods of operation during which the average concentration of organics rather than benzene in the exhaust gas is more than 20 percent greater than the average exhaust gas concentration during the most recent performance test which showed compliance. The EPA believes that these changes address the commenters' concerns about measurement of actual benzene concentration, inequity in monitoring requirements between carbon adsorbers and other devices, different averaging times for individual versus common vents, and demonstration of 95 percent removal when there is no vapor inlet flow.

Comment: One commenter believed that if hydrocarbons lighter than benzene are present from previous loading of other products, they may be displaced by the benzene loading. The commenter suggested that the compliance provisions allow for detection and subtraction of nonbenzene hydrocarbons when using method 25A or 25B.

Response: It is true that NDIR and FID instruments would not differentiate between benzene and other hydrocarbons. The EPA assumed that the other hydrocarbons displaced would not be significant and that method 25A or 25B instruments, if calibrated with benzene, would provide adequate proof of compliance. The EPA understands that NDIR and FID instruments will have a response to most hydrocarbons other than benzene and that the effect of using the nonspecific method will depend on the magnitude of the compound-specific variable control efficiency. The EPA believes that the relative benefit of using a less complicated method justifies this uncertainty. If the source owner or operator believes this is unfair, then he or she may request an alternative testing procedure under § 61.13.

Comment: One commenter questioned EPA's authority to require marine terminal operators to test ships and barges which they do not own and for the terminals to do EPA testing.

Response: The EPA does not have the obligation to do the testing. It is the source's responsibility to comply with the requirements of this subpart which includes ensuring that vessels loaded at the facility are in compliance with the leak-tight requirements of the NESHAP. In some cases, this may be accomplished by the source owner or operator requiring a test to be conducted.

3. Industrial Solvent Use

Rubber Tire Manufacturing Regulation

Comment: Two commenters stated that EPA's estimate of benzene emissions from solvent use in rubber tire manufacturing was overstated. The commenters pointed out that old VOC emission factors and solvent composition information for tire production had been used to develop the estimate of benzene emissions, and that these factors did not reflect recent trends in the industry and the effect of the 1987 OSHA rule (September 11, 1987; 52 FR 34460) which encouraged the use of solvents containing less than 0.1 percent benzene. To support this point, one commenter submitted actual data on solvent use and percentage of benzene in the solvents for the 39 tire manufacturers in the United States. These data showed that total benzene emissions from U.S. tire manufacturers are no more than 9,700 kilograms/year, or only 8 percent of EPA's estimate, at proposal, of 121,560 kilograms/year. With this revised benzene usage information and using the same assumptions on source characteristics in the exposure modeling, the commenters calculated that the MIR was at most 5×10^{-6}, and cancer incidence was 0.001 case/year. The commenters believed that because the risk from benzene emissions from rubber tire manufacturing solvent use is so low, and is well below the EPA's presumptive acceptable risk level, the regulation for rubber tire manufacturing should not be promulgated.

Response: The EPA was well aware at proposal that the emission and risk estimates were based on old information that may not accurately characterize current practices. It was for this reason EPA specifically requested information on current benzene emissions and on the cost of appying additional control to the manufacturing facilities. The EPA examined the information provided by one of the commenters and found that it supported the contentions that less solvent is used per tire today than was used in the late 1970's, and that the solvents used contain less benzene. The overall solvent usage rate indicated by the commenter's data was approximately half of what had been previously observed for the tire manufacturing industry. On an individual facility basis, the larger differences between actual solvent use and the EPA's estimate of solvent use occurred at facilities located in ozone nonattainment areas (i.e., sources subject to the CTG requirements for tire manufacturing), and at facilities subject to the NSPS for tire manufacturing. Although the commenters did not provide information on tire production for the period, a review of trade reports indicates that the tire industry has been operating at close to full capacity. In addition, the average percentage of benzene in solvents used in the rubber tire industry reported by the commenter was 0.05 percent; this is lower than the estimate used by EPA at proposal by a factor of 6. None of the 39 facilities had benzene usage more than 1,500 kilograms/year; benzene usage ranged from less than 100 kilograms/year to about 1,400 kilograms/year, with only 6 facilities reporting more than 500 kilograms/year.

Based on the reported benzene usage, EPA concluded the proposed standard would not reduce benzene emissions or risks. Currently no facility uses more than 1,500 kilograms/year of benzene and thus none would be required to apply control systems or to further limit benzene content of solvents. The proposed standard also would not significantly reduce future increases in emissions because any new sources (including growth at existing facilities) would have to comply with the requirements of the NSPS for the rubber tire manufacturing industry (40 CFR 60, Subpart BBB). The primary effect of the proposed standard would be to require existing facilities to submit reports to EPA documenting their solvent usage. This recordkeeping and reporting requirement would affect all 39 facilities in the industry and would cost roughly $250,000 annually for the industry as a whole.

Because of the new information and the absence of any benefit from the proposed standard, EPA reanalyzed the risks from these sources, the feasibility of further control, and reexamined the proposed decisions. Using the benzene emission estimates provided by the commenter for all 39 tire manufacturing facilities, EPA reran the HEM to predict risks for this source category. The resulting risk estimates were an MIR of approximately 4×10^{-6}, an incidence of 0.0006 case/year, and fewer than 1,000 people at risk levels greater than 1×10^{-6}. The decrease in the predicted risks from those estimated by EPA at the time of proposal is primarily due to the change in the benzene emission estimates. Since none of the facilities were colocated, the MIR is not expected to be higher than predicted due to colocation.

The commenters did not provide any information on the extent of the use of water-based sprays and cements versus those which are solvent based, or on the use of emission capture and control devices. Consequently, it is not possible to determine from the commenters' information the feasibility of further emission reductions. However, since only a few facilities are known to have installed hoods and control devices, EPA assumes the 50 percent VOC reduction is due to use of water-based and low-VOC cements and sprays. Thus, additional emission reductions would be primarily achieved through use of emission capture systems and control devices.

The EPA reassessed the cost of further emission reductions from these sources to ensure the costs were representative of widespread use of capture systems routed to control devices. (The estimates considered in the proposal analysis were representative of controlling a few operations by capture and control device combinations and use of low-VOC cements and sprays.) The control costs were reassessed using flow rates representative of operations in a 30,000 tire/day model plant and assuming plant-wide use of capture systems. The annual cost for incinerator control of the captured emissions was estimated to be approximately $7.7 million/year for the model plant.

Decision on Acceptable Risk: The baseline MIR of 4×10^{-6} is below the presumptive benchmark of approximately 1×10^{-4} and the estimated cancer incidence of 0.0006 case/year does not change the presumption that these risks are acceptable. The vast majority (more than 99.9 percent) of the population is exposed to risk levels below 1×10^{-6}. Fewer than 1,000 people are estimated to be exposed to risk levels of approximately 1×10^{-6} with a total incidence of 0.00002 case/year for this group. Benzene concentrations reported to produce noncancer health effects are at least four orders of magnitude greater than the exposure modeled for the source category. After considering all these factors, EPA judged that the baseline emission level represents an acceptable risk.

Decision on Ample Margin of Safety: To judge whether more stringent control should be considered, a new alternative was evaluated. This alternative (Alternative 2) requires facilities using 500 kilograms/year, or more, of benzene to reduce emissions by 75 percent. Based on current solvent usage, Alternative 2 would require application of controls to 6 facilities and would reduce emissions by approximately 2.4 megagrams/year of benzene and 3,200 megagrams/year of VOC. It is estimated this emission control would cost approximately $46 million/year (1984 dollars).

Alternative 2 would reduce the MIR to approximately 1×10^{-6}. The number of people exposed to risk levels greater than 1×10^{-6} would be reduced from fewer than 1,000 to fewer than 200. For the population exposed to risks greater than 1×10^{-6} the incidence would be reduced from approximately 0.00002 case/year to essentially zero. The overall incidence reduction would be approximately 0.0003 case/year.

Essentially all of the risk reduction occurs for the population exposed to risk levels below 1×10^{-6}. In addition, benzene concentrations reported to produce noncancer health effects are at least four orders of magnitude greater than the exposures modeled for this source.

As noted previously, the cost of this emission reduction is $46 million/year (1984 dollars). The EPA considers the cost of this emission reduction to be far in excess of the small additional risk and incidence reductions which would be achieved.

After considering the preceding factors, EPA concluded that the existing level of emissions provides an ample margin of safety and it is unnecessary for EPA to establish a NESHAP for this source category. The EPA is, therefore, withdrawing the proposed standard for rubber tire manufacturing facilities.

Pharmaceutical Manufacturing Regulation

Comment: Two commenters questioned whether the actual emission reduction and health benefits of a standard for pharmaceutical manufacturing facilities would justify the cost of the standard. In addition, one of the commenters considered the control approach of the proposed standard to be inappropriate for these sources owing to the intermittent and varied operations in batch pharmaceutical manufacturing. In the commenter's opinion, a better standard would give credit for process redesign that minimizes emissions.

Response: The EPA's estimates at proposal of baseline emissions and risks from pharmaceutical facilities were based on the emission estimates reported in 1987 under the SARA title III reporting requirements by the one facility in this category, and on stack release parameters assumed by EPA. To address the commenters' question of the actual emission and risk reduction benefits of the proposed standard, EPA obtained additional information from the one pharmaceutical manufacturing facility known to be using benzene as a solvent. Facility-specific information was obtained on the basis for the SARA title III emission estimates, the source's estimate of actual emissions, the release height and velocity of the emissions source, and the actual location coordinates of the facility. Information was also obtained on the specific characteristics of the process from which benzene is being emitted.

The new information contained several important differences from that used by EPA at the time of proposal to model risks from this source category. First, the emission rate, of approximately 5 megagrams/year of benzene, reported by the facility under SARA title III and subsequently used in the proposal analysis was based on the facility's current permit level, which is an hourly emission rate not to be exceeded. Based on recent measurements of air in-leakage into the process unit, actual emissions were estimated by the facility to be no greater than one-third of the permit limit, or 1.6 megagram/year benzene. Also, the stack height and release velocity are significantly greater than the representative parameters assumed by EPA in the proposal analysis to model exposures. These stack height and release velocity conditions are required for releases of toxic pollutants by the State where this pharmaceutical manufacturer is located.

Benzene exposures associated with this facility's operations were reevaluated using the information supplied by the commenter. The revised estimate of baseline cancer risk predicted by HEM is approximately 0.001 case/year and an MIR of 1×10^{-6}. Because the new information resulted in a significant change in the risk estimates, EPA reexamined the proposed decisions.

Decision on Acceptable Risk: The baseline MIR of 1×10^{-6} is below the presumptive benchmark of approximately 1×10^{-4} and the estimated cancer incidence of 0.001 case/year does not change the presumption that these risks are acceptable. The vast majority (more than 99.99 percent) of the population is exposed to risk levels below 1×10^{-6}. Only 700 people are estimated to be exposed to a risk of approximately 1×10^{-6} with a total incidence of 0.00001 case/year for this group. Benzene concentrations reported to produce noncancer health effects are at least four orders of magnitude greater than the exposure modeled for this source. After considering all these factors EPA judged that the baseline emission level represents an acceptable risk.

Decision on Ample Margin of Safety: In addition to the site-specific emission information, the company also provided EPA with information on the design and estimated cost of a planned process redesign and control program. Because the company is in the best position to understand the specific design requirements of the process unit, and the planned changes result in an emission reduction equivalent to EPA's proposed standard, EPA considered the company's control plan in examination of whether to require control to provide an ample margin of safety.

The new control alternative would reduce benzene emissions by 1.6 megagrams/year, leaving about 60 kilograms/year emissions. The MIR would be reduced from the baseline of 1×10^{-6} to 4×10^{-8}. Thus, no one would be potentially exposed to risks of 1×10^{-6} or higher. For the population exposed to risks of 1×10^{-6}, the incidence would be reduced by about 0.00001 case/year. Overall the incidence reduction would be about 0.001 case/year and the residual incidence would be 0.00004 case/year in a modeled population of 12 million people. The benzene exposures expected after these controls are applied are many orders of magnitude below exposures that have been reported to produce noncancer health effects.

To achieve this emission reduction, the company estimated it would cost $425,000 for the process redesign, operational changes and installation of carbon canisters. The EPA estimated this capital cost would result in annual costs of roughly $110,000/year assuming a 10-year equipment life, 10 percent interest, and 10 percent operation and maintenance costs. The controls are not expected to result in cocontrol of other pollutants such as VOC or other toxic compounds.

While the costs of the controls are small, they are disproportionate to the small additional emission and risk reduction which might be achieved through further control. Therefore, EPA decided that the existing level of controls provides an ample margin of safety and it is unnecessary for EPA to establish a NESHAP for this source category. The EPA is thus withdrawing the proposed standard for pharmaceutical manufacturing process vents.

4. Benzene Waste Operations

The major comments and responses for the standards for benzene waste operations are summarized in this preamble section. Additional details for some responses are contained in the docket for these standards, which is referred to in the ADDRESSES section of this preamble. Also, some minor comments are responded to in memoranda to the docket. Public comments on the proposed standards for benzene waste operations identified several major issues. In responding to these comments, EPA reevaluated the rationale for several provisions to the proposal and revised those provisions where it was determined to be appropriate. These revisions are described in the response to comments presented below.

Regulatory Scope

Comment: A number of respondents commented that the proposed regulation would cover numerous facilities that were not intended to be regulated and for which there were no data to indicate that they pose a health risk problem. A major concern was the expansiveness of the definition of waste and commenters suggested several specific examples of waste streams that would be included in the definition of waste but which should not be covered by the regulation. There was also concern that the definition of waste in the proposed regulation included recycled streams and wastes handled in enclosed systems and returned to the process which could cause waste streams with a low emission potential to be regulated. Some commenters suggested that many facilities with a low potential for emitting benzene could be determined to handle more than 10 megagrams per year of benzene in their wastes solely on the basis of recycled or recovered products. Commenters were uncertain whether gaseous emissions from process vents or equipment leaks were included in the calculation of annual quantity of benzene in waste.

The commenters were also concerned about the industries covered. The commenters suggested that a large number of relatively small facilities associated with petroleum exploration, production, transportation, and marketing activities would be regulated even though they pose a very low health risk, the court order did not require control of these industries, and they were not included in the analysis of impacts.

Commenters also expressed concern that many waste streams that have a very low emission potential would have to be monitored and possibly controlled merely because the benzene concentration could potentially be occasionally above 10 parts per million by weight (ppmw). Examples that were cited included low volume waste streams and stormwater runoff.

One of the primary concerns of commenters was that, even though many of the facilities and waste streams covered by the proposed regulation would qualify for an exemption from the control requirements of the regulation, the waste sampling required to qualify for an exemption would impose an undue burden on the regulated community.

Response: In the proposal, EPA was seeking to regulate all facilities that could pose a potential health risk problem from managing wastes containing benzene. To identify plants and waste streams that might pose a problem, residual risk estimates were made for several emission control scenarios using the best available data from several sources to estimate benzene emissions, human exposure, and MIR. The data used for the analysis included information on petroleum refineries, chemical plants, coke by-product recovery plants, and hazardous waste TSDF. The estimates showed that health risks due to emissions from those facilities would exceed acceptable levels and that applying controls to waste streams with a benzene concentration of 10 ppmw or more at all facilities that handle 10 megagrams per year or more of benzene in their waste would reduce the health risks from all facilities to acceptable levels. The EPA's intent in the proposal was to regulate those plants which pose a significant health risk. However, because of the possibility that there may be plants not identified in the data base that generate or manage benzene containing wastes that could pose an unacceptable risk, EPA chose to make the proposed standards broadly applicable to all wastes that contain benzene. The EPA sought to focus the control requirements on only those facilities and individual waste streams with significant emission potential by including provisions in the proposed regulation that would allow facilities to obtain exemptions from control and monitoring requirements if it were demonstrated that specified levels of benzene in waste were not exceeded.

Based on comments received and a reevaluation of the potential impacts of a broadly applicable approach, EPA is now aware that the proposed standard could affect a very large number of facilities and waste streams which have low emissions, which EPA did not intend to regulate with this rulemaking (e.g., service stations), or for which the levels of risk are not known because no data are contained in the data base. Although there are provisions in the proposal that allow owners and operators to seek exemptions from the control requirements, obtaining an exemption could involve a substantial effort on the part of an affected facility. Therefore, EPA has reconsidered the proposed approach and decided to narrow the scope of the standards as discussed below. Even though the scope of the regulation has been narrowed, the final rule still regulates those sources which EPA intended to regulate in the proposal and still achieves the reduction in benzene emissions from those sources necessary to protect public health. The primary effect of the reduced scope is the elimination of monitoring, recordkeeping, and reporting requirements for many sources that would have been affected by the proposal but that are not affected by the final rule.

The scope of the final rule has been narrowed through several revisions to the proposed rule. These revisions consist of specific exclusions of certain waste streams from coverage by the rule, revisions to the procedure for determining if a facility is subject to the rule, and revisions to the procedure for determining if an individual waste stream is subject to the control requirements of the rule. These revisions are discussed below.

a. Waste Definition

Numerous comments were submitted regarding the definition of waste. Some of the commenters were uncertain about the meaning of wastes from "community activities", there were suggestions that the RCRA definition of waste be used, and there was concern about the inclusion of recycled waste streams in the definition. The EPA considered all of the comments and concluded that the most appropriate way to address the comments was to provide specific exclusions in the final rule for those streams that clearly have little or no emission potential rather than to change the proposed definition of waste. Specific exclusions were included for recycled streams that are internal to the production process, segregated stormwater runoff, and gaseous emissions from process vents.

The definition of waste in the proposed rule is the same as that used in 40 CFR part 60, subpart Kb. The EPA chose to use this definition in the benzene waste rule to be consistent with a rule already promulgated under the CAA, and because the definition is broad enough to cover all wastes that could potentially contain benzene.

Although EPA has chosen not to change the definition of waste in response to comments, EPA has made revisions to the proposal pertaining to the applicability of the rule and has included specific exclusions for certain types of wastes as discussed below.

Based on the definition of waste, all wastes that are recycled would have been subject to the proposed regulation if they contain benzene. However, several commenters contend that many waste streams are recycled internally to the production process and have little or no air emissions and were never previously considered wastes. These commenters further contend that including these waste streams in the determination of the annual quantity of benzene in waste could cause facilities to be subject to the regulation that would otherwise be exempt, thus unnecessarily increasing the monitoring and recordkeeping burden imposed. Recycled and recovered streams were not excluded from the definition of waste to ensure that benzene emissions are controlled. For example, when an off-specification product is stored in a tank prior to being returned to the process, unless the storage tank is equipped with controls, benzene will be emitted to the atmosphere. However, upon reevaluation, EPA concurs that in-process recycle streams such as the reflux from a distillation column and reboilers are not exposed to the atmosphere, and consequently, there is no need to regulate these streams in this rulemaking. Therefore, EPA included a specific exemption for in-process, recycled wastes in the final rule. Other recycled or recovered wastes that exit the production process or pass through oil-water separators or similar treatment devices, such as slop oil, are not exempted from control in the final regulation because they could be managed in open sources and have the potential for air emissions.

Stormwater runoff that is kept segregated from process wastes is also specifically excluded from today's rule. Benzene in stormwater would result on an intermittent basis when spills or leaks are entrained by rainwater that falls at the facility. Existing regulations related to spills under both the CWA and RCRA should minimize the amount of benzene available for entrainment by stormwater runoff. Because of this and considering that stormwater runoff waste streams occur intermittently, EPA believes that on an annual average basis, benzene emissions from stormwater will not contribute significantly to overall risk due to benzene emissions at a facility. Therefore, segregated stormwater runoff is specifically excluded from today's benzene rule.

Waste in the form of gases or vapors that is emitted from process fluids is also specifically excluded from today's final rule. Some commenters were uncertain whether or not these gaseous emissions would have to be included in the calculation of annual quantity of benzene in waste managed at a facility. In the proposed regulation, EPA did not intend that the calculation of annual quantity of benzene in waste would include gaseous emissions because these emissions were considered in separate regulatory decisions that addressed process emissions (rather than emissions from waste operations) from various source categories. In order to clarify this position, today's final rule includes a specific exclusion for these wastes. On the basis of these specific exclusions and the other changes discussed elsewhere in this preamble, EPA concluded that the commenters' concerns are adequately addressed without changing the definition of waste.

b. Facility Applicability

Two revisions were made to the proposed standards that affect the procedure for determining if a facility is covered by the standards. They are: (1) A clarification of the industries regulated and (2) a change in the procedure for calculating the annual quantity of benzene in the waste managed at a facility. The clarification of industries regulated, in effect, reduces the number of facilities subject to the regulation by explicitly citing the industry sectors that will be regulated. The final rule is applicable to facilities in the following industry sectors: petroleum refineries, coke by-product recovery plants, chemical plants, and commercial TSDF that manage wastes generated by the other three industries (i.e., petroleum refineries, coke by-product recovery plants, and chemical plants). Examples of affected industries include SIC codes 2911, 3312, 2800's, 4959, and 9511. The clarification of industries regulated appeared in the Federal Register on December 15, 1989, (54 FR 51423). Although, as mentioned previously, the definition of waste has not been changed from proposal, one of the effects of the clarification of the industries regulated is to eliminate consideration of wastes from community activities, which was a source of uncertainty for some commenters.

Several commenters maintained that petroleum refineries should not be covered by the benzene waste rule because refineries were not included in the court order mandating development of the standards and because they did not consider the data base for petroleum refineries adequate to show that a benzene emission problem exists. Although the court order requiring development of today's standard did not specifically include petroleum refineries, for the purpose of regulating benzene emissions from waste operations, EPA found it difficult to distinguish between waste operations at petroleum refineries and those at chemical plants. There is no clear point at which a petrochemical complex changes from a refinery to a chemical plant and the waste streams from both types of operations are often combined for transport or treatment. The EPA therefore concluded that it was not possible to make a sufficiently clear distinction between refinery waste streams and chemical plant waste streams to allow them to be regulated separately. Furthermore, EPA disagrees with those commenters who challenged the adequacy of the data base for demonstrating a benzene air emission problem at petroleum refineries. Available data on petroleum refinery wastes indicate the potential for significant benzene emissions that, if not controlled, will cause an unacceptable health risk. Although there is uncertainty associated with the data, as discussed below in Data Base and Emission Modeling, EPA believes that the data are adequate for estimating benzene emissions and associated risk levels. Therefore, petroleum refineries are included as an affected industry sector in the final rule.

The second change affecting the identification of facilities subject to the standards involves a change in the method of calculating the annual quantity of benzene in waste. This change was made in response to comments related to waste stream emission potential. Under the proposed standards, emission controls for benzene were not required at a facility if the total annual quantity of benzene in the waste managed at the facility was less than 10 megagrams per year. For the purpose of determining if a facility would be subject to the standards, the proposed standards required that the total benzene in waste managed at a facility be calculated as the sum of the quantity of benzene in all waste streams at the facility. Several commenters pointed out that the emission potential of benzene in aqueous wastes (those wastes containing water) is much higher than that for organic waste having equivalent benzene concentrations and, in addition, that aqueous wastes are more likely to be handled in waste management units that are open to the atmosphere, which further increases their emission potential. It was further noted by commenters that if all wastes at a facility consist of streams with a low emission potential, such as organic waste streams, then there is no need for those streams to be controlled.

The EPA agrees that benzene in aqueous waste is the dominant source of benzene air emissions from waste operations. When benzene is dissolved in water, it is highly volatile and thus easily emitted. Therefore, when aqueous wastes are managed in open sources such as open sewer systems, tanks, or surface impoundments, the benzene in the waste is quickly emitted to the atmosphere. In contrast, when benzene is dissolved in organics, it is much less volatile than benzene in aqueous wastes at the same concentration. Additionally, organic wastes are more likely to be transported in closed pipes and managed in closed systems such as covered tanks than are aqueous wastes, which are routinely managed in open wastewater treatment tanks. Finally, aqueous wastes are normally generated in much larger quantities than organic wastes, which further contributes to the dominance of aqueous wastes over organic wastes as a major source of benzene emissions from waste.

On the basis of these considerations, the final rule does not require the benzene contained in organic waste streams to be counted in the calculation of annual quantity of benzene managed at a facility. The benzene in all other wastes is counted in this calculation, including the benzene in all process wastewater, tank drawdown, and landfill leachate. The final rule specifies that "double counting" of benzene in waste streams is not required in calculating the annual quantity of benzene managed. For example, the benzene in waste streams that are generated by the treatment or management of other wastes would be excluded from the calculation if the benzene in these streams has been counted already at the point of generation. This means that benzene wastes generated by a waste management unit, such as API separator sludges, would be excluded from the calculation of the annual quantity of benzene assuming it already would have been included at the point of generation. Including the benzene in these sludges in the calculation of annual quantity of benzene in waste would cause double counting of the benzene in these wastes. These exclusions are only for the purpose of determining if a facility meets the 10 megagrams per year of benzene in waste applicability level. At facilities that meet the applicability level, all wastes, including organics, are subject to the control requirements of the final rule unless they have a specific exclusion or meet other exemption criteria. Even though the calculation of annual quantity of benzene in waste excludes organic waste streams, benzene emissions from organic wastes contribute to the overall risk and the impacts of the rule were estimated based on the assumption that these streams would be controlled. The exclusion of organic wastes in the calculation of benzene in waste, along with other changes discussed in this preamble, will further focus the benzene waste rule on those wastes identified as having the greatest benzene emmission potential.

To determine the annual quantity of benzene in waste, organic wastes are defined as any waste that contains less than 10 percent water. The EPA chose a value of 10 percent to insure that the estimate of annual quantity of benzene in waste will clearly exclude those organic wastes with a low benzene emission potential. With this value, organic waste streams cited by the commenters, such as off-specification product that is returned to the process, will not be included in the determination of whether a facility exceeds 10 megagrams per year of benzene in waste. Reanalysis of EPA's data base for benzene waste shows that the change in the procedure for calculating benzene in waste would not cause any facilities that warrant control to be excluded from the control requirements of the final rule.

c. Waste Stream Applicability

Under the proposed regulation, facilities that generate or manage 10 megagrams per year or more of benzene in their wastes could seek exemptions for individual waste streams if they demonstrate by waste sampling that the benzene concentration of a waste stream is less than 10 ppmw. Several commenters contended that some types of waste streams (e.g., intermittent or low volume streams) with benzene concentrations of 10 ppmw or more have a low emission potential and should not be controlled by the standards. The EPA has considered these comments and incorporated revisions in the final rule that affect the determination of whether individual waste streams are exempt from the control and monitoring requirements of the regulation. The exemption of in-process recycle streams, stormwater runoff and gaseous emissions from process fluids from all requirements of the regulation was previously discussed under the definition of waste. Other revisions include: (1) Use of annual average benzene concentration, (2) addition of a low-flow cutoff for process wastewater streams, and (3) an exemption for certain process wastewater streams.

(1) Benzene Concentration Determinations

In the proposed regulation, any facility that manages 10 megagrams per year or more of benzene would be required to manage each waste stream at the facility in controlled units and treat the waste to remove or destroy benzene. An exemption to these requirements was allowed if the owner or operator demonstrated through waste sampling that the benzene concentration of the waste stream would be less than 10 ppmw based on analysis of samples taken at a time when the benzene concentration is at its highest level. The analysis included a conservative safety factor, implemented through the use of a statistical t-test, to take into account sampling and analytical variability. This approach to obtaining an exemption was selected to insure that all waste streams with the potential for causing adverse health impacts would be regulated. Several commenters noted that some waste streams could potentially have a benzene concentration in excess of 10 ppmw at certain times even though they almost always would have concentrations that are less than 10 ppmw (e.g., maintenance activities, process upsets, etc.) and have a low potential for benzene emissions. Other commenters were concerned that the use of a statistical t-test to account for sampling and analytical variability could cause wastes that never have a benzene concentration greater than 10 ppmw to be controlled. Still others questioned the ability to sample waste (and the representativeness of samples) at a time when the benzene concentration is at the maximum level.

In developing the specific requirements of the proposed standards, EPA was not aware of the extent to which waste streams with benzene concentrations that are generally much less than 10 ppmw could exceed 10 ppmw. Although it was not EPA's intent to apply controls to waste streams that, on a continuous basis, normally contain well below 10 ppmw of benzene, the proposal, in effect, established a benzene concentration of 10 ppmw as a level never to be exceeded. Based on a review of the comments submitted, EPA is now aware that this approach could require the control of numerous waste streams that normally have benzene concentrations well below 10 ppmw, which is contrary to the intent of the proposal. Consequently, EPA has concluded that it is more appropriate to use an annual average benzene concentration for determining if a stream is exempt from the control requirements of the regulation rather than using waste sampling performed when the benzene concentration is at its highest level. Use of an annual average is consistent with EPA's concern with chronic or long-term benzene emissions which was the basis of the risk analysis. Therefore, the final rule allows the use of an annual average benzene concentration without the use of a t-test to determine if a waste stream qualifies for an exemption from the control requirements. An owner or operator seeking an exemption from control for a waste stream under this provision must include an assessment of how the concentration of benzene in the waste stream varies over the course of a year as part of his demonstration that a stream is less than 10 ppmw on an annual basis. The owner or operator would also be expected to maintain and operate the process or equipment generating the waste stream in a manner that would minimize the concentration of benzene in the waste in order to comply with the general provisions of 40 CFR part 61.

(2) Low-Flow Cutoff

Commenters also suggested that many waste streams at a facility may have low emission potential even though the annual average benzene concentration is 10 ppmw or more if the stream consists of only a small quantity of waste such as might be generated by a small batch process or maintenance operations or by a continuous process with a low flat rate. In these cases, the commenters asserted that if the total quantity of waste is small, then the emission potential is also small and the waste stream should not be subject to the control requirements of the regulation.

The EPA concurs with the commenters that there are certain small quantity waste streams that have a low emission potential and consequently make a negligible contribution to overall risk at a facility. These waste streams would also be difficult and inefficient to control with the types of controls that served as the basis of the proposal, which included piping of waste streams to a treatment unit. Based on these considerations, EPA evaluated alternative low-flow cutoffs and concluded that it would be appropriate to exempt individual process wastewater streams with a continuous flow rate below 0.02 liters of waste per minute or intermittent and batch flows with a total mass of waste below 10 megagrams per year for each process wastewater stream. Process wastewater streams that have a flow rate below the exemption cutoff would have a very low emission potential and even if there were many streams at the cutoff level at a facility, emissions from these streams would not contribute significantly to the maximum risk. In addition, exempting these low-flow process wastewater streams will substantially reduce the monitoring, reporting, and recordkeeping burden that would have been imposed by the proposed standards.

Only those streams that are process wastewater are eligible for this low-flow exemption. As defined in the final rule, "process wastewater" means water that comes in contact with benzene during manufacturing or processing operations conducted within a process unit. Organic wastes, process fluids, product tank drawdown, cooling tower blowdown, steam trap condensate, and landfill leachate are specifically excluded from the definition of process wastewater and, as such, are not eligible for the low-flow cutoff.

(3) Wastewater Stream Exemption

Several commenters claimed that at some facilities particularly at petroleum refineries where there are many waste streams, only a few waste streams cause the majority of the risk and that controls should only be required on those streams. These commenters further requested that EPA provide an option in the final rule that would allow facilities to selectively identify and treat waste streams until an overall facility-based level of benzene in waste was met. The commenters suggested 10 megagrams per year of benzene in waste as a facility target level because this level was used by EPA in the proposed standards to identify facilities for control.

The EPA considered this comment and determined that it is not necessary to require blanket control of all waste streams if emissions can be reduced to a safe level without doing so. Therefore, EPA has included an additional option in the final rule for exempting process wastewater streams from control if it is demonstrated that the total amount of benzene in all process wastewaters at a facility is reduced to a specified level. This exemption provision, like the exemption for low-flow streams, only applies to process wastewaters at a facility.

As discussed under Selection of Standards, the 10 megagrams per year level of benzene in waste used in the proposed standards to identify facilities for control, and suggested by commenters for use in the option discussed here, was not intended as a facility target level. Consequently, 10 megagrams per year of benzene in waste was rejected as a facility target level. Instead, one megagram per year was selected because it is sufficiently stringent that EPA is confident that the maximum individual risk at any facility choosing to use this option will be at a safe level. In addition, this target level will serve as a cap on emissions, thereby continuing to ensure that a limited number of people will be exposed to maximum risks greater than 1×10^{-6}.

Under this option, an owner or operator would first determine the quantity of benzene present in all process wastewaters at their points of generation. Then the owner or operator would select individual streams for control (i.e. management in units controlled for air emissions until treatment in a unit also controlled for air emissions) until the quantity of benzene remaining in the treatment residue from the treated streams plus the benzene in the streams not treated is less than 1 megagram per year. When a sufficient number of streams have been controlled to reduce the total quantity of benzene in both treated and untreated streams to less than 1 megagram per year, the remaining untreated streams would be exempt from the control requirements of the regulation.

Interrelationship with Other Regulations

Comment: Some commenters stated that air emission standards for benzene waste operations should be developed under RCRA instead of the CAA. In contrast, other commenters supported the use of the CAA as the basis for air emission standards for these sources. Many commenters claimed that the proposed standards for benzene waste operations are not needed because regulations promulgated by EPA under the CAA and other Federal statutes (i.e., RCRA, CERCLA, and FWPCA) and by OSHA already adequately control benzene emissions from waste operations. To the extent the proposed standards are acceptable under the CAA and are not addressing sources already adequately controlled by other regulations for benzene emissions, commenters further stated that the specific requirements for benzene waste operations (e.g., allowable control techniques, monitoring intervals, recordkeeping requirements) needed to be consistent with rules already promulgated by EPA.

Response: As discussed in the response to legal comments, EPA has the authority to regulate hazardous air pollutants from waste under Section 112 of the CAA. The EPA has determined that benzene is a hazardous air pollutant and standards for benzene waste operations were proposed under section 112 of the CAA to control benzene emissions from waste management units in which waste containing benzene is placed prior to treatment and from processes used to treat this waste.

The preamble to the proposed standards for benzene waste operations discussed the interrelationship of the proposal with other EPA rulemakings under the CAA, RCRA, CERCLA, and FWPCA. Regulations promulgated under these Acts that affect the management of waste, for the most part, require treatment of the waste to remove or destroy benzene or other organics in at least some of the waste: they do not ensure control of air emissions from the management of the waste prior to treatment or from the treatment process itself. In response to comments on the proposed standards, certain requirements were changed to make the final standards consistent with other related standards promulgated by EPA and to improve the ease of implementation by the facility owner and operator. This section of the preamble discusses why the other Acts do not adequately address the problem of controlling benzene emissions from benzene waste operations and how the requirements of the standards promulgated today generally relate to other standards. Existing regulations were found to be inadequate for controlling benzene emissions from waste operations for one or more of the following reasons: (1) The existing standards do not apply to the sources of benzene emissions, (2) the existing standards only apply to a subset of the sources (e.g., NSPS only applies to new, modified or reconstructed facilities), or (3) the existing regulation does not require controls from the point of generation, but, rather, requires controls only on certain downstream units.

a. CAA Requirements

As discussed in the preamble to the proposed standards, EPA expected that some requirements proposed for the national emission standard for benzene waste operations would overlap with other regulations developed by EPA under the CAA. Under section 111 of the CAA, EPA has established NSPS controlling VOC emissions from certain VOL storage tanks (40 CFR part 60, subpart Kb) and from petroleum refinery wastewater systems (40 CFR part 60, subpart QQQ). By controlling VOC emissions, these NSPS also control benzene emissions from some types of benzene waste operations but only at new, modified, or reconstructed facilities. These standards do not require controls on all existing facilities. The EPA has also established specific national emission standards under section 112 of the CAA for benzene emissions from equipment leaks (40 CFR part 61, subpart J), coke by-product recovery plants (40 CFR part 61, subpart L), and benzene storage vessels (40 CFR part 61, subpart Y). The standards previously promulgated under sections 111 and 112 of the CAA control benzene emissions from some but not all benzene waste operations that EPA's analysis indicates require benzene emission controls. The national emission standard promulgated today is needed to ensure that all benzene waste operations requiring benzene emission controls are controlled to a level protective of public health and the environment.

The control requirements specified in today's final standards are compatible with other CAA standards. Where today's standards are applicable to a benzene waste operation that is also regulated by another CAA standard, the requirements for controls, monitoring, recordkeeping, and reporting are as consistent as possible considering that the purpose of today's standards is to specifically control benzene emissions. It is important to note that coverage under another regulation does not eliminate the requirement to demonstrate compliance with the benzene waste rule.

(1) NSPS (Section 111)

The standards of performance for VOL storage vessels (40 CFR part 60, subpart Kb) apply only to those tanks constructed, reconstructed, or modified after July 23, 1984 that contain organic liquid that meets specified vapor pressure criteria. The VOL storage NSPS generally controls large storage tanks (i.e., greater than 151 m^3); waste storage tanks are typically not as large as product storage tanks. Although there is a potential for overlap of the VOL storage vessel rule with the benzene waste operations rule, the control requirements of the two rules are the same. The benzene waste operations rule allows the standards in 40 CFR part 60, subpart Kb as alternative standards for tanks.

The standards of performance for petroleum refinery wastewater systems (40 CFR part 60, subpart QQQ) apply to affected facilities located in petroleum refineries for which construction, modification, or reconstruction commenced after May 4, 1987. The standards for individual drain systems and oil-water separators established in subpart QQQ do not apply to chemical plants, TSDF, or coke by-product recovery plants. Therefore, the only overlap that potentially arises is at new, modified, or reconstructed refinery wastewater systems. The standards for individual drain systems in the final benzene waste operations rule allow the alternative use of water seals for drains and vents on covers applied to junction boxes as specified in 40 CFR part 60, subpart QQQ. However, either water seal controls on waste streams entering each junction box or venting the junction box to a closed vent system and control device would be required for the benzene waste operations rule to ensure that no flow occurs through the sewer system and out the junction boxes during normal operation. This additional requirement is necessary to control benzene emissions. To the extent that the NSPS controls are now allowed, today's rule is consistent with the NSPS. Any overlap in the two drain standards is not expected to present a compliance problem.

(2) NESHAP (Section 112)

The national emission standards for benzene storage vessels (40 CFR part 61, subpart Y) apply to tanks storing benzene (not mixtures) with a capacity of greater than 38 m^3 (10,000 gallons) that are not located at coke by-product plants or on vehicles. The provisions of subpart Y are essentially the same as those in 40 CFR part 60, subpart Kb. There appears to be no potential for overlap with the benzene waste rule because subpart Y applies to product storage vessels as opposed to benzene containing wastes.

The national emission standards for equipment leaks of benzene (40 CFR part 61, subpart J) apply to specific pieces of equipment (i.e., pumps, compressors, pressure relief devices, sampling connections, open-ended valves or lines, valves, flanges, product accumulator vessels, and control devices required by the subpart) that either contains or contacts a fluid with at least 10 percent benzene by weight. The benzene waste operations rule does not address the same type of emission sources as subpart J.

The national emission standards for benzene emissions from coke byproduct recovery plants (40 CFR part 61, subpart L) regulate a number of benzene emission sources from waste operations at coke by-product recovery plants. These include the tar decanters, tar-intercepting sumps, and light-oil sumps at both furnace and foundry coke plants and ammonia liquor storage tanks at furnace coke plants. These sources could also be regulated under the benzene waste operations rule; however, the control requirements under subpart L are considered adequate to meet the requirements of the benzene waste rule. Under the benzene waste operations rule, the point of generation for a waste stream regulated by subpart L is considered the outlet or effluent from the regulated unit. In addition, there are other sources that handle benzene containing wastes at coke by-product recovery plants that are not controlled by subpart L (e.g., wastewater from the light-oil sump that is not currently stripped (in the ammonia stripper) and ammonia-liquor storage tanks at foundry coke plants). These sources would be regulated under the benzene waste operations rule.

b. RCRA Requirements

Benzene is listed as a hazardous constituent in 40 CFR part 261, appendix VIII, and has been identified as a component in several types of RCRA-listed hazardous waste. The proposed organic toxicity characteristic (51 FR 21648, June 13, 1986) would identify additional benzene containing wastes as hazardous. Therefore, certain wastes containing benzene would be hazardous wastes that would be affected by various emission control programs being developed by EPA under authority of RCRA sections 3004(m), (n), and (u). Standards developed under these RCRA sections would control benzene emissions from certain benzene waste operations, but because of exclusions and exemptions allowed under RCRA not all benzene waste operations at TSDF would be controlled. The national emission standards for benzene waste operations promulgated today will in some cases overlap with regulations developed under RCRA but, most importantly, today's final rule will also control benzene emissions from benzene waste operations not controlled under RCRA.

(1) Land Disposal Restrictions

Under RCRA section 3004(m), EPA is developing regulations restricting the land disposal of untreated hazardous wastes. The LDR establish standards that require certain hazardous waste be treated to reduce specific hazardous waste properties (e.g., concentrations of individual toxic constituents such as benzene) before the waste is placed in a land disposal unit. The LDR treatment standards are expressed as either concentration limits or specified technologies that are based upon the performance achievable by the "best demonstrated available technologies" that will minimize the health and environmental threats posed by the waste. When a treatment standard is expressed as a concentration limit (i.e., performance level), the owner or operator may use any nonprohibited technology to treat the waste to meet the standard. However, when a treatment standard is expressed as a specific technology or technologies (i.e., BDAT), the owner or operator must treat the waste using the specified technologies prior to land disposal.

The EPA is proposing and promulgating LDR in stages. The first set of LDR, for certain dioxins and solvent-containing hazardous wastes was promulgated on November 7, 1986 (51 FR 40572); the second set of restrictions, the "California list," was promulgated on July 8, 1987 (52 FR 25760); the "First Third" was promulgated on August 17, 1988 (53 FR 31138); and the "Second Third" on June 23, 1989 (54 FR 26597). To date, the only benzene-specific LDR treatment standards that have been promulgated are benzene concentration limits for certain petroleum refining wastes (i.e., 0.011 milligrams of benzene per liter of wastewater and 9.5 milligrams per kilogram of nonwastewaters) (53 FR 31138, August 17, 1988). These treatment standards are based on the use of solvent extraction or fluidized bed incineration, but the LDR allow the owner or operator to meet this standard by using any nonprohibited technology.

Because LDR treatment minimizes the benzene concentration in the residual waste, LDR treatment processes are allowed as equivalent control systems (treatment processes) under the benzene waste operations rule. This point is discussed further under the Control Technology section. While treatment to meet benzene-specific LDR standards will minimize benzene emissions from waste management units in which a waste is placed following treatment, air emission controls are not required under RCRA for the LDR treatment process. Thus, benzene emissions from waste management units in which waste containing benzene is placed prior to LDR treatment and from LDR treatment processes used to treat this waste are not controlled by the standards under RCRA Section 3004(m). These sources of benzene emissions would be controlled as part of the requirements of the benzene waste operations rule.

(2) Air Emission Standards

Section 3004(n) of RCRA directs EPA to promulgate regulations for the monitoring and control of air emissions from hazardous waste TSDF as may be necessary to protect human health and the environment. In a separate three-phase rulemaking, EPA is developing nationwide standards for the control of organic emissions from certain waste management units at TSDF. The first two phases of this rulemaking are addressing total organic emissions as a class from TSDF sources (as opposed to emissions of specific organic compounds such as benzene). For the third phase, EPA is planning to assess the protectiveness of the organic emission control requirements specified by standards developed for the first two phases and for other EPA air emission control programs such as today's promulgated national emission standards for benzene waste operations. If this assessment determines that additional standards or guidance are necessary to protect human health and the environment, then one approach EPA may choose would be to develop nationwide TSDF standards for individual constituents.

Although EPA is aware that there will be some overlap in the RCRA 3004(n) air emission standards and the benzene waste operation rule, the controls required by these regulations are, to the extent possible, consistent. In addition, regulations being developed under RCRA section 3004(n) apply to only specific waste management units at TSDF subject to RCRA subtitle C permitting requirements. Not all facilities managing hazardous waste are subject to RCRA permit requirements and not all waste management units at TSDF subject to RCRA permit requirements will be subject to RCRA air emission standards.

The EPA's analysis indicates that a significant portion of the risk to human health and the environment from benzene waste operations is due to exposure to air emissions from wastewater and wastewater sludges containing benzene. Many waste operations used to manage wastewater containing benzene are not subject to RCRA subtitle C permitting requirements. The RCRA regulations under 40 CFR 270.1(c)(2)(iv) specifically exclude owners and operators of elementary neutralization units or wastewater treatment units as defined in 40 CFR 260.10 from obtaining a RCRA permit. This exception from RCRA permitting requirements applies not only to the tank where the waste is treated but also to any ancillary equipment connected to the tank (53 FR 34080; September 2, 1988). Thus, a major source of benzene emissions wastewater collection and treatment units, would be not controlled by the RCRA standards under section 3004(n). Benzene emissions from wastewater collection and treatment units at the affected facilities are regulated by today's final standards.

Other benzene waste operation emission sources are also exempt from RCRA subtitle C permitting requirements and, therefore, may not be controlled by standards under RCRA section 3004(n). The RCRA regulations under 40 CFR 261.4(a)(8) exclude from the definition of hazardous waste those materials that are reclaimed and returned within 12 months to the process which generated the material. Thus, benzene waste operations that accumulate and store materials containing benzene that are ultimately recycled to the process or processes generating the material (e.g., slop oil collected in waste management units at a petroleum refinery) may not be controlled by air emission standards under RCRA section 3004(n). Also under RCRA, tanks and containers used to accumulate hazardous waste for short periods of time (i.e., up to 90 or 270 days depending on the quantity of waste generated) may be exempted from the RCRA subtitle C permitting requirements in accordance with requirements specified in 40 CFR 262.34. Thus, air emission standards under RCRA section 3004(n) may not control benzene emissions from tanks and containers used to accumulate waste containing benzene. Because these tanks and containers manage the waste near the point where the waste is generated and the potential for benzene emissions is greatest, if the accumulation tanks and containers are not controlled, the majority of the benzene contained in the waste may be emitted to the atmosphere before the waste is transferred to a waste management unit subject to control under RCRA section 3004(n). Today's final standards will regulate benzene waste operations from the point where the waste leaves the process unit where it is generated through treatment of the waste to remove or destroy benzene, including any storage or accumulation devices.

(3) Corrective Action

Under authority of RCRA section 3004(u), EPA is developing regulations to address releases of hazardous waste or hazardous constituents from SWMU's that pose a threat to human health and the environment. This corrective action program applies to contamination of soil, water, and air media. Therefore, at TSDF with benzene waste operations, benzene emissions from SWMU's may be addressed by a corrective action program. This corrective action program would be designed to achieve target risk levels for individual process units based on an examination of the particular TSDF. It is not intended to set national emission standards for specific constituents, such as benzene, from all TSDF. Today's promulgated national emission standards for benzene waste operations are applicable to those TSDF that meet the applicability criteria and would require benzene controls for the benzene waste operations conducted at these facilities.

(4) Waste Combustion

The proposed national emission standards for benzene waste operations would establish specific treatment requirements for certain waste streams containing benzene. Several commenters claimed that these treatment requirements would be inconsistent with the LDR treatment standards and the RCRA regulatory approach proposed by EPA under 40 CFR part 266, subpart D for burning hazardous waste in any boiler or industrial furnace. It is not EPA's intention in developing the NESHAP for benzene waste operations to prevent or discourage an owner or operator from using a certain treatment process that they are currently using or plan to use to comply with RCRA standards provided that treatment process can meet or exceed the treatment requirements that EPA has determined to be necessary for reducing benzene emissions to levels protective of public health and the environment. Therefore, EPA concluded that it was appropriate to include boilers and industrial furnaces allowed under the proposed regulatory amendments to 40 CFR part 266, subpart D as equivalent waste treatment processes in today's final standards. It is important to note that existing regulations in 40 CFR part 266, subpart D do not contain substantive control requirements for these waste combustion processes. These treatment processes are discussed more fully in the Control Technology section.

c. CERCLA Requirements

The CERCLA as amended by SARA, 42 U.S.C 9601 *et seq.*, authorizes EPA to undertake removal and remedial actions to clean up hazardous substance releases. Removal actions typically are short-term or temporary measures taken to minimize exposure or danger to humans and the environment from the release of a hazardous substance. Remedial actions are longer term activities that are consistent with a permanent remedy for a release. On-site remedial actions are required by CERCLA section 121(d)(2) to comply with the requirements of Federal and more stringent State public health and environmental laws that are ARAR's to the specific CERCLA site. "Relevant and appropriate requirements" means those Federal or State requirements that, while not applicable, address problems or situations sufficiently similar to those encountered at the CERCLA site such that their use is well suited to the particular site (53 FR 51478). In addition, the NCP provides that on-site CERCLA removal actions "should comply with the Federal ARAR's to the extent practicable considering the exigencies of the circumstances" (40 CFR 300.65(f)). The EPA has developed interim final guidance on the appropriate use of ARAR's. It is entitled "The CERCLA Compliance with Other Laws Manual: Parts I and II (9234.1–01 and 9234.1–02)". A requirement under a Federal or State environmental law may either be "applicable" or "relevant and appropriate," but not both, to a remedial or removal action conducted at a CERCLA site. "Applicable requirements" as defined in the proposed revisions to the NCP, means those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under Federal or State law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site (40 CFR 300.5 (proposed), 53 FR 51475; December 21, 1988).

d. CWA Requirements

Wastewater containing benzene is subject to regulation under the CWA. Because CWA controls apply to the point where the wastewater is discharged to a POTW or directly into surface waters, the CWA requirements do not generally control benzene either upstream at the benzene waste operations or at the treatment process used to meet the discharge requirements.

e. OSHA Requirements

Standards are issued by OSHA to protect the health and safety of personnel working at a facility. The OSHA standards limit exposure of workers to hazardous materials such as benzene in the workplace but do not apply to people living outside the facility boundaries. Controls implemented at a facility to comply with OSHA standards are intended and designed to reduce worker exposure to benzene. Consequently, these controls would not necessarily result in reduced benzene emissions to the atmosphere. For example, requiring workers to wear protective equipment such as respirators or installing engineering controls such as room or hood ventilation systems to maintain benzene concentrations in work areas below specified limits would reduce worker exposure but would not control benzene emissions to the atmosphere. In addition, there is expected to be no overlap between the benzene waste rule and OSHA requirements. Furthermore, sufficient flexibility was included in the rule to allow owners and operators to consider safety in the selection of benzene emission controls for compliance with today's rule.

Data Base and Emission Modeling

Comment: Comments on the plant-specific estimates of benzene emissions generally suggested that emissions were overestimated because the data base was outdated or incomplete and the emission modeling approach was flawed. Many of these respondents concluded that because of shortcomings in the data base and modeling, EPA failed to show that benzene emissions from waste operations were high enough to pose health risk problems or that the proposed emission controls were needed. Others stated that the data used by EPA were not collected for the purpose of developing regulations for air emissions because they were submitted in response to data-gathering efforts by OW and OSW. These commenters suggested that EPA should conduct additional surveys and an extensive sampling and analysis program to develop data specifically for this regulatory effort. A few commenters stated that the benzene concentrations used for specific waste streams at specific facilities were too high. Others noted that there were actually many more benzene-containing wastes at certain types of facilities, especially petroleum refineries, than those recorded in the EPA data base and used to estimate emissions. Commenters also stated that emissions from the wastewater collection system (drains, sewers, junction boxes) were overestimated, benzene destruction by biodegradation was underestimated, and the modeling approach did not account for the significant quantities of benzene removed with the oil phase in oil-water separators. Other commenters focused on the uncertainties in the emission estimates that were described in the proposal preamble and stated that the estimates of impacts were not valid because of these uncertainties. Additional comments stated that the rulemaking docket was incomplete and that the emission estimates could not be verified because of the incomplete documentation of the information that EPA used. A few commenters stated that benzene emissions were overestimated for their plants because they had already installed technology similar to that required by the proposed regulation. One company reported that benzene was stripped from their process wastewater prior to discharge of the water to open-sources (such as sewers, wastewater treatment tanks, surface impoundments), and another stated that their wastewater collection system was already enclosed because of the presence of benzene and other volatile organics in the process wastewater.

Response: The EPA has reassessed both the data base and the emission modeling approach and concluded that both are adequate to support the proposed control of benzene emissions from waste operations at chemical plants, petroleum refineries, coke by-product recovery plants, and commercial TSDF. Data for benzene waste operations at these industries are included in the analysis of impacts and show significant benzene emissions based on the quantities of benzene in the waste and the management of these wastes in open sources. In addition, the final rule is structured to ensure that the facilities and waste streams that must be controlled are determined based on facility-by-facility estimates of benzene emission potential as determined by the quantity of benzene in the wastes.

a. Sources of Benzene Wastes

Wastes that contain benzene are generated from raw materials, intermediates, and products that contain benzene at petroleum refineries, chemical plants that use or produce benzene, and coke by-product recovery plants. At petroleum refineries, benzene is present in the crude oil, in light fractions produced during refining, and in final products such as gasoline, BTX (benzene-toluene-xylene), and pure benzene. Water is introduced into refinery processes that use direct contact steam and cooling water, and into storage tanks from storm water or incomplete separations of water and process fluids. Benzene wastes are generated from the refinery processes when water, waste oil, or sludge is separated from materials that contain benzene. Because of incomplete separations and emulsions, the wastes usually contain aqueous and oily phases. The wastes are removed from the process units and storage tanks through drains that discharge into a sewer system composed of piping or trenches and junction boxes that combine different wastewaters. Oil-water separators and air flotation units are used to remove and recover the oil and sludges, and the water phase is usually processed in a series of open tanks, such as equalization basins, clarifiers, and biological treatment units. Certain chemical plants use benzene as a raw material or produce it as a product or as a coproduct or by-product in processes that involve direct-contact with steam or cooling water. These processes generate wastewater, sludges, and organic liquid wastes that contain benzene. Benzene is also present in coke oven gas, and wastewaters are generated in by-product recovery processes from water that directly contacts the gas (for cooling or tar removal). In addition, steam is used in the light oil recovery operation, and wastewater is decanted from a mixture of benzene, toluene, and xylene. Some chemical and by-product recovery plants remove the benzene from the waste by stripping for recycle or reuse. Other plants discharge these wastewaters through process drains, trenches, sumps, junction boxes, oil-water separators, open wastewater treatment tanks, and surface impoundments. The concentration of benzene in these wastes is highest when the waste is first generated (point of generation) before it is exposed to the atmosphere. The benzene concentration decreases as the waste passes through the collection and treatment system because benzene is emitted and because of mixing with wastewaters that do not contain benzene. Benzene in water is highly volatile and is emitted from open collection systems and open (sometimes aerated) treatment tanks.

b. EPA's Data Base for Waste Operations

In developing the data base for the proposed benzene waste rule, EPA examined data from several sources in an attempt to characterize the wastes generated at petroleum refineries, chemical plants, and coke by-product recovery plants. Most of the data for the affected industries were gathered to support regulatory programs within OSW and OW; however, these data provided details on waste quantity, benzene concentration, and how the waste is managed, which are the critical components in estimating benzene air emissions. Some of the data were collected several years ago, and other data were submitted to EPA within the past 2 to 3 years in response to survey questionnaires. All of the data sources were used in combination to characterize wastes that contain benzene. By using data from several different sources, EPA was able to compile the best available characterization of those facilities that manage wastes with benzene. Very few of the comments on the proposed rule supplied alternative or more complete data than that compiled by EPA. Consequently, the data base constructed on benzene waste operations was the best available within the time constraints of this regulatory development effort and provided a documented record of the estimates of benzene emissions.

Although EPA believes the data base for benzene waste operations is sufficient to support regulatory development, EPA acknowledged the uncertainties associated with the data base in the proposal preamble and continues to acknowledge those uncertainties. Although several sources of data were used, it is unlikely that the data base includes all facilities that manage benzene wastes. Neither is it likely that the data base includes all benzene containing waste streams at those facilities that are represented in the data base. Additionally, in several cases the information for facilities did not include data on their wastewaters or on organic wastes that are eventually recovered and recycled.

Additional uncertainties are introduced by the reported benzene concentration in the waste, which often represented a point in the collection system after much of the benzene could have been emitted and after the waste had been diluted by combination with other wastewater. For example, some refineries reported benzene concentrations measured at the equalization basin, after the waste had been collected and retained in units open to the atmosphere. For those waste streams, the benzene concentration would have been higher at upstream locations, such as the process drain where the waste is first exposed to the atmosphere.

Many of the wastes were a mixture of oil and water when they were generated; however, there were few data on the relative amounts of each phase or the benzene concentration in each phase. Several plants did not identify benzene as a constituent in their waste, and others identified benzene but provided no concentration data. For some facilities, the sequence of waste management units was not described in detail, and for others, emission controls that may have been installed were not recorded.

A few commenters on the proposed rule offered additional site-specific details that were used by EPA to improve the data, but most did not provide information to reduce the uncertainties described above. It is important to note that most of the uncertainties cited above indicate that actual benzene concentrations are higher than was reported and used by EPA in the risk analysis.

Many commenters questioned the characterization of wastes that are managed at the affected industries. For example, several commenters focused on specific waste streams in the data base for specific facilities and claimed that the benzene content and emissions were overestimated. Others stated that when they reported the benzene concentration to EPA as a range in the survey of hazardous waste generators, the actual concentration was at the lower end of the range and was less than the midrange value used to estimate emissions for the benzene waste proposal. These commenters stated that emissions were overestimated for some of the plants, and EPA failed to show that emissions were high enough to pose health risk problems. Others noted that there were actually more benzene-containing wastes than those recorded in EPA's data base. For example, one commenter identified 13 major benzene containing waste streams at petroleum refineries rather than the 2 or 3 used by EPA in the analysis for the proposed standards. The commenter also suggested that when small quantity streams are considered, there may be thousands of benzene containing waste streams at petroleum refineries.

The EPA performed a revised analysis of impacts in an attempt to improve the data base and to examine the potential effects of the uncertainties. The revised analysis also incorporated revised emission estimates for wastewater treatment systems, including the collection system and oil-water separators. As will be discussed, the results of the analysis indicate that the benzene emissions presented at proposal were underestimated, rather than overestimated as some of the commenters claimed. Two major factors that contributed to this revised estimate were a reexamination of the benzene concentration data and revised estimates of the quantity of waste that contains benzene. These are discussed below.

(1) Benzene Concentration

Most of the benzene concentration data reported by the facilities and contained in EPA's data base for waste operations were not based on analyses conducted at the point where the waste is first exposed to the atmosphere, where the benzene concentration would be at its maximum. The reported data generally represented the benzene concentration at some point downstream of process drains and the waste collection system after significant quantities of benzene had already been emitted. For example, the major emitting streams contained in EPA's data base for waste operations were large quantities of process wastewater. The reported concentrations for these waste streams were generally associated with measurements at the equalization basin, which is designed to mix wastewaters from different processes after they have traveled through the wastewater collection system. The concentrations presented for the equalization basin do not reflect that 20 to 40 percent of the benzene may have already been emitted as the wastewater traveled from the process drains, through sewers or trenches, junction boxes, sumps, and lift stations. This range of the percent of the benzene emitted for the wastewater collection system is based on analyses presented in the CTG document for industrial wastewater volatile organic compound emissions, which provides background information for BACT/LAER determinations.

Another example of benzene concentration data that do not reflect losses in the collection system includes wastes from the petroleum refining industry that were identified as sludges or waste oil removed from oil-water separators. For these wastes, the reported benzene concentration and quantity do not reflect the benzene lost in the wastewater collection system or the separator itself. Because the company-reported data used to estimate emissions were not for the point where the waste was discharged and first exposed to the atmosphere, the quantity of benzene actually generated and discharged with these wastes would have been much higher than the quantity of benzene represented by the data base used at proposal.

The revised analysis of impacts attempted to compensate for benzene emissions in the wastewater collection system that were not represented by the reported benzene concentrations. The revised estimates were based on 20 to 40 percent of the benzene being emitted during wastewater collection and resulted in an increase in the emission estimates. The revised analysis also examined the effect of using the midrange benzene concentration versus the lower or upper end of the range. For example, some facilities reported the benzene concentration as a range (such as 10 to 100 ppmw), and some commenters claimed that the average concentration was actually at the lower end of the range. A closer examination of the estimates for two chemical plants showed that the maximum risk may be significant even if all waste stream benzene concentrations are at the lower end of the concentration range. For petroleum refineries, revised estimates were generated based on a range of benzene concentrations for several waste streams that are likely to contain benzene. The revised estimates indicated that a few of the largest refineries may have maximum risks of 1×10^{-4} or higher even if the benzene concentrations are always at the lower end of the range. If benzene concentrations are actually at the upper end of the range, numerous facilities are estimated to exceed a maximum risk of 1×10^{-4}.

(2) Waste Quantity

The other major factor leading to a potental underestimate for benzene emissions involves the reported waste quantities and the number of waste streams. Several commenters indicated that certain facilities, especially petroleum refineries, have many more waste streams that contain benzene than were actually recorded in EPA's data base for waste operations. These commenters stated that there might be thousands of small quantity waste streams that contain benzene at petroleum refineries. Many respondents to hazardous waste surveys generally reported only those wastes they believed to be classified as hazardous under RCRA, and in many cases the only data available were for relatively low volume wastes such as oily sludges. Additionally, wastes that are eventually recycled and reused generally were not reported. Total wastewater quantity has the most significant potential for affecting estimated benzene emissions and was also missing in EPA's data base for several facilities. These wastes were not accounted for in the analysis of impacts presented at proposal because they were not reported in the original surveys used to compile the data bases.

The analysis of impacts for the proposed rule was revised for the final rule to improve the estimates of waste quantity and number of waste streams. The focus of the revised analysis was to identify the major waste streams that contain benzene because the proposed regulation was revised to exclude small quantity wastes (less than 10 megagrams of waste per year) that have a low emission potential. This revision will exclude from the control requirements of the final rule many of the very small quantity waste streams, such as pump drips, that were cited by the commenters. For petroleum refineries, a total of 13 major waste streams were identified based on comments received from the industry and an evaluation of the refinery processes that generate the wastes. These waste streams are generated from processes and storage tanks that contain benzene, such as crude storage, light product storage, catalytic cracking, catalytic reforming, and benzene production. Waste generation factors (e.g., gallons of wastewater per barrel of crude oil) were used with site-specific capacity data by process for 187 petroleum refineries to estimate the quantity of each major waste stream generated at each refinery. For coke by-product recovery plants, data from effluent guidelines documents prepared by OW were used to identify 3 major waste streams that contain benzene and their generation factors (gallons per ton of coke). The data from petroleum refineries and coke by-product recovery plants for wastes containing benzene were used to reevaluate the number of facilities, the number of waste streams, and the total waste quantity, all of which increased significantly from the estimates that were used at proposal. At proposal 74 facilities in EPA's data base were estimated to have more than 10 megagrams per year of benzene in their wastes, and were estimated to handle 200 waste streams totaling 8 million megagrams of benzene per year. The revised analysis estimates that 80 to 200 facilities manage aqueous wastes that contain over 10 megagrams of benzene per year, and these facilities are projected to have 1,000 to 3,500 waste streams exceeding a concentration of 10 ppmw benzene with a total waste quantity of 22 to 76 million megagrams per year. The revised estimates of the total quantity of waste that contains benzene resulted in an increase in the emission estimates and also supports the conclusion that the benzene emission estimates presented at proposal were not overestimated.

c. Emission Modeling Approach

Several commenters questioned the validity and accuracy of the emission models used for the wastewater collection system, biodegradation, and oil-water separators. These models were used to estimate the fracton of benzene that is likely to be emitted in different types of sources. The emission models have been reviewed by the public and comments have been incorporated during regulatory development programs for air emissions from hazardous waste facilities and industrial wastewater treatment systems. The uncertainties associated with the emission modeling have been acknowledged and discussed in the proposal preamble. The models used for the wastewater collection system (open sewers and junction boxes) were under development at the time of proposal. These models have been recently revised based on additional design and operation data, improved modeling assumptions, and comments received during public review of the models. Revisions have been incorporated into the estimates of emissions for benzene waste operations to account for changes to the emission models. The effect of these revisions was to lower the estimates of benzene emitted from the wastewater collection system. The previous estimate of 97 percent emitted collectively from the entire wastewater treatment system (from the process drain, sewers, junction boxes, equalization basin, activated sludge unit, etc.) was revised downward to 73 percent. The major components of the revised estimate include 20 to 40 percent emitted in an open collection system prior to the equalization basin and 40 percent emitted in a nonaerated equalization basin.

Some of the commenters on the emission models stated that benzene destruction by biodegradation was not evaluated properly and that EPA's revised model for air emissions from units with biodegradation, "Chemdat 7", should have been used. However, the EPA emission estimates presented at proposal for the biodegradation unit in the wastewater treatment sequence were based on Chemdat 7, which contained the revised kinetics for biodegradation. Commenter also stated that the original estimate of 97 percent emitted for wastewater treatment and the current estimate of 73 percent emitted do not appear to give credit for biodegradation as a competing removal mechanism. However, the emission estimate used by EPA was based on the entire wastewater treatment system, including the collection system, a series of open wastewater treatment tanks prior to the biodegradation unit, and the biodegradation unit. Most of the benzene emissions are projected to occur before the wastewater reaches units designed for biodegradation.

For the biodegradation (activated sludge) unit alone, the Chemdat 7 model predicted that only 6 to 12 percent of the benzene is emitted and 88 to 92 percent is biologically degraded. One commenter who stated that credit was not given for biodegradation cited values of 12 percent emitted and 88 percent biologically degraded in an activated sludge unit, which is not significantly different from EPA's estimate. Another commenter stated that benzene emissions from a series of wastewater treatment tanks is only 25 to 72 percent, which neglects emissions from the wastewater collection system. However, EPA's estimate for the wastewater treatment tanks (neglecting the collection system) falls within the range suggested by the commenter because EPA's estimate includes 40 percent emitted in the equalization basin, 2.5 percent emitted in the clarifier, and 6 to 12 percent emitted in the biodegradation unit. One commenter stated that their emission model for an aerated surface impoundment with biodegradation predicted only 73 percent emitted, and the model they believed EPA used predicted 98.6 percent emitted. The model cited by the commenter was not used for surface impoundments. For surface impoundments, emissions were estimated to range from 50 to 100 percent because some impoundments are biologically active, some are not biologically active, some are aerated, and some are quiescent. A midrange value of approximately 75 percent emitted was used in the EPA emission estimates for surface impoundments in general.

The models used for biodegradation and for open tanks in the wastewater treatment system have undergone extensive review as part of the development of air standards for hazardous waste TSDF, and revisions were made based on public comments prior to their use in estimating benzene emissions for the proposed rule. Several of these comments focused on the biodegradation component of the model and recommended the use of Monod kinetics to estimate the extent of biodegradation. The model was revised to incorporate Monod kinetics for biodegradation, and this version of the model (Chemdat 7) was used to estimate emissions for the biodegradation unit in the previously cited CTG document for VOC emissions from industrial wastewater treatment systems. This CTG document served as the primary source for EPA's estimates of benzene emissions from wastewater treatment systems.

Several commenters stated that the emission modeling for oil-water separators did not reflect that most of the benzene will be removed with the oil layer and a smaller amount will leave with the wastewater from the separator. One commenter stated that 10 to 30 percent of the benzene would be removed with the wastewater, and another estimated that 10 to 20 percent would be removed with the wastewater. The EPA agrees that benzene will preferentially partition into the oil layer (the benzene concentration in the oil will be much higher than that in the water layer). The emission modeling approach was revised for petroleum refineries to reflect that about 20 percent of the benzene (midrange of 10 to 30 percent) will be removed with the wastewater and about 80 percent of the benzene will be removed from the separator with the oil layer. The revised analysis also considered that some oil-water separators are covered, as mentioned by a few commenters, and some are open vessels. In addition, an attempt was made to estimate emissions from the wastewater collection system prior to the oil-water separator. The revised analysis estimates that 30 to 50 percent of the benzene that enters the wastewater collection system is recovered with the waste oil from the oil-water separator. Most of the balance of the benzene is emitted from the wastewater collection system prior to the oil-water separator and from open oil-water separators.

Oil-water separators and air flotation units also generate sludges. These sludges may first be dewatered, and an EPA field evaluation of a sludge dewatering unit at a petroleum refinery showed that up to 40 percent of the benzene ay be emitted during dewatering. The balance of the benzene leaves with the dewatered solids (6 to 28 percent) and the water or filtrate (32 to 94 percent). The benzene leaving with the solids or filtrate is also likely to be emitted in subsequent processes, such as wastewater treatment or land treatment. For these sludges, the revised impacts analysis estimated that over 90 percent of the benzene would be emitted in the sludge treatment and disposal processes.

d. Baseline Controls

Several commenters stated that emissions were overestimated for certain facilities because they had already installed emission control equipment. For example, one commenter stated that at two plants their current practice is to routinely strip benzene from their wastewater prior to discharging the wastewater to open wastewater treatment units. Another stated that the sewers were enclosed at their particular plant because of the presence of benzene and other volatile organics in the wastewater. Commenters also indicated that some coke by-product recovery plants currently strip benzene from their wastewater.

The EPA finds it encouraging that some plants have already adopted control technology similar to that required by the proposed benzene waste standard; however, only a few facilities fell into this category. These existing controls are expected to comply with the requirements of the benzene waste rule; therefore, the standard is not expected to impose additional control requirements on these sources. The changes already implemented by these plants demonstrate the feasibility of removing the benzene prior to managing the wastes in sources with a high emission potential, such as open tanks, aerated units, or surface impoundments.

The revised analysis of impacts included controls that are in place at facilities identified by the commenters, such as those that currently strip the wastewater. In addition, the revised estimate for petroleum refineries considers that some oil-water separators are covered. For coke by-product plants, the revised analysis assumes that a significant portion of the wastewater is stripped prior to placement in open wastewater treatment tanks and assumes that the facilities are in compliance with subpart L of 40 CFR part 61. The result of these revisions was much lower emission estimates for those plants that currently control benzene emissions from their wastes. However, many plants do not remove the benzene from their wastes prior to transporting the wastes in open wastewater collection systems or treatment in open wastewater tanks. Although a few plants may have already installed controls that are in compliance with the standard, many other plants have not installed controls. The revised impacts analysis estimated significant benzene emissions at many plants from handling wastes with benzene, and significant reductions in emissions will be obtained by the controls required for benzene waste operations.

e. Summary of Revised Impacts Analysis

As discussed in the preceding paragraphs, EPA considered all the comments submitted concerning the data base and emission modeling and performed a revised analysis of the impacts of benzene emissions from waste operations in the affected industries. In the revised analysis, EPA addressed the uncertainties that were cited by commenters and that were cited in the proposal preamble. Where site specific information on particular facilities was submitted by commenters, it was incorporated into the analysis. The EPA believes that the revised analysis represents the best available approach to estimating emissions and risk within the time constraints imposed by the court order, utilizes the most recent data available, and supports the final rulemaking.

The results of the revised analysis show that annual baseline emissions of benzene from waste operations are about 6,000 megagrams/year, as compared to the proposal estimate of 5,300 megagrams/year at baseline. The estimate of MIR at baseline produced by the revised analysis is approximately 2×10^{-3} compared to the proposal estimate of approximately 8×10^{-3}. The revised estimate of incidence at baseline is approximately 0.6 case/year compared to the estimate of approximately 0.3 case/year at proposal. These results indicate that even when the uncertainties in the proposal analysis are addressed, additional controls for benzene emissions are needed to reduce emissions and risk to an acceptable level. The EPA, therefore, concluded that the emission controls required by the benzene waste rule are warranted.

The results of the revised analysis further show that after application of the controls required by the final standards, benzene emissions from the affected waste operations are reduced to 450 megagrams per year, a reduction of 93 percent from baseline. The MIR after control is approximately 5×10^{-5} and the annual cancer incidence after control is approximately 0.05 case/year. At baseline, about 5,000,000 people are estimated to be exposed at risk levels above 1×10^{-6}; 300,00 of these people are estimated to be exposed at risk levels above 1×10^{-5}; 10,000 are estimated to be exposed at risk levels above 1×10^{-4}; and 200 above 1×10^{-3}. After control, no one is estimated to be exposed at risk levels above 1×10^{-4} and the number exposed to levels above 1×10^{-6} is estimated to be reduced to 200,000 and the number exposed to levels above 1×10^{-5} is estimated to be reduced to about 9,000 people.

f. Documentation

One commenter stated that the rulemakng docket was incomplete and that the emission estimates could not be verified. The commenter stated that all of the background information was not provided and public comments that had been made on draft documents were not included in the docket. In fact, the docket for this rulemaking contained all the data used to estimate emissions except for confidential business information. The chapters and appendices from the CTG document for emissions from industrial wastewater treatment that were used to estimate impacts for the proposed rule were included in the docket. Those sections of the background information document for volatile organic emissions from TSDF that were used for estimates of impacts were also included. Public comments on these documents were available in the two meetings of the National Air Pollution Control Techniques Advisory Committee held in

May 1988 and June 1989. The only details not publicly available in the docket were surveys that were classified as confidential business information. However, the commenters have access to this information for their facilities because they participated in the survey and provided the data. In addition, the confidental information for their specific facility can be obtained directly from OW or OSW, which are the EPA offices that conducted the surveys and are responsible for protecting the confidential information they may contain. The documentation includes each element of the nonconfidential information in the data base, such as the company name, location, and data for each waste stream (RCRA waste code, waste quantity, midrange benzene concentration, physical form of the waste, and the waste management processes). In addition, the documentation describes in detail how the emission factors for the waste management processes were derived, how average or typical benzene concentrations were developed to fill data gaps, and how emissions were estimated. The revised analysis of impacts performed by EPA after proposal is also included in the docket.

Selection of Standards

Comment: Comments were received both for and against the cutoff levels and format of the proposed standard. One commenter stated that the level of the standard is appropriate for the industries and waste streams regulated while other commenters suggested that the basis of the 10 ppmw cutoff should be clarified and contended that if 10 ppmw offers an ample margin of safety, alternative treatment technologies should not be required to achieve a treatment level less than 10 ppmw. Several of the commenters stated that the 10 ppmw criteria was arbitrary and that the control requirements are not supported by the record. Some commenters suggested that the basis for the 10 megagram per year benzene-in-waste facility cutoff should be explained, while others maintained that the cutoff level is too low and will catch numerous small refineries with low emissions. Some of the commenters suggested that the format of the proposal should be changed to an emission standard to provide facilities as much freedom as possible to choose the least-cost path to attain adequate control. One commenter suggested that the standard should be a facility-based performance standard in which controls are applied to individual waste streams with benzene concentrations of 10 ppmw or more until a sufficient number of streams are controlled to reduce the amount of benzene in wastes sent to wastewater treatment to 10 megagrams per year. This commenter also requested that the standards not mandate the use of steam stripping for the treatment of petroleum refinery wastes. Some commenters contended that those provisions of the proposed standard related to dilution were unnecessarily complicated and difficult to use. Commenters also expressed concern regarding use of the point of generation as the point at which waste stream benzene concentrations would be determined. Some commenters were not sure what was meant by the point of generation, others thought that making measurements at the point of generation would be extremely difficult for some sources, and some suggested that the rule be modified to allow waste stream testing downstream of the point of generation.

Response: In preparing a response to comments related to the selection of the standard, EPA identified five basic areas of commenter concern: (1) The reasons for selecting 10 megagrams per year and 10 ppmw for facility and waste stream exemption levels, respectively, (2) the levels of performance specified for alternative treatment technologies, (3) the selection of a format other than an emission limit or performance standard, (4) the complexity of using the dilution equation, (5) the selection of the point of generation as the location for determining waste stream benzene concentration, and (6) the deadline for compliance with the rule. Each of these concerns is addressed below.

a. Facility and Waste Stream Exemption Levels

In selecting the requirements of the proposed standards, EPA performed risk analyses using available waste stream data from several sources. The results of the risk analyses indicated that health risks would be reduced to acceptable levels if controls are applied on all waste streams with a benzene concentration of 10 ppmw or more at all facilities that manage 10 megagrams per year or more of benzene in their waste. Those commenters who suggested a facility-specific performance standard with a 10 megagram per year target for the amount of benzene in waste managed in uncontrolled units apparently misinterpreted the way EPA used the 10 megagrams per year threshold. The intent of the regulation was to control major benzene containing waste streams at facilities that might pose a health risk problem. The 10 megagrams per year was not established as a target level of emissions for all facilities; rather, it was identified as a cutoff for identifying plants with the potential for exceeding acceptable levels of health risk. That is, plants managing benzene-in-waste above this level were identified as needing controls. The EPA considered selecting lower levels of 6 megagrams per year and 1 megagram per year as the cutoff. Lowering the cutoff level successively increases the number of facilities that must apply controls. Based on the revised data base and considering only wastes that are at least 10 percent water, the number of facilities affected at a cutoff level of 10 megagrams per year is estimated to be about 140. Lowering the cutoff to 6 megagrams per year or 1 megagram per year is estimated to increase the number of facilities affected to about 160 and 240, respectively. The EPA's primary concern was to control emissions at plants with the potential for creating unacceptable health risks, and the additional plants that would be required to install controls at the lower cutoff levels have a low benzene emission potential. The risk analysis showed that a level of 10 megagrams per year in wastes containing at least 10 percent water brings all facilities with a potential for exceeding acceptable risk levels under the standards. Consequently, that level was selected for the proposed standards and is retained in today's final rule. Once controls are applied, benzene emissions at most affected plants would be reduced significantly below 10 megagrams per year.

The EPA's intent in the development of the proposed benzene waste rule was to require controls on all benzene-containing waste streams at facilities that manage more than 10 megagrams per year of benzene in waste. However, an evaluation of benzene waste data in the data base indicated that controlling all streams that contain any benzene could include many waste streams with trace amounts of benzene that have a very low emission potential. The primary concern of EPA was to control those emission sources that contribute to benzene emissions, which were identified as waste streams that have a benzene concentration well above detectable levels. Consequently, to avoid controlling waste streams with a low emission potential, EPA evaluated allowing exemptions for waste streams with benzene concentrations below a certain cutoff level. Evaluations of several concentration cutoffs indicated that acceptable risk levels were not exceeded if a concentration cutoff of 10 ppmw is used. This level was therefore selected for the proposed standards for the purpose of identifying waste streams that are subject to the benzene waste rule.

In response to comments, EPA looked at the effects on health impacts of varying both the 10 megagrams per year facility cutoff and the 10 ppmw waste stream cutoff. As discussed under Data Base and Emission Modeling, EPA added additional data and re-estimated impacts. The reanalysis incorporated changes made in the final rule, such as applying the 10 megagrams per year cutoff only to wastes that are more than 10 percent water rather than to all benzene containing wastes and using annual average benzene concentrations rather than a maximum value. The results of this reanalysis confirm that controls are needed on waste streams with benzene concentrations of 10 ppmw or more at plants managing greater than 10 megagrams per year of benzene in waste (see Data Base and Emission Modeling for discussion of revised impacts). In light of these evaluations, EPA still believes that the proposed cutoff levels are needed to assure that acceptable health impacts are not exceeded. Consequently, these values are retained in today's final rule.

b. Level of Control Required for Alternative Treatment Technologies

In the proposed standards, it was not EPA's intent to mandate the use of a particular treatment technology and provisions were included that would allow alternative technologies other than those named in the proposed rule. However, certain controls were assumed in the analysis to support the proposal. To ensure that emissions and risk were also reduced to acceptable levels if alternative technologies were used, a performance level for alternative treatment was selected based on the performance level that would be achieved by the controls assumed in the analysis. The estimates of emissions after control assumed the use of steam stripping of wastewaters at an efficiency of 99 percent, TFE for sludges at an efficiency of 98 percent, and incineration for organic liquids and solids at an efficiency of 99.99 percent. The estimates also assumed the use of submerged fill for container loading, which is estimated to reduce loading emissions by 65 percent, and the use of 95 percent efficient vapor controls on vents from waste management units.

As with the 10 megagrams per year facility cutoff, the 10 ppmw level for waste streams was identified as a level above which controls were needed. Although 10 ppmw was allowed as a treatment standard for steam strippers and TFE, it was anticipated that the devices would operate at the benzene removal efficiencies that they typically achieve (98 to 99 percent or more). Although it is assumed that a small portion of the total waste treated to meet the standards will be treated by TFE at an efficiency of 98 percent, it is anticipated (and assumed in the analysis) that most waste will be steam stripped at an efficiency of 99 percent. To ensure that comparable emission reductions would be achieved if other treatment technologies are used, EPA selected an efficiency of 99 percent as the levels of control that must be met by alternative treatment technologies in the proposed rule. The treatment devices assumed in the analyses are well proven in treating the types of waste streams of concern in this rule and the levels of control assumed in the analyses were based on the demonstrated performance of these devices in similar application. In setting the level of control required in the proposed standards, EPA elected to specify the use of the treatment devices that served as the basis for the risk analyses. Although these devices were specifically identified, compliance flexibility was added to the proposed rule by allowing the use of alternatives if they can be demonstrated to achieve a 99 percent mass emission reduction. Allowing treatment alternatives would permit owners and operators to use any control device that can be demonstrated to achieve control efficiencies that are equivalent to that of the specified devices. This could benefit owners and operators with unused capacity in existing treatment devices.

The EPA believes that the treatment requirements specified in the proposed standards were reasonable and that the rule provides sufficient flexibility for owners and operators in choosing a method of compliance. By specifying particular treatment devices, the proposal allowed compliance to be demonstrated without a formal performance test thus minimizing the burden on facility owners and operators and on EPA enforcement. The premise is that a properly designed and operated treatment device will obtain the benzene emission control levels that are needed to protect public health. As stated previously, even though the concentration cutoff level was set at 10 ppmw, a properly designed and operated TFE or steam stripper should achieve benzene removal rates of at least 98 and 99 percent, respectively, and, therefore, EPA used those values in the analyses of risk. However, EPA agrees with the commenter that it is inconsistent to allow steam strippers and TFE to demonstrate compliance by reducing waste stream benzene concentrations to less than 10 ppmw while requiring other treatment devices to demonstrate a mass emission reduction of 99 percent. Consequently, the final rule was revised to allow all treatment processes to demonstrate compliance by either a 99 percent destruction or removal efficiency or by a reduction in waste stream benzene concentrations to levels below 10 ppmw. Even though the revision includes the 10 ppmw concentration limit to demonstrate compliance, EPA still anticipates that properly operated treatment devices will achieve removal efficiencies consistent with the assumptions in the risk analysis.

c. Format of the Standard

Section 112 of the CAA requires EPA to establish standards in the form of emission limits for hazardous air pollutants unless it is not feasible to do so. Section 112 then defines what is meant by not feasible as including situations where a hazardous pollutant cannot be emitted through a conveyance, where use of a conveyance violates Federal, State, or local law, or where measurement methods are not practicable. Where emission standards are determined to be not feasible, a design, equipment, work practice, or operational standard is allowed. In developing the proposed regulation for benzene waste operations, EPA first considered an emission standard; however, because of practical problems associated with that format, EPA selected a combination of equipment, performance, and operational standards applicable to facilities and waste streams above specified cutoff levels. Because of the close correlation between emissions from open waste management units and the amount of benzene in waste managed in these units, EPA chose to express the cutoffs in terms of benzene quantity managed (for facilities) and benzene concentration (for individual waste streams).

For waste treatment operations, owners or operators may demonstrate that a treatment technology will achieve specified performance levels. For other waste management units, such as tanks and impoundments, emissions must be contained by the use of covers or enclosures up to the point where treatment occurs and vents must be controlled by vapor control equipment. The standards that require covers and enclosures are in the form of equipment specifications. The standard for vapor recovery devices is a performance standard that requires a specified percent reduction in benzene in the gas stream. For container loading, where equipment, performance, or operational standards are not feasible, a work practice standard requiring submerged fill is appropriate.

An emission limit was not selected as the format of the standard primarily because of the difficulty associated with the measurement of emissions from many of the sources regulated by the rule (e.g., drains and surface impoundments). For example there are no reasonably accurate or precise test methods for routinely measuring emissions from area sources such as open sewers, open treatment tanks, or surface impoundments for the purpose of implementing standards. Additionally, emissions from these sources may vary because of changes in meteorological conditions (e.g., windspeed, temperature, etc.), changes in processes, as from the intermittent (batch) generation of wastes, and small changes in operating conditions of the source such as throughput and residence time. Although several commenters suggested a change in the format of the proposed standard to an emission limit, none of them offered any suggestions on how these practical difficulties could be overcome and EPA still believes that the reasons for choosing a combination of formats are valid. Consequently, a combination of formats has been retained in the final rule.

d. Dilution

To avoid situations where an owner or operator would dilute or mix waste streams to reduce the benzene concentration below the 10 ppmw cutoff level, the proposed standards included an equation for calculating a concentration limit that must be met when multiple waste streams are combined before treatment. Several commenters stated that the equation is unwieldy and unusable in many situations because of the large number of waste streams that must be considered and the many different ways in which waste streams are combined for transfer or treatment. The EPA agrees that using the dilution equation could be difficult in many situations and has deleted it from the final rule. The final rule allows the combination of individual waste streams to facilitate treatment in a centralized treatment process unit but prohibits the use of dilution or mixing of waste streams for the sole purpose of reducing the benzene concentration.

While the final rule allows the combination of waste streams for the purpose of centralized treatment, EPA recognizes that this allowance could result in emissions and risks higher than intended in certain cases when many large volume waste streams that contain levels of benzene above and below 10 ppmw are mixed. This situation could occur if an owner or operator chooses to reduce the benzene content of process wastewater streams through treatment that occurs in a facility's wastewater treatment system rather than segregate streams with greater than 10 ppmw benzene for separate treatment. The wastewater treatment system at some facilities, such as at petroleum refineries, manages large quantities of wastewater made up of a mixture of waste streams having benzene concentrations above and below 10 ppmw. The mixed stream may go through several management steps leading to a biological treatment unit. Due to the large volume of wastes handled, benzene emissions could be substantial even though the benzene concentration in the mixed waste is below 10 ppmw. The dilution equation in the proposed rule would have required an appropriate level of control in these situations by establishing a treatment limit below 10 ppmw for the mixed stream. With the dilution equation deleted in the final rule, some other provision is needed to ensure the streams are treated to an appropriate level. Therefore, a provision has been added to the final rule that applies specifically to those situations where an owner or operator chooses to use an existing wastewater treatment system to meet the treatment requirements of the rule. In these situations, the final rule requires the facility to apply controls to all wastewater treatment units up to the point where the benzene concentration is below 10 ppmw and one of the following occurs: (1) The total annual quantity of benzene in the process wastewater for the facility is reduced below 1 megagram; or (2) the waste has reached the biological treatment unit. Biological treatment units would need to be controlled only if the benzene concentration of the waste entering the unit is 10 ppmw or greater. These units routinely remove up to 80 percent of the organics in dilute waste streams and thus would not be required to meet the 1 megagram per year limit if the concentration entering the unit is less than 10 ppmw.

e. Point of Generation

In the determination of benzene concentration of a waste stream for the purpose of calculating annual quantities of benzene in waste or to identify waste streams that are exempt from the control requirements of the standards, EPA has specified that the determination be made at the point of generation of the waste stream. The point of generation was described as the point at which the waste leaves the device or process that generates it or the point at which it enters the first downstream waste management unit if there has been no exposure to the atmosphere. The point of generation was selected as the most appropriate location for making a determination of the benzene content. The goal of the benzene waste regulation is to protect public health from benzene emissions from waste management activities and, consequently, it is important to control all sources of benzene emissions along the flow path of a waste stream. By specifying controls for all waste management units and waste transfer activities from the point of generation, the potential for the release of benzene to the atmosphere is minimized. If benzene concentration determinations are made at a point further downstream, as requested by some commenters, significant amounts of benzene may already have been released to the atmosphere. This would be especially true if the waste stream has passed through any open waste transfer activities such as sewers or open waste management units such as surface impoundments or open tanks. Therefore, the point of generation has been retained in the final rule as the point at which waste stream benzene concentrations are determined.

As discussed under Interrelationships with Other Regulations there is one exception to the general definition of the point of generation. Benzene emissions from coke by-product recovery plants are currently regulated by subpart L of 40 CFR, part 61, which requires emission controls on some sources of benzene emissions at these facilties. For the purpose of implementing today's final rule, the point of generation at these facilities would be considered to be the point at which waste exits from the unit regulated by subpart L.

f. Compliance Deadline

Several commenters stated that it was unreasonable to require compliance with the standards within 90 days of the effective date (March 7, 1990). One commenter suggested that at least 180 days would be needed to design and install the controls required by the proposed standards. Another commenter suggested that up to three years be allowed.

Although the compliance deadline of the standards is 90 days after promulgation, under section 112 of the Clean Air Act the Administrator may grant a waiver of compliance for up to two years after the effective date, if he finds that this period is necessary for the installation of controls. The procedure for applying for this waiver of compliance is described in the general provisions of 40 CFR part 61. However, under the general provisions, each owner or operator must separately request a waiver of compliance. Considering the comments received and the controls required by the final standards, EPA believes that most facilities that must install controls will not be able to comply with the standards within 90 days of the effective date. Furthermore, due to the complexity of the controls required and the fact that many of the controls must be retrofit to existing units, EPA believes that up to two years may be required to design and install the controls. Given that most facilities will need up to two years to design and install the controls required by the standards, EPA has specifically allowed up to two years for compliance in the final standards, rather than require each owner or operator to separately request a waiver of compliance under the general provisions.

Control Technology

Comment: Several comments were received regarding the selection, technical feasibility, and cost of the control technologies required by the proposed rule for benzene waste operations. Commenters stated that there is insufficient flexibility in the treatment technologies available for use in the removal of benzene. The commenters recommended that the benzene waste rule establish performance levels instead of requiring specific treatment technologies. As an example, rather than specify three treatment technologies, the rule should allow any technology that achieves a mass emission reduction of 99 percent for benzene or attains the 10 ppmw benzene concentration criterion. In addition, commenters claim that the equivalency demonstration or petition process established in the proposed rule for alternative technologies (§ § 61.353 and 61.355) is duplicative, unnecessary, burdensome, and discourages the use of other treatment technologies capable of achieving the desired emission control. Commenters stated that use of control technologies required by other environmental regulations, as discussed in Interrelationships with Other Regulations, should be considered as acceptable alternatives to the technologies prescribed in the proposed rule. Also, waste disposed of in management units or processes, such as deep well injection, that have low benzene emission potential should be exempt from the requirements of the rule, accepted in the rule as equivalent alternative technologies, or, at a minimum, exempt from the "equivalence" procedures of § 61.342(b)(2) and § 61.353. With regard to technical feasibility, the proposed rule requires the use of TFE for benzene removal from sludges and steam stripping for benzene removal from watewaters. However, commenters contend that because of erosion problems, TFE may not be suitable for processing waste material with gritty solids, i.e., benzene sludges, and that alternative technologies to TFE (i.e., indirectly heated dryers or evaporators) may not be technically capable of removal efficiencies of 99 percent because of physical limitations. The technical feasibility of steam stripping of benzene containing wastewater was also questioned. Commenters stated that steam stripping has not been demonstrated as effective for removing benzene on very dilute streams with just over 10 ppmw of benzene. Commenters also claimed that wastewater at refineries contains significant quantities of dissolved solids, emulsified oil, and suspended solids and that these contaminants will foul a steam stripper and make it unusable. It was also pointed out by commenters that the container standard requires submerged fill loading and that this method of loading is incompatible with sludges and bulk solids. Commenters also had several concerns regarding the technical feasibility, cost, and operation of closed drain systems. Commenters stated that these systems pose a fire and explosion hazard. In addition, if the waste is "hard piped" from process units, spills would not have anywhere to drain, equipment such as pumps could not be drained to the sewer system prior to maintenance or repair, and there would be no practical way to determine that the water or hydrocarbon interface has been reached when draining water bottoms from a tank. Regarding the level of control required for drain systems, commenters stated that the proposed standards apply to facilities similar to those regulated under 40 CFR 60.692-2 (the NSPS for petroleum refinery wastewater), but require different standards (or control levels). The requirement that "individual drain systems shall not be open to the atmosphere and shall be covered or enclosed" should be clarified to explicitly state that "p-traps" and comparable vapor seals constitute a "cover" or "enclosure". Several commenters believe that standards consistent with the petroleum refinery wastewater NSPS regulations are adequate to control benzene emissions from drains and should be considered as an alternative technology.

Response: As previously discussed EPA's approach to controlling benzene emissions was based on identifying waste streams with significant emissions potential at the point of generation and piping these waste streams to a treatment device effective in removing or destroying the benzene in the waste. The EPA has reviewed the comments relating to control technologies and has revised the rule to allow greater flexibility in use of treatment technologies and emission control systems that achieve the desired emission reduction. The revisions to the rule are also intended to reduce the burden imposed on facility owners or operators that elect to use alternative or equivalent control systems. In short, the final rule makes it easier to use other technologies that EPA believes will reduce benzene emissions to the needed levels. Responses to specific comments on control technology issues are presented below.

a. Feasibility of Selected Technologies

In the proposed regulation, EPA was seeking to insure that emissions are reduced to a level that is protective of public health. The EPA specified three technologies (i.e., steam stripping, TFE, and incineration) as acceptable because they have been demonstrated to be effective in treating benzene containing wastes (i.e., they can effectively remove or destroy the benzene to the levels required by the standards). As an alternative, EPA allowed owners or operators to use other control technologies if they could demonstrate a mass emission reduction of at least 99 percent, a level that the risk analyses indicated is protective of public health.

The EPA agrees with the comment that TFE may not be suitable for processing some benzene waste sludges containing gritty solids. The EPA does not agree that there are no alternative technologies capable of reducing benzene concentrations to less than 10 ppmw or achieving removal efficiencies of 99 percent. Commenters only discussed indirect dryers or evaporators as an alternative to TFE and the physical limitations of these devices that may inhibit achieving removal efficiencies of 99 percent. However, the owner or operator may elect to install and operate a waste incinerator rather than a TFE to treat benzene containing waste sludges with solids. In addition, solvent extraction processes have been determined as a viable alternative to TFE for treatment of sludges. As part of the LDR, EPA evaluated the effectiveness of removing specific waste constituents from a variety of hazardous waste forms and concluded that solvent extraction and incineration were BDAT for removal of benzene in various hazardous wastes (e.g., K048 nonwastewater (53 FR 31161)). Therefore, EPA maintains that technologies are demonstrated and available for treating benzene waste sludges containing solids; these technologies can be utilized efficiently and effectively as alternative technologies to TFE under the final benzene waste operations rule.

Several commenters questioned the technical feasibility of steam stripping wastewaters that contain dilute concentrations of benzene (just over 10 ppmw), emulsified oil, and solids. Steam stripper test data collected by EPA show that dilute concentrations of benzene are easily stripped, even when the wastewater contains solids and high levels of other organics. Benzene is highly volatile in water and is easily removed by steam stripping. The steam stripper design that was used as the cost basis included a large storage tank with a long residence time that would permit the removal of any solids that settle out or the decanting of any separate organic or oil phase layer that might form. In addition, some steam strippers are routinely designed with an oil-water separator prior to the stripping column; others include methods for solids removal prior to steam stripping. Removal of any separate oil or solid phase in the wastewater prior to the stripper will improve performance and minimize maintenance problems. Also, steam stripping is commonly and successfully used to treat sour condensate, a wastewater at refineries, without encountering fouling problems. The EPA therefore has concluded that steam stripping is technically feasible for treatment of benzene containing waste streams such as wastewaters.

b. Alternative Treatment Technologies

A major concern of the commenters regarding the proposed alternative treatment standard (§ 61.342(b)(2)) was the requirement for formal rulemaking under § 61.353. As proposed, owners or operators wishing to use technologies other than the three specified in the rule for waste treatment would have had to demonstrate to the Administrator that the alternative means achieves equivalent emission reductions. The Administrator would then publish in the Federal Register a notice permitting the use of the alternative means of emission limitation, only after notice (of intent) and an opportunity for a hearing. This process is quite time consuming and could lead to substantial delays in applying controls. The commenters suggested several alternatives that should be accepted as equivalent controls without the need for conducting a performance test or formally applying for an equivalency determination by EPA. The commenters recommended that the rule allow use of any treatment technology that would perform as well as steam stripping in reducing benzene concentrations below 10 ppmw or achieve a removal efficiency of 99 percent for benzene in the waste stream, without the public hearing requirements and without the prior approval of EPA as was proposed under § 61.353.

The EPA considered these comments and concluded that the demonstration and notice requirements associated with the use of alternative treatment technologies may not be necessary to ensure benzene emissions are adequately controlled. Alternative treatment devices in many cases may provide the same degree of control of benzene emissions and the formal equivalency procedures required for use of alternative technologies under § 61.353, Alternative Means of Emission Limitation, would be burdensome to both industry and EPA. Therefore, in an effort to (1) reduce the burden imposed by requiring alternative treatment determinations to go through formal equivalence procedures prior to use, and (2) provide greater flexibility and encourage innovation that might lead to more efficient and costeffective methods of controlling emissions from benzene-containing wastes, EPA has revised the regulation regarding approaches for meeting the treatment requirements of the benzene waste standards. These changes are described below.

Revisions to the proposed rule would allow facilities to use any other available treatment technologies to reduce the benzene concentration of an affected waste stream to a level below 10 ppmw (without the aid of dilution). Furthermore, those provisions of the proposed rule that require the owner or operator to demonstrate that the alternative control device or treatment process achieves a mass emission reduction of 99 percent and requiring a formal equivalency demonstration, which is subject to a formal public hearing, were deleted. Under the final rule, the owner or operator has the option of demonstrating that any treatment process reduces the benzene concentration of the waste to less than 10 ppmw or achieves an overall benzene destruction or removal efficiency of 99 percent or greater.

Owners or operators of affected facilities that choose to use their wastewater treatment system to treat benzene containing wastes must not only meet the concentration requirement but must also comply with a limit on the total annual quantity of benzene in the waste in order to handle the waste in uncontrolled units in the overall wastewater treatment system. A discussion of the requirements for wastewater treatment systems is presented in the Selection of Standards section.

In § 61.342(b)(2) of the proposed rule, alternative treatment processes were required to demonstrate a mass emission reduction of 99 percent for benzene in the waste stream. Upon further consideration, EPA has concluded that formatting the performance requirement in terms of a percent emission reduction is inappropriate for units treating a benzene containing waste. The goal of treatment is to reduce the benzene concentration of the waste and thereby reduce the benzene emission potential of the waste. Therefore, in the final rule, treatment technologies may demonstrate a 99 percent removal efficiency for benzene in the waste as an alternative to meeting the concentration criteria. Formatting the performance requirement in terms of a removal or destruction efficiency rather than an emission reduction also avoids problems associated with interpretation and demonstration of an "emission reduction." The term emission reduction implies that a baseline or uncontrolled level of emissions first must be determined and, as a requirement of the benzene waste operations rule, these emissions would be controlled or reduced. Determination of the percent emission reduction achieved by treating a waste with an alternative treatment device would be complex and unnecessarily burdensome; this was not EPA's intent. Therefore, the requirement for alternative treatment devices, not meeting the concentration criteria, is stated in terms of a removal efficiency for benzene in the waste.

In summary the requirements for treatment technologies in the final rule no longer require formal rulemaking; the Federal Register notice and public hearing requirement for approval of alternative treatment technologies has been removed. A demonstration of the effectiveness of the treatment technology is still required in some cases; however, the demonstration does not necessarily include a performance test. Engineering calculations or adequately documented knowledge of the treatment process are allowed by the final rule for the demonstration of benzene removal or destruction efficiency.

c. Equivalent Control Systems

The revisions to the standards also specifically include allowance of certain control systems or treatment technologies as equivalent to those listed in the proposed standards. The equivalent control systems were selected on the basis that EPA believes these technologies are fully capable of reducing the emission potential of the waste to levels that meet or exceed the treatment levels required by the final rule and as a result are considered protective of public health.

(1) Treatment Technologies

Wastes treated with an equivalent control system would be considered in compliance with the 10 ppmw waste concentration requirement in § 61.348 (i.e., Standards: Treatment Processes) and the unit would be exempt from the 99 percent benzene removal requirement of § 61.342(b)(2). Among the treatment and disposal technologies that are accepted as equivalent are deep well injection, the "Best Demonstrated Available Technologies" used to comply with the LDR for benzene containing waste in 40 CFR part 268, and waste combustion devices (such as an incinerator or cement kiln) that are subject to and operating in compliance with the standards for hazardous waste burned in boilers and industrial furnaces in 40 CFR part 266, subpart D. These treatment technologies are discussed in more detail below.

The EPA agrees with the comment that there is no need to require incineration or steam stripping of a waste that is being disposed of by deep well injection, since there will be little or no ambient air emissions of benzene from waste that is injected into a deep well. Therefore, benzene-containing wastes that are injected into deep wells are specifically exempted in the final rule from the treatment requirements. However, should the benzene concentration of the waste stream at the point of generation exceed 10 ppmw, waste management units located upstream of deep well injection would be required to meet applicable control requirements.

In allowing the exemption for deep well injection EPA is not suggesting that deep well injection is in all cases an appropriate disposal method for benzene containing wastes. Deep well injection should only be utilized to dispose of benzene containing waste (or any other waste) to the extent it is allowed under applicable statutory or regulatory authority specific to the waste. The conclusion reached herein is that once a benzene containing waste is disposed of by deep well injection it has little or no emission potential and at this point does not present a public health risk as a result of benzene emissions to the ambient air.

The LDR, developed under section 3004(m) of HSWA to RCRA, require that hazardous waste be treated to reduce concentrations of specific chemicals or hazardous properties to certain performance levels or by certain methods before the waste may be disposed of on land. Because LDR BDAT treatment standards are capable of reducing the concentration of benzene in a waste to less than 10 ppmw, EPA has revised the benzene waste operations rule such that treatment units used to comply with LDR treatment standards prescribed by EPA in 40 CFR part 268 for the treatment of benzene containing hazardous wastes are considered equivalent control systems. As equivalent control systems, wastes treated by these technologies to meet benzene-specific LDR treatment standards, expressed as either a concentration limit or a specified technology, would be considered in compliance with the 10 ppmw waste concentration requirement, a level that has been determined to be protective of public health, and these units would be exempt from the 99 percent emission reduction requirement. Nonetheless, if any of the BDAT technologies applicable under LDR for treatment of benzene containing hazardous wastes are used, waste with a benzene concentration exceeding 10 ppmw prior to treatment must be managed in units that comply with the benzene waste operations rule and the LDR treatment process itself must be controlled for air emissions to achieve a minimum 95 percent reduction in total organic emissions.

Similarly, wastes treated to comply with the FWPCA effluent guideline limits for benzene are considered to have a low potential for emission of benzene to the ambient air; therefore in the final rule, wastes discharged from these units are exempt from the benzene waste operation rule. However, if the benzene concentration of the waste stream prior to treatment required under the FWPCA exceeds 10 ppmw, waste management units located upstream of the treatment process as well as the treatment process itself would be required to meet the control requirements of the benzene waste operations rule. As is the case with LDR BDAT technologies, treatment units used to comply with the FWPCA effluent guideline limits for benzene must be controlled for air emissions to achieve a minimum 95 percent reduction in total organic emissions.

A performance test, using the procedures specified in § 61.355, was not required at proposal for waste incinerators subject to and operated in compliance with 40 CFR part 264, subpart O. This provision has been retained in the final rule. In addition, waste combustion units subject to and operated in compliance with the standards for hazardous waste burned in boilers and industrial furnaces proposed (May 6, 1987 (52 FR 16982) and October 26, 1989 (54 FR 43718)) in 40 CFR part 266, subpart D, and issued a final RCRA permit under 40 CFR part 270 that incorporates the requirements of the boiler and furnace standards are considered to comply with § 61.348 of the final benzene waste operations rule. Thus, no additional demonstration is required for these units. Waste incinerators, boilers and industrial furnaces that do not have a RCRA permit will be required to demonstrate a 99 percent destruction efficiency for benzene. However, a performance test is not specifically required; engineering calculations are also allowed as the basis of the demonstration of destruction efficiency.

(2) Drain Systems

Commenters concerns regarding the technical feasibility, cost, and operation of closed drain systems appear to be based on a misunderstanding of the proposed rule. Further clarification of the basis of the drain system standards is therefore needed. The use of a central steam stripper or other treatment device prior to discharge of the waste to the sewer system was considered the technical basis for the standards. The cost and emission reduction analysis is based on the waste streams requiring control being segregated and piped to the treatment device. As an alternative to waste treatment prior to discharge, the facility may choose to enclose the existing sewer system and not segregate the wastes prior to treatment. The waste stream (i.e., the combined flow) would then be treated to meet the concentration cutoff or performance criteria. However, this alternative approach is, as the commenters observed, more costly; and as a res[illegible] many plants are not likely to enclose entire sewer systems.

Several commenters felt that the requirements under 40 CFR 60.692-2, subpart QQQ, are adequate to control individual drain systems and should be considered as an alternative to the completely closed system required by the proposed standards. The EPA considered these comments, conducted a number of analyses to evaluate and compare the two control methods, and concluded that the control level achieved under the NSPS for petroleum refinery wastewater with some modifications to the requirements would be equivalent to the level that would be achieved by a completely closed system. Therefore, the standard for individual drain systems in the final rule allows the alternative use of water seals for drains and vents on covers applied to junction boxes as specified in 40 CFR 60.692-2. The EPA has concluded, as a result of analyses performed since proposal, that these controls are equivalent to completely closed drain systems if, under the alternative approach, the junction boxes are isolated such that no air flow occurs through the sewer system and out the junction boxes during normal operation or the junction boxes are vented to a control device. The EPA believes this "no flow" (or emission) requirement can be achieved by use of water seals to isolate the junction boxes or by use of a 95 percent efficient control device, such as a carbon adsorber, on the vent stack of the junction box. This change to the individual drain system requirements makes the benzene waste standards, with the exception of the isolated vent requirement, consistent with the level of control required for the NSPS for petroleum refinery wastewater which may apply to some portions of facilities regulated under § 61.348.

With regard to commenters safety concerns relating to closed drain systems, it should be pointed out that EPA is not requiring the use of such systems. However, closed drain systems, as the commenter notes, are in use although not in widespread use; and the owner or operator has the option of using this type of system to the extent that it can be utilized safely under circumstances particular to the facility. With most commenters recommending that EPA promulgate benzene waste standards for drains consistent with the NSPS regulations, EPA believes that the concerns regarding closed drain systems have been adequately addressed.

(3) Container Controls

With regard to comments on the container standard requirement for submerged fill loading of waste into containers, EPA agrees with the commenters that this method of loading is incompatible for some waste forms (e.g., sludges and solid wastes). Therefore, the final rule includes a clarification that the requirement for submerged fill loading of containers applies only to "pumpable" wastes. Other wastes (i.e., nonpumpable wastes) must be loaded into containers using appropriate good engineering practices to minimize benzene air emissions.

d. Cost of Control

There were two general areas where commenters felt that control costs presented at proposal did not accurately reflect the true cost of achieving the control levels required to comply with the benzene waste standard. Commenters indicated that the steam stripper model unit cost estimates were too low and that the cost of meeting the individual drain system requirements were underestimated because the cost of enclosing sewer systems was not considered.

As a result of comments on steam stripping cost estimates, EPA has revised the model unit steam stripping cost analysis. Changes in the analysis since proposal include a modification to the stripper design assumed for the purpose of developing costs. In the original design, steam requirements were estimated on removal of semi-volatile organics at a high efficiency. This resulted in an overestimate of operating costs because benzene is highly volatile in water and is more readily stripped from the wastewater than a semivolatile organic. An additional component for piping costs was also added to the steam stripper model unit costs to more accurately reflect the cost of transporting the waste to be treated from the process area to the steam stripper unit. This cost estimate was based on installing 5000 feet of piping for waste transfer (as opposed to enclosing existing sewer systems). The changes made to the steam stripper cost analysis since proposal have had the overall impact of increasing the model unit capital costs (because of the additional piping) and decreasing the total annual cost (a result of the reduction in steam requirements). The revised steam stripper costs are based on a design presented in the EPA document "Industrial Wastewater Volatile Organic Compound Emissions-Background Information for BACT/LAER Determinations," for highly volatile compounds like benzene.

With regard to the cost of meeting the individual drain system requirements, the cost of enclosing the entire sewer system was not included in the cost estimates because this action is not a requirement of the benzene waste rule. As pointed out in the discussion on equivalent control systems, enclosing sewer systems is an alternative approach to control of drain systems; it is not the technical basis for the standards. Therefore, costs for this alternative were not presented as an impact of the benzene waste rule.

After incorporating the above changes in model unit costs, and using the revised data base discussed in Data Base and Emission Modeling, the total capital cost of the final rule is estimated to be approximately $250 million and the total annual cost is estimated at about $87 million. These costs are higher than the $65 million capital cost and the $39 million annual cost estimated at proposal. The primary reason for the increase in cost is the estimated higher quantity of waste to be treated than was estimated at proposal. The increase in the steam stripper model unit capital cost discussed above also contributed to the increase in the capital cost since proposal. The decrease in the steam stripper unit annual cost only partially offset the increase in annual cost due to the increase in waste quantity treated.

Monitoring, Recordkeeping, and Reporting

Comment: Numerous commenters considered the monitoring, reporting, and recordkeeping requirements of the proposed standards to be unnecessarily burdensome. Comments on the monitoring requirements of the regulation focused on the extent of waste sampling required to qualify for an exemption from the control requirements of the standards. The commenters maintained that instead of the few waste streams per facility assumed by EPA in their burden estimates, many facilities subject to the regulation would have thousands of waste streams, each of which would have to be sampled to show that the stream would qualify for an exemption. The costs of this sampling would be unnecessarily burdensome. Commenters suggested that methods other than waste sampling (e.g. knowledge of the waste or process generating the waste) should be allowed to demonstrate compliance with the rule. In addition, regarding the monitoring requirements for control and treatment devices, several commenters submitted that the requirements should be made compatible with those in existing regulations. With respect to the recordkeeping and reporting requirements, commenters objected that many facilities that would not be required to install controls would still incur costs for recordkeeping and reporting. Several commenters maintained that continued reporting and recordkeeping after demonstrating initial compliance or exemption should not be required.

Response: Commenters particularly objected to the monitoring, recordkeeping, and reporting required to qualify for an exemption from the control requirements of the proposed standards. At proposal, a facility could qualify for an exemption if the total annual quantity of waste containing benzene generated or managed at the facility was less than 10 megagrams per year or if the total annual quantity of benzene in the waste managed at the facility was less than 10 megagrams per year. Where the total annual quantity of benzene in the waste at a facility was 10 megagrams per year or more, a waste stream could qualify for an exemption from the control requirements if the waste stream had a benzene concentration less than 10 ppmw.

To make each of the determinations required for the facility or waste stream exemptions, waste sampling and analysis by specified test methods were required by the proposed standards. For facilities handling less than 10 megagrams per year of waste containing benzene and facilities handling less than 1 megagrams per year of benzene in the waste, an initial determination was required with the records to be retained for as long as the waste was generated. No further determinations were required for facilities handling less than 1 megagrams per year of benzene in the waste unless a change occurred that could cause an increase in the total annual quantity of benzene in the waste. For facilities handling between 1 megagrams per year and 10 megagrams per year of benzene in the waste determinations were to be repeated on a monthly basis for one year, then on a semiannual basis if the monthly determinations showed the facility to be consistently below 10 megagrams per year. Records of the determinations were required to be retained for 2 years and initial and quarterly certifications of all inspections and determinations also were required. For facilities handling a total annual quantity of benzene in the waste of 10 megagrams per year, a determination that an individual waste stream had a benzene concentration of less than 10 ppmw was required initially and monthly for one year. The determination frequency could be reduced to a semiannual basis after a year if the test results showed a benzene concentration consistently below 10 ppmw for 12 consecutive sampling periods in accordance with a t-test procedure on each individual waste stream. Two year retention of records and also initial and quarterly certification were required.

The commenters submitted that the treatment device and control device monitoring requirements were inconsistent with existing regulations, including the performance testing of waste incinerators that do not comply with the requirements of subpart O of part 264, the determination of the benzene concentration in treated waste, and the detectable emissions monitoring of closed-vent systems. As proposed, for waste incinerators not complying with the requirements of subpart O of part 264, the owner or operator was required to conduct a performance test initially, and at other times as requested by the Administrator. Also, daily waste sampling and analysis was required to determine the benzene concentration in treated waste. In lieu of measuring the benzene concentration in treated waste, the owner or operator was allowed to demonstrate compliance by monitoring an operational or process parameter (or parameters) on the treatment process that was indicative of proper system operation and thus a benzene concentration less than 10 ppmw in the exit stream from the treatment process. With respect to control devices, the proposed standards required quarterly detectable emissions monitoring of closed-vent systems.

The proposed standards required waste sampling and analysis for waste determinations because this approach would provide the clearest, most definite indication to EPA and the facility of whether controls were required by the standards. The standard test methods would also provide uniform means for documenting the results. The purpose of the recordkeeping and reporting requirements was to confirm to EPA that the facility is complying with the provisions of the standard. The reports would also serve to alert EPA offices of situations that might present potential compliance problems.

Changes that have been made to the standards in response to other comments will reduce the burden of the monitoring, reporting, and recordkeeping requirements of the rule. Also, upon reconsideration, EPA has made specific changes to the monitoring, reporting, and recordkeeping requirements that will reduce the impact of the rule on affected facilities but will still provide sufficient information to determine initial and continued compliance with the rule. These are discussed below.

a. Facility Applicability

The overall monitoring, recordkeeping, and reporting burden of the standards will be reduced by revisions to the industry and facility applicability criteria. These revisions, which were made in response to comments on the applicability of the standards, are discussed earlier in the Regulatory Scope section. The revisions include specifying the industries covered and basing the 10 megagrams per year benzene facility applicability threshold on wastes that contain greater than 10 percent water. In-process recycle, segregated storm water streams, and gases and vapors emitted from process fluids are specifically excluded from the facility applicability determination. To avoid double counting of benzene, oils and sludges recovered from wastes after the point of generation as well as any other stream that could lead to double counting are also excluded from this determination.

The EPA has considered the comments regarding the amount of waste sampling required to qualify for an exemption from control requirements and agrees with the commenters that waste sampling is not needed in all cases to demonstrate that the amount of benzene generated or managed at a facility is less than the facility exemption level of 10 megagrams per year. There are situations where the owner or operator's knowledge of the waste could be used as the basis for an exemption, provided supporting documentation is maintained. For example purchase, production, and inventory records or records of the quantity of benzene waste generated could be used to show that a facility handles less than 10 megagrams per year of benzene. Consequently, EPA revised the proposed standards to allow the use of knowledge of the waste as a means of demonstrating that a facility qualifies for an exemption from the control requirements of the standards. This change will reduce and in some cases eliminate the expense related to waste stream sampling. However, in cases where knowledge of the waste does not provide conclusive proof that a facility is below the cutoff level, waste sampling may be required.

In the proposed standards, a facility generating or managing less than 10 megagrams per year of waste that contains benzene was exempt from the control requirement of the regulation. This exemption was included to provide an easily determined exemption for facilities handling small quantities of benzene containing wastes without the need to calculate the total quantity of benzene in waste. In the final rule, knowledge of the waste is allowed as a means of determining the quantities of both waste and benzene in waste managed at a facility. Because of this revision, a demonstration that a facility manages less than 10 megagrams per year of benzene-containing waste can be made without waste testing as required in the proposed rule. This demonstration will also serve to demonstrate that the amount of benzene in the waste managed is less than 10 megagrams per year. As a result, EPA concluded that the specific exemption provision based on 10 megagrams per year of total benzene-containing waste in the proposal is not needed in the final rule. Therefore, for the sake of simplifying the language in the final rule the exemption was eliminated.

In another revision that will reduce the monitoring and recordkeeping requirements, a facility that is exempt because of generating or managing less than 1 megagrams per year of benzene in the waste must only do a redetermination if a process change occurs that could cause annual benzene throughput to exceed 1 megagram per year. This change will reduce the burden for a facility that experiences small fluctuations in the annual quantity of benzene in the waste handled.

Finally, a facility that generates or manages between 1 and 10 megagrams per year of benzene in the waste must do only an annual recertification (in the form of an annual report on the regulatory status of each benzene-containing waste stream) rather than quarterly that the benzene throughput has not exceeded 10 megagrams per year. This change was made to reduce the reporting burden of the standards. However, it should be noted that an exempt facility that becomes subject to the control requirements because of increased quantities of benzene waste managed must be in compliance when the benzene throughput increases.

b. Waste Stream Applicability

As discussed above for the industry and facility applicability criteria, the overall monitoring, recordkeeping, and reporting burden of the standards will be reduced by revisions to the waste stream applicability criteria. These revisions include allowing knowledge in place of sampling, basing the 10 ppmw waste stream concentration on an annual average, and adding a low flow cutoff.

Again, as is the case for the facility exemption, EPA agrees with the commenters that waste sampling is not needed in all cases to demonstrate that the benzene content of a particular waste stream is less than the waste stream exemption level of 10 ppmw. There are situations where the owner or operator's knowledge of the waste could be used as the basis for an exemption. To qualify for the 10 ppmw benzene waste stream concentration exemption, a facility might use mass balance calculations, information documenting that the waste is identical to another waste at the same facility that has previously been demonstrated by direct measurement to have a benzene content less than 10 ppmw, or prior analytical results on the waste stream where it can be documented that no process changes that could affect the waste benzene concentration have occurred since that analysis. Therefore, the proposed standard has been revised to allow the use of knowledge of the waste as a means of demonstrating that a waste stream qualifies for an exemption from the control requirements of the standard, thereby reducing and in some cases eliminating the expense related to waste stream sampling. However if knowledge is used, the owner or operator must also provide an estimate of the variability of the benzene concentration of the waste stream as part of the demonstration that the annual average benzene concentration is less than 10 ppmw. This will allow enforcement personnel to assess whether a waste stream is out of compliance based on the measurement results from samples collected during a compliance inspection, rather than requiring the facility to sample the waste stream over the period of a year.

In the proposed standards, an owner or operator seeking an exemption from control for a waste stream on the basis that it contained less than 10 ppmw of benzene was required to report the results of waste determinations initially and quarterly. The final standards require a report on the regulatory status of each waste stream that contains benzene, including the basis of any waste stream control exemptions claimed. The owners or operators of all facilities subject to the final rule must submit this report initially. The owners or operators of facilities that manage 1 megagram per year or more of benzene must update and resubmit this report annually. This means that facilities that seek an exemption from control for waste streams based on the 10 ppmw criterion will be required to submit fewer reports than were required under the proposed rule. However, the reports must identify the regulatory status of all benzene-containing waste streams at each facility, rather than only those not being controlled.

In addition, as discussed in the Regulatory Scope section of this preamble, because of changes to the standards making the 10 ppmw determination an annual average and allowing the use of knowledge, the t-test requirement for the waste sampling results has been dropped. This change is expected to substantially reduce the monitoring and recordkeeping burden for a facility.

c. Control/Treatment Devices

Commenters submitted that the performance testing requirements for incinerators under § 61.355(p) are duplicative of requirements under 40 CFR parts 264 and 266 of RCRA. As proposed, performance testing of waste incinerators would only be required for incinerators not subject to or not complying with subpart 0 of 40 CFR part 264. Therefore, the proposed performance testing requirements were not duplicative of requirements under part 264 for hazardous waste incinerators, including boilers or industrial furnaces which the owner or operator has elected to be regulated under subpart 0. However, EPA agrees that the proposed requirements for boilers and industrial furnaces under subpart D of part 266 also will be sufficient to demonstrate compliance with the destruction efficiency specified by the benzene waste requirements. Furthermore, to reduce the monitoring burden of the standards, engineering calculations documenting destruction efficiency will be allowed instead of performance testing to demonstrate that treatment devices meet the requirements of the standards. Therefore the standards have been revised so that certification of performance will not be required of boilers and industrial furnaces with final permits issued under the proposed revisions to subpart D of part 266. However until the revisions to subpart D are promulgated, owners and operators of boilers or industrial furnaces used to incinerate benzene-containing hazardous waste must either be permitted under the requirements of subpart 0 or demonstrate compliance with the benzene waste requirements through engineering calculations or a performance test.

According to commenters, the proposed monitoring requirements for treatment devices are inconsistent with the monitoring and testing requirements under the LDR prescribed pursuant to section 3004(m) of RCRA. As discussed in the Control Technology section, EPA agrees that the benzene waste requirements should be consistent with the LDR treatment standards. Therefore, under the final standards, wastes that meet the LDR treatment standards are assumed to be in compliance with the final benzene waste rule. Furthermore, in a revision to reduce the monitoring and recordkeeping burden of the standards, for facilities that choose to measure the benzene concentration in the treated waste, monthly rather than daily benzene concentration measurements will be required.

Regarding the proposed control device monitoring requirements, commenters noted that the method 21 detectable emissions monitoring requirements for closed-vent systems should be consistent with the requirements of the NESHAP for benzene equipment leaks (40 CFR part 61, subpart V). As proposed, quarterly method 21 detectable emissions monitoring was required; subpart V requires annual method 21 detectable emissions monitoring. The EPA agrees that since the same control device could be used to comply wth both subparts, the detectable emissions monitoring requirements should be consistent. The EPA could see no reason why more frequent monitoring would further reduce emissions from the systems and having different requirements for different standards could increase the potential for confusion over the standards and complicate enforcement. Therefore, the promulgated standards have been revised to require annual method 21 detectable emissions monitoring of closed-vent systems.

5. Gasoline Marketing System

Comment: Several commenters thought that the decision to propose NESHAP for the gasoline marketing source categories was inconsistent with decisions on other benzene source categories. These commenters recommended that EPA reevaluate the need for control for these source categories considering that the risks were much lower than EPA's presumptive benchmark and lower than the risk remaining after application of controls for other benzene source categories. The commenters concluded that EPA inappropriately considered VOC cocontrol benefits in the gasoline marketing decisions.

Response: As discussed earlier in this notice, EPA has reexamined the decisions for the gasoline marketing system source categories. The EPA concluded from this reexamination that, based on the final NESHAP policy, it is unnecessary to establish a NESHAP for any of these source categories in order to protect public health with an ample margin of safety. Consequently, EPA is withdrawing the proposed standards for the gasoline marketing source categories. The bases for these decisions are presented in detail below.

Decision on Acceptable Risk. The baseline MIR is estimated to be 5×10^{-5} for bulk gasoline terminals; 1×10^{-5} for bulk gasoline plants and 5×10^{-6} for service stations. These baseline MIR are below the presumptive benchmark of approximately 1×10^{-4} and are judged to be acceptable after considering several factors.

First, although the emission and risk estimates were derived using an average benzene concentration in gasoline (1.47 percent), the possible range in benzene concentrations in gasoline is such that it is extremely unlikely that the MIR would exceed the benchmark of approximately 1×10^{-4}. Second, these estimates of MIR reflect consideration of typical groupings of bulk terminals, bulk plants, and service stations. The MIR estimates are viewed as providing reasonable worst-case analysis estimates. It is unlikely that the MIR would be significantly affected by additional colocation of facilities.

The nationwide incidence of cancer from exposure to emissions from these sources is estimated to be about 0.1 case/year for bulk terminals, about 0.05 case/year for bulk plants, and about 0.1 case/year for service stations. These estimates were calculated based on modeled average ambient concentrations and conditions for model areas which were projected to a nationwide total. Thus, EPA could not calculate meaningful estimates of the number of people and the incidence at different risk levels.

The EPA also considered the noncancer health effects associated with benzene exposure at levels comparable to baseline MIR. Noncancer health effects are not expected because the modeled exposures are at least three orders of magnitude lower than benzene exposure levels reported to produce noncancer health effects in animals. More importantly, these exposures are below the inhalation Reference Dose (RfD) currently under discussion within EPA. (The RfD is an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily exposure to the human population (including sensitive subgroups) that is likely to be without appreciable risk of noncancer health effects during a lifetime.)

After considering all these factors, EPA concluded that the baseline emission levels for each of the gasoline marketing source categories are acceptable.

Decision on Ample Margin of Safety: For each of the source categories, EPA considered several control levels more stringent than the baseline level. Table E-4 in the proposal notice (September 14, 1989; 53 FR 38109-38110) presented a summary of the estimates of the control cost and emission reduction. This information was used with the exception that for service stations, the Alternative 1 cost was revised upward from $20 to $49 million/year. (The control cost of Alternative 1 was revised after considering public comments. The basis for the revised cost estimate is contained in the docket.) In evaluating the alternatives for each source category, EPA considered these estimates and the quantitative estimates of the benzene risks as well as technical feasibility, economic impacts, and qualitative information on risk distributions. Specific considerations in the qualitative assessments of benzene risks for these categories were the number of facilities, the proximity of facilities to residential areas and the potential population at risk levels greater than 10^{-6} and estimates of the risk to the vast majority of the population. It was also recognized that judgments on the population at risk levels greater than 10^{-6} would be among the more uncertain parameters considered.

Bulk gasoline terminals: For bulk gasoline terminals, EPA considered three alternative control levels and concluded that existing emission levels provided an ample margin of safety based on the following considerations. Alternative 2 would reduce the MIR from approximately 5×10^{-5} to 1×10^{-5}. (Alterntive 1 was not considered because it achieved less emission reduction and cost more than Alternative 2.) These controls were also estimated to reduce the nationwide incidence by about 0.04 case/year, leaving an incidence of 0.08 case/year. The incidence and incidence reduction are relatively small considering the entire population of the country is exposed. While EPA was not able to estimate the population risk distribution, it is expected that the vast majority of the current exposure and risk reduction would occur in the population exposed to risks below 10^{-6}. This expectation is based on the magnitude of the MIR and typical rate of decrease in concentration with downwind distance from an emission source. Noncancer health effects are not expected at the exposures associated with the baseline MIR of 5×10^{-5}. This maximum exposure is about three orders of magnitude lower than the exposures reported to produce noncancer health effects in animals.

Alternative 2 would reduce emissions from baseline by about 60 percent, or reduce benzene emissions from 1,900 to 800 megagrams/year and VOC emissions from 303,000 to 132,000 megagrams/year. To achieve this emission reduction would cost about $48 million (in 1984 dollars) per year for application of controls at approximately 500 facilities. This cost is considered high relative to the small risk and incidence reductions achieved. The costs of Alternative 3 were also judged to be disproportionately high relative to the incidence and risk reduction achieved.

After considering all relevant quantitative and qualitative information on the health benefits, costs, and the uncertainties of the health benefits, EPA concluded that the existing emission level provides an ample margin of safety. In addition, since all new or modified facilities will have to meet the NSPS, emissions and risks from bulk terminals will be reduced over time. Therefore, EPA is withdrawing the proposed standard for bulk gasoline terminals.

Bulk gasoline plants: For bulk gasoline plants, EPA considered two alternative control levels and concluded that existing emission levels provided an ample margin of safety based on the following considerations. Alterative 1 would reduce the MIR from approximately 1×10^{-5} to approximately 2×10^{-6}. These controls were estimated to reduce the nationwide incidence by about 0.03 case/year, leaving an incidence of 0.02 case/year. Again, due to the small incidence and incidence reduction, it is expected that the vast majority of the population is exposed to risk below 10^{-6}.

Alternative 1 would reduce emissions from baseline by about 65 percent, or by 800 megagrams/year of benzene and 130,000 megagrams/year of VOC. To achieve this emission reduction would cost about $32 million/year (1984 dollars) from application of controls at about 11,000 facilities. These costs are considered high in relation to the small additional health benefits which would be achieved. The costs of Alternative 2 were also judged to be disproportionately high relative to the incidence and risk reduction achieved.

Based on consideration of all relevant qualitative and quantitative information on the health benefits of the controls, costs, and uncertainties of the health benefits. EPA decided that the existing emission level would protect the public health with an ample margin of safety. Therefore, EPA is withdrawing the proposed standard for bulk gasoline plants.

Service station storage vessels: For storage vessels at service stations, EPA considered two alternative levels and concluded that the public health is protected with an ample margin of safety at existing emission levels based on the following considerations. Alternative 1 would reduce the MIR from approximately 5×10^{-6} to approximately 2×10^{-7}. Although no estimates of population and incidence at different risk levels could be developed, Alternative 1 would ensure no one would be at risk greater than 1×10^{-6}. However, due to the decrease in concentration with distance from an emission source, it is expected that the vast majority of current exposures and the incidence reduction of 0.07 case/year would occur at risk levels below 10^{-6}. The incidence reduction and risk reduction are considered small. In addition, the maximum exposure at baseline is about four orders of magnitude lower than the exposures reported to produce noncancer health effects in animals. Thus, there are no health benefits expected from reduction of noncancer health effects.

Alternative 1 would reduce emissions from baseline by about 70 percent, or by about 1,200 megagrams/year benzene and 190,000 megagrams/year VOC. This emission reduction would cost about $49 million/year (1984 dollars) from installation of equipment at roughly 77,000 facilities. The EPA considers the cost of this emission reduction to be far in excess of what is acceptable in light of the small additional health benefits that would be achieved.

Alternative 2 would extend controls to an additional 200,000 facilities at a cost of $200 million/year. This control would reduce emissions an additional 6 percent and the incidence would be reduced by 0.008 case/year to 0.05 case/year. The cost of controlling these additional facilities was judged to be disproportionately high considering the very small additional emission and incidence reduction achieved.

Based on consideration of all relevant qualitative and quantitative information on the health benefits of the controls, costs, and uncertainties of the health benefits, EPA concluded that the public health is protected with an ample margin of safety at the existing level of emissions. Therefore, EPA is withdrawing the proposed standard for service stations.

V. Administrative Requirements

A. Paperwork Reduction Act

The information collection requirements contained in these rules have been approved by OMB under the provisions of the PRA, 44 U.S.C. 3501 *et seq.* and have been assigned OMB Control Numbers 2060–0182 and 2060–0183.

The public reporting burden for collection of information, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed and completing and reviewing the collection of information is estimated to average: (1) 291 hours annually per response for the benzene transfer operations source category and (2) 10 hours annually per response for the benzene waste operations source category.

No standards are being promulgated for benzene emissions from the chemical manufacturing process vents, industrial solvent use, and the gasoline marketing source categories. Therefore, there are no associated recordkeeping and reporting burdens. Send comments regarding the burden estimates or any other aspect of each collection of information, including suggestions for reducing these burdens, to Chief, Information Policy Branch (PM–223), U.S. Environmental Protection Agency, 401 M Street SW., 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."

B. Regulatory Flexibility Act

The Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*) requires EPA to consider potential impacts of regulations on small business "entities." If a preliminary analysis indicates that a regulation would have a significant economic impact on 20 percent or more of small entities, then an RFA must be prepared.

Present Regulatory Flexibility Act 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; and

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

1. Benzene Emissions from Chemical Manufacturing Process Vents

The source category of chemical manufacturing process vents is not being regulated. Therefore, there is no impact on these sources and an RFA is not required.

2. Benzene Transfer Operations

The source category of benzene transfer operations includes benzene production facilities and bulk terminals at which benzene is loaded into tank trucks, railcars, or marine vessels. Tank trucks, railcars, and marine vessels are included in SIC 44, 4742, 4212, 4213, and 4214. Because of the uncertainty concerning the actual cost distribution of tank trucks, railcars, and marine vessels, assessment of the likelihood of a significant economic impact on small entities is difficult. However, the entities involved in benzene transfer operations are expected to constitute less than 20 percent of all the small entities involved in SIC 44, 4742, 4212, 4213, and 4214. Therefore, since a substantial number of small entities are not being regulated, an RFA is not required.

In regard to benzene producers and bulk terminals, less than five percent of benzene storage facilities are owned by independent bulk storage terminal operators. The rest are owned by benzene producers and consumers which are generally large chemical companies. The standard exempts facilities with an annual throughput of less than 1.3 million gallons or those loading liquids with less than 70 weight-percent benzene. These exemptions allow facilities that only load benzene periodically throughout the year and those loading other products such as gasoline that are not predominately benzene to not be required to install additional control. The annualized capital costs for the smallest bulk terminal not exempted would only be $222/year. Volatility of benzene supply has lead to price swings as dramatic as that of $0.80 to $2.50 a gallon between 1986 and 1987 without significant changes in the quantity of benzene used. Therefore, the less than two percent anticipated increase in the cost of producing benzene is expected to be passed through as an increase in the price of benzene. Because the impacts are not expected to be significant, an RFA is not required.

3. Benzene Waste Operations

This source category includes chemical manufacturing plants, petroleum refineries, coke by-product recovery plants, and treatment, storage, and disposal facilities handling wastes from these three industries. The SBA's definition of small entities in SIC 28 (Chemicals and Allied Products) ranges from 500 to 1,000 employees as an upper bound for an entity to be considered small. Similarly, the upper bound for employees in SIC 29 (Petroleum Refining and Related Industries) is 1,500 employees. There are few small entities in these two industries. Therefore, it is very unlikely that the regulated facilities are owned by small entities. There is a cutoff for applicability of control requirements for sources generating small quantities of benzene waste measured as the total annual quantity of benzene in the waste. Facilities subject to the cutoff are required only to keep records and make reports to verify their exemption. Therefore, since a substantial number of small entities are not being regulated, an RFA is not required.

4. Industrial Solvent Use

The industrial solvent use source category includes benzene solvent use in the manufacture of rubber tires and pharmaceuticals. This source category is not being regulated. Therefore, an RFA is not required.

5. Gasoline Marketing System

This group of source categories includes bulk gasoline terminals, bulk plants, and gasoline service stations. These source categories are not being regulated. Therefore, no RFA is required.

Pursuant to the provisions of 5 U.S.C. 605(b), I hereby certify that these rules will not have a significant economic impact on a substantial number of small business entities.

C. Docket

The docket is an organized and complete file of all the information submitted to or otherwise considered by EPA in the development of this rulemaking. 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 statement of basis and purpose of the proposed and promulgated standards, and EPA responses to significant comments, the contents of the docket, except for interagency review materials, will serve as the record in case of judicial review (section 307(d)(7)(A)).

D. Executive Order 12291

Under Executive Order 12291, EPA is required to judge whether a regulation is a "major rule' and therefore subject to certain requirements of the Order. The EPA has determined that the regulations for benzene transfer operations and benzene waste operations source categories will result in none of the adverse economic effects set forth in Section 1 of the Order as grounds for finding a regulation to be a "major rule."

With regard to the regulations for benzene waste operations and benzene transfer operations, the nationwide annualized control costs per year are estimated to be $87 million and $30 million, respectively. These regulations are not major because: (1) Nationwide annual compliance costs are below the threshold of $100 million; (2) the regulations do not significantly increase prices or production costs; and (3) the regulations do not cause significant, adverse effects on domestic competition, employment, investment productivity, innovation, or competition in foreign markets.

The regulations presented in this notice were submitted to OMB for review as required by Executive Order 12291. Any written comments from OMB to EPA and any written EPA responses to those comments are included in the dockets listed at the beginning of today's notice under "Dockets." These dockets are available for public inspection at the EPA's Air Docket Section, which is listed in the **ADDRESSES** section of this preamble.

E. Miscellaneous

As prescribed by section 112 of the CAA, as amended, establishment of today's final national emission standards was preceded by the Administrator's listing of benzene as a hazardous air pollutant on June 8, 1977 (42 FR 29332).

In accordance with section 117 of the Act, publication of these actions on benzene was preceded by consultation with appropriate advisory committees, independent experts, and Federal departments and agencies to the maximum extent practical.

In addition to provisions regarding removal and remedial actions to clean up hazardous substance releases, CERCLA includes requirements for reporting releases of hazardous substances. Under section 103 of CERCLA, the person in charge of a facility or vessel must notify the National Response Center of releases of benzene in a reportable quantity of 10 pounds or more. Under CERCLA section 107, responsible parties may be liable for costs incurred in responding to such releases and for natural resources damages. Release reports also must be made to State and local officials under section 304 of title III of SARA. Federally permitted releases are exempt from CERCLA liability and from the emergency release reporting requirements under CERCLA and SARA. The CERCLA section 101(10) definition of federally permitted release includes "any emission into the air subject to a permit or control regulation under * * * section 112 * * * of the Clean Air Act * * *" Thus, releases of benzene from facilities subject to a NESHAP may be exempt from reporting and liability under the federally permitted release provisions of CERCLA. Releases of hazardous substances not specifically controlled under one of the environmental regulations listed under CERCLA section 101(10) are not federally permitted and, therefore, are subject to the release reporting and liability provisions under CERCLA and SARA title III. CERCLA section 103(f)(2), however, does provide some reporting relief for facilities that release CERCLA hazardous substances in a "continuous" and "stable" manner in amounts that equal or exceed a reportable quantity. The EPA published a proposed rule on April 19, 1988, on continuous release reporting (53 FR 12868); a final rule is scheduled for promulgation in April 1990. To receive available guidance materials on the continuous release reporting requirements, call the RCRA/Superfund Hotline at 1-800/424-9346; in Washington, DC at 1-202/382-3000.

List of Subjects in 40 CFR Part 61

Air pollution control, Arsenic, Asbestos, Benzene, Beryllium, Coke oven emissions, Hazardous substances, Incorporations by reference, Intergovernmental relations, Mercury, Radionuclides, Reporting and recordkeeping requirements, Vinyl chloride, Volatile hazardous air pollutants.

Dated: February 27, 1990.

William K. Reilly,

Administrator.

For the reasons set out in the preamble, 40 CFR part 61 is amended by adding paragraph (c) to § 61.18 and by adding subpart BB and subpart FF as follows:

PART 61—[AMENDED]

1. The authority for part 61 continues to read as follows:

Authority: Secs. 101, 112, 114, 116, 301 of the Clean Air Act, as amended (42 U.S.C. 7401, 7412, 7414, 7416, 7601).

2. Section 61.8 is amended by adding paragraph (c) to read as follows:

§ 61.18 Incorporations by reference.

* * * * *

(c) The following material is available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402-9325, telephone (202) 783-3238.

(1) Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, EPA Publication SW-846, Third Edition, November 1986, as amended by Revision I, December 1987, Order Number 955-001-00000-1:

(i) Method 8020, Aromatic Volatile Organics, IBR approved March 7, 1990, for § 61.355(c)(2)(iv)(A).

(ii) Method 8021, Volatile Organic Compounds in Water by Purge and Trap Capillary Column Gas Chromatography with Photoionization and Electrolytic Conductivity Detectors in Series, IBR approved March 7, 1990, for § 61.355(c)(2)(iv)(B).

(iii) Method 8240, Gas Chromatography/Mass Spectrometry for Volatile Organics, IBR approved March 7, 1990, for § 61.355(c)(2)(iv)(C).

(iv) Method 8260, Gas Chromatography/Mass Spectrometry for Volatile Organics: Capillary Column Technique, IBR approved March 7, 1990, for § 61.355(c)(2)(iv)(D).

3. Subpart BB is added to read as follows:

Subpart BB—National Emission Standard for Benzene Emissions from Benzene Transfer Operations

Subpart BB—National Emission Standard for Benzene Emissions from Benzene Transfer Operations

§ 61.300 Applicability.

(a) The affected facility to which this subpart applies is the total of all loading racks at which benzene is loaded into tank trucks, railcars, or marine vessels at each benzene production facility and each bulk terminal. However, specifically exempted from this regulation are loading racks at which only the following are loaded: benzene-laden waste (covered under subpart FF of this part), gasoline, or benzene-laden liquid from coke by-product recovery plants.

(b) Any affected facility under paragraph (a) of this section which loads only liquid containing less than 70 weight-percent benzene is exempt from the requirements of this subpart, except for the recordkeeping and reporting requirements in § 61.305(i).

(c) Any affected facility under paragraph (a) of this section shall comply with the standards in § 61.302 at each loading rack that is handling a liquid containing 70 weight-percent or more benzene.

(d) Any affected facility under paragraph (a) of this section whose annual benzene loading is less than 1.3 million liters of 70 weight-percent or more benzene is exempt from the requirements of this subpart, except for the recordkeeping and reporting requirements in § 61.305(i)

(e) The owner or operator of an affected facility, as defined in § 61.300(a) that loads a marine vessel shall be in compliance with the provisions of this subpart on and after February 28, 1991. If an affected facility that loads a marine vessel also loads a tank truck or railcar, the marine vessel loading racks shall be in compliance with the provisions of this subpart on and after February 28, 1991, while the tank truck loading racks and the railcar loading racks shall be in compliance as required by § 61.12.

§ 61.301 Definitions.

As used in this subpart, all terms not defined herein shall have the meaning given them in the Act, or in subpart A or subpart V of part 61.

Bulk terminal means any facility which receives liquid product containing benzene by pipelines, marine vessels, tank trucks, or railcars, and loads the product for further distribution into tank trucks, railcars, or marine vessels.

Car-sealed means having a seal that is placed on the device used to change the position of a valve (e.g., from open to closed) such that the position of the valve cannot be changed without breaking the seal and requiring the replacement of the old seal, once broken, with a new seal.

Control device means all equipment used for recovering or oxidizing benzene vapors displaced from the affected facility.

Incinerator means any enclosed combustion device that is used for destroying organic compounds and that does not extract energy in the form of steam or process heat. These devices do not rely on the heating value of the waste gas to sustain efficient combustion. Auxiliary fuel is burned in the device and the heat from the fuel flame heats the waste gas to combustion temperature. Temperature is controlled by controlling combustion air or fuel.

Leak means any instrument reading of 10,000 ppmv or greater using method 21 of 40 CFR part 60, appendix A.

Loading cycle means the time period from the beginning of filling a tank truck, railcar, or marine vessel until flow to the control device ceases, as measured by the flow indicator.

Loading rack means the loading arms, pumps, meters, shutoff valves, relief valves, and other piping and valves necessary to fill tank trucks, railcars, or marine vessels.

Marine vessel means any tank ship or tank barge which transports liquid product such as benzene.

Nonvapor tight means any tank truck, railcar, or marine vessel that does not pass the required vapor-tightness test.

Process heater means a device that transfers heat liberated by burning fuel to fluids contained in tubes, except water that is heated to produce steam.

Steam generating unit means any enclosed combustion device that uses fuel energy in the form of steam.

Vapor collection system means any equipment located at the affected facility used for containing benzene vapors displaced during the loading of tank trucks, railcars, or marine vessels. This does not include the vapor collection system that is part of any tank truck, railcar, or marine vessel vapor collection manifold system.

Vapor-tight marine vessel means a marine vessel with a benzene product tank that has been demonstrated within the preceding 12 months to have no leaks. This demonstration shall be made using method 21 of part 60, appendix A, during the last 20 percent of loading and during a period when the vessel is being loaded at its maximum loading rate. A reading of greater than 10,000 ppm as methane shall constitute a leak. As an alternative, a marine vessel owner or operator may use the vapor-tightness test described in § 61.304(f) to demonstrate vapor tightness. A marine vessel operated at negative pressure is assumed to be vapor-tight for the purpose of this standard.

Vapor-tight tank truck or *vapor-tight railcar* means a tank truck or railcar for which it has been demonstrated within the preceding 12 months that its product tank will sustain a pressure change of not more than 750 pascals within 5 minutes after it is pressurized to a minimum of 4,500 pascals. This capability is to be demonstrated using the pressure test procedure specified in method 27 of part 60, appendix A, and a pressure measurement device which has a precision of ±2.5 mm water and which is capable of measuring above the pressure at which the tank truck or railcar is to be tested for vapor tightness.

§ 61.302 Standards.

(a) The owner or operator of an affected facility shall equip each loading rack with a vapor collection system that is:

(1) Designed to collect all benzene vapors displaced from tank trucks, railcars, or marine vessels during loading, and

(2) Designed to prevent any benzene vapors collected at one loading rack from passing through another loading rack to the atmosphere.

(b) The owner or operator of an affected facility shall install a control device and reduce benzene emissions routed to the atmosphere through the control device by 98 weight percent. If a boiler or process heater is used to comply with the percent reduction requirement, then the vent stream shall be introduced into the flame zone of such a device.

(c) The owner or operator of an affected facility shall operate any flare used to comply with paragraph (b) of this section in accordance with the requirements of § 60.18 (b) through (f).

(d) The owner or operator of an affected facility shall limit loading of benzene into vapor-tight tank trucks and vapor-tight railcars using the following procedures:

(1) The owner or operator shall obtain the vapor-tightness documentation described in § 61.305(h) for each tank truck or railcar loaded at the affected facility. The test date in the documentation must be within the preceding 12 months. The vapor-tightness test to be used for tank trucks and railcars is method 27 of part 60, appendix A.

(2) The owner or operator shall cross-check the identification number for each tank truck or railcar to be loaded with the file of vapor-tightness documentation before the corresponding tank truck or railcar is loaded. If no documentation is on file, the owner or operator shall obtain a copy of the information from the tank truck or railcar operator before the tank truck or railcar is loaded.

(3) Alternate procedures to those described in paragraphs (d)(1) and (d)(2) of this section may be used upon application to, and approval by, the Administrator.

(e) The owner or operator of an affected facility shall limit the loading of marine vessels to those vessels that are vapor tight as determined by either paragraph (e)(1), (e)(2), (e)(3), or (e)(4) of this section.

(1) The owner or operator of an affected facility shall ensure that each marine vessel is loaded with the benzene product tank below atmospheric pressure (i.e., at negative pressure). If the pressure is measured at the interface between the shoreside vapor collection pipe and the marine vessel vapor line, the pressure measured according to the procedures in § 61.303(f) must be below atmospheric pressure.

(2) The owner or operator of an affected facility shall use the following procedure to obtain the vapor-tightness documentation described in § 61.305(h). The vapor-tightness test for marine vessels is method 21 of part 60, appendix A, and shall be applied to any potential sources of vapor leaks. A reading of 10,000 ppmv or greater as methane shall constitute a leak.

(i) The owner or operator of an affected facility shall obtain the leak test documentation described in § 61.305(h) for each marine vessel prior to loading, if available. The date of the test listed in the documentation must be within the 12 preceding months.

(ii) If there is no documentation of a successful leak test conducted on the marine vessel in the preceding 12 months, the owner or operator of an affected facility shall require that a leak test of the marine vessel be conducted during the final 20 percent of loading of the marine vessel or shall not load the vessel. The test shall be conducted when the marine vessel is being loaded at the maximum allowable loading rate.

(A) If no leak is detected, the owner or operator of an affected facility shall require that the documentation described in § 61.305(h) is completed prior to departure of the vessel. The owner or operator of the affected facility shall retain a copy of the vapor-tightness documentation on file.

(B) If any leak is detected, the owner or operator of an affected facility shall require that the vapor-tightness failure be documented for the marine vessel owner or operator prior to departure of the vessel. The owner or operator of the affected facility shall retain a copy of the vapor-tightness documentation on file. Delay of repair of equipment for which leaks have been detected will be allowed if the repair is technically infeasible without dry-docking the vessel. This equipment will be excluded from future method 21 tests until repairs are effected. Repair of this equipment shall occur the next time the vessel is dry-docked.

(iii) If the marine vessel has failed its most recent vapor-tightness test as described in § 61.302(e)(2)(ii), the owner or operator of the affected facility shall require that the owner or operator of the nonvapor-tight marine vessel provide documentation that the leaks detected during the previous vapor-tightness test have been repaired, or proof that repair is technically infeasible without dry-docking the vessel. Once the repair documentation has been provided, the owner or operator may load the marine vessel. The owner or operator shall require that the vapor-tightness test described in § 61.302(e)(2)(ii) be conducted during loading, and shall retain a copy of the vapor-tightness documentation on file.

(3) The owner or operator of an affected facility shall obtain a copy of the marine vessel's vapor-tightness documentation described in § 61.305(h) for a test conducted within the preceding 12 months in accordance with § 61.304(f).

(4) Alternate procedures to those described in paragraphs (e)(1), (e)(2) and (e)(3) of this section may be used upon application to, and approval by, the Administrator.

(f) The owner or operator of an affected facility shall limit loading of benzene to tank trucks, railcars, and marine vessels equipped with vapor collection equipment that is compatible with the affected facility's vapor collection system.

(g) The owner or operator of an affected facility shall limit loading of tank trucks, railcars, and marine vessels to tank trucks, railcars, and marine vessels whose collection systems are connected to the affected facility's vapor collection systems.

(h) The owner or operator of an affected facility shall ensure that the vapor collection and benzene loading equipment of tank trucks and railcars shall be designed and operated to prevent gauge pressure in the tank truck or railcar tank from exceeding, during loading, the initial pressure the tank was pressured up to and shown to be vapor tight at during the most recent vapor-tightness test using method 27 of part 60, appendix A. This vapor-tightness test pressure is not to be exceeded when measured by the procedures specified in § 61.304(c).

(i) The owner or operator of an affected facility shall ensure that no pressure-vacuum vent in the affected facility's vapor collection system for tank trucks and railcars shall begin to open at a system pressure less than the maximum pressure at which the tank truck or railcar is operated.

(j) The owner or operator of an affected facility shall ensure that the maximum normal operating pressure of the marine vessel's vapor collection equipment shall not exceed 0.8 times the relief set pressure of the pressure-vacuum vents. This level is not to be exceeded when measured by the procedures specified in § 61.304(d).

(k) The owner or operator of an affected facility shall inspect the vapor collection system and the control device for detectable emissions, and shall repair any leaks detected, in accordance with § 61.242-11 (e) and (f). This inspection of the vapor collection system and control device shall be done during the loading of tank trucks, railcars, or marine vessels.

(l) Vent systems that contain valves that could divert a vent stream from a control device shall have car-sealed opened all valves in the vent system from the emission source to the control device, and car-sealed closed all valves in the vent system that would lead the vent stream to the atmosphere, either directly or indirectly, bypassing the control device.

§ 61.303 Monitoring requirements.

(a) Each owner or operator of an affected facility that uses an incinerator to comply with the percent reduction requirement specified under § 61.302(b) shall install, calibrate, maintain, and operate according to manufacturer's specifications a temperature monitoring device equipped with a continuous recorder and having an accuracy of ±1 percent of the combustion temperature being measured expressed in degrees Celsius or ±0.5° C, whichever is greater.

(1) Where an incinerator other than a catalytic incinerator is used, the owner or operator of the affected facility shall install a temperature monitoring device in the firebox.

(2) Where a catalytic incinerator is used, the owner or operator shall install temperature monitoring devices in the gas stream immediately before and after the catalyst bed.

(b) Each owner or operator of an affected facility that uses a flare to comply with § 61.302(b) shall install, calibrate, maintain, and operate according to manufacturer's specifications a heat sensing device, such as an ultraviolet beam sensor or thermocouple, at the pilot light to indicate the presence of a flame during the entire loading cycle.

(c) Each owner or operator of an affected facility that uses a steam generating unit or process heater to comply with § 61.302(b) shall comply with the following requirements. Where a steam generating unit with a design heat input capacity of less than 44 MW is used to comply with § 61.302(b), the owner or operator of an affected facility shall comply with paragraph (c)(1) of this section. Where a steam generating unit or process heater with a design heat input capacity of 44 MW or greater is used to comply with § 61.302(b), the owner or operator of an affected facility shall comply with paragraph (c)(2) of this section.

(1) Install in the firebox, calibrate, maintain, and operate according to manufacturer's specifications a temperature monitoring device equipped with a continuous recorder and having an accuracy of ±1 percent of the temperature being measured expressed in degrees Celsius or ±0.5° C, whichever is greater, for steam generating units or process heaters of less than 44 MW design heat input capacity.

(2) Monitor and record the periods of operation of the steam generating units or process heater if the design heat input capacity of the steam generating unit or process heater is 44 MW or greater. The records must be readily available for inspection.

(d) Each owner or operator of an affected facility that uses a carbon adsorption system to comply with the percent reduction requirement specified under § 61.302(b) shall install, calibrate, maintain, and operate according to manufacturer's specifications a device that continuously indicates and records the concentration or reading of organic compounds in the outlet gas stream of each carbon adsorber bed.

(e) The owner or operator of an affected facility who wishes to demonstrate compliance with the standards specified under § 61.302(b) using control devices other than an incinerator, steam generating unit, process heater, carbon adsorber, or flare shall provide the Administrator with information describing the operation of the control device and the process parameter(s) that would indicate proper operation and maintenance of the device. The Administrator may request further information and will specify appropriate monitoring procedures or requirements.

(f) Each owner or operator of an affected facility complying with § 61.302(e)(1) shall install, calibrate, maintain, and operate a recording pressure measurement device (magnehelic gauge or equivalent device) and an audible and visible alarm system that is activated when the pressure vacuum specified in § 61.302(e)(1) is not attained. The owner or operator shall place the alarm system so that it can be seen and heard where cargo transfer is controlled and on the open deck.

(g) Owners or operators using a vent system that contains valves that could divert a vent stream from a control device used to comply with the provisions of this subpart shall do one or a combination of the following:

(1) Install a flow indicator immediately downstream of each valve that if opened would allow a vent stream to bypass the control device and be emitted, either directly or indirectly, to the atmosphere. The flow indicator shall be capable of recording flow at least once every 15 minutes.

(2) Monitor the valves once a month, checking the position of the valves and the condition of the car seal, and identify all times when the car seals have been broken and the valve position has been changed (*i.e.*, from opened to closed for valves in the vent piping to the control device and from closed to open for valves that allow the stream to be vented directly or indirectly to the atmosphere). (Approved by the Office of Management and Budget under control number 2060–0182)

§ 61.304 Test methods and procedures.

(a) The procedures for determining compliance with § 61.30.2(b) for all control devices other than flares is as follows:

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

(2) The time period for a performance test shall be not less than 6 hours, during which at least 300,000 liters of benzene are loaded. If the throughput criterion is not met during the initial 6 hours, the test may be either continued until the throughput criterion is met, or resumed the next day with at least another 6 complete hours of testing.

(3) For intermittent control devices:

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

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

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

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

(ii) Method 1 or 1A of part 60, appendix A, as appropriate, shall be used for selection of the sampling site.

(iii) The volume exhausted shall be determined using method 2, 2A, 2C, or 2D of part 60, appendix A, as appropriate.

(iv) The average benzene concentration upstream and downstream of the control device in the vent shall be determined using method 25A or method 25B of appendix A of this part, using benzene as the calibration gas. The average benzene concentration shall correspond to the volume measurement by taking into account the sampling system response time.

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

$$M_i = FKV_{is}C$$

where:

M_i = Mass of benzene emitted during testing interval i, kg.

V_s = Volume of air-vapor mixture exhausted, m^3 at standard conditions.

C = Benzene concentration (as measured) at the exhaust vent, ppmv.

K = Density, (kg/m^3 benzene), standard conditions.

K = 3.25 for benzene.

F = Conversion factor, (m^3 benzene/m^3 air)(1/ppmv).

$F = 10^{-6}$.

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

(6) The benzene mass emission rates before and after the control device shall be calculated as follows:

$$E = \frac{\sum_{i=1}^{n} M_i}{T}$$

where:

E = Mass flow rate of benzene emitted, kg/hr.

M_i = Mass of benzene emitted during testing interval i, kg.

T = Total time of all testing intervals, hr.

n = Number of testing intervals.

(7) The percent reduction across the control device shall be calculated as follows:

$$R = \frac{E_b - E_a}{E_b} (100)$$

where:

R = Control efficiency of control device, %.

E_b = Mass flow rate of benzene prior to control device, kg/hr.

E_a = Mass flow rate of benzene after control device, kg/hr.

(b) When a flare is used to comply with § 61.302(b), a performance test according to method 22 of appendix A of this part, shall be performed to determine visible emissions. The observation period shall be at least 2 hours and shall be conducted according to method 22. Performance testing shall be conducted during at least three complete loading cycles with a separate test run for each loading cycle. The observation period for detecting visible emissions shall encompass each loading cycle. Integrated sampling to measure process vent stream flow rate shall be performed continuously during each loading cycle.

(c) For the purpose of determining compliance with § 61.302(h), the following procedures shall be used:

(1) Calibrate and install a pressure measurement device (liquid manometer, magnehelic gauge, or equivalent instrument), which has a precision of ±2.5 mm H_2O in the range that the tank truck or railcar was initially pressured to during the most recent vapor-tightness test.

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

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

(4) If more than one loading rack is used simultaneously, then the performance test shall be conducted simultaneously to represent the maximum capacity.

(d) For the purpose of determining compliance with § 61.302(j), the following procedures shall be used:

(1) Calibrate and install a pressure measurement device (liquid manometer, magnehelic gauge, or equivalent instrument), capable of measuring up to the relief set pressure of the pressure-vacuum vents.

(2) Connect the pressure measurement device to a pressure tap in the affected facility's vapor collection system, located as close as possible to the connection with the marine vessel.

(3) During the performance test, record the pressure every 5 minutes while a marine vessel is being loaded, and record the highest instantaneous pressure that occurs during each loading cycle.

(e) Immediately prior to a performance test required for determination of compliance with § 61.302(b), all potential sources of vapor leakage in the affected facility's vapor collection system equipment shall be inspected for detectable emissions as required in § 61.302(k). The monitoring shall be conducted only while a vapor-tight tank truck, railcar, or marine vessel is being loaded. All identified leaks in the terminal's vapor collection system shall be repaired prior to conducting the performance test.

(f) The following test method shall be used to comply with the marine vessel vapor-tightness requirements of § 61.302(e)(3):

(1) Each benzene product tank shall be pressurized with dry air or inert gas to not less than 1.0 psig and not more than the pressure of the lowest relief valve setting.

(2) Once the pressure is obtained, the dry air or inert gas source shall be shut off.

(3) At the end of one-half hour, the pressure in the benzene product tank and piping shall be measured. The change in pressure shall be calculated using the following formula:

$$\Delta P = P_i - P_f$$

where:

ΔP = Change in pressure, inches of water.

P_i = Pressure in tank when air/gas source is shut off, inches of water.

P_f = Pressure in tank at the end of one-half hour after air/gas source is shut off, inches of water.

(4) The change in pressure, ΔP, shall be compared to the pressure drop calculated using the following formula:

$$\Delta PM = 0.861 \, P_{io} \, L/V$$

where:

ΔPM = Maximum allowable pressure change, inches of water.

P_{io} = Pressure in tank when air/gas source is shut off, pounds per square inch, absolute (psia).

L = Maximum permitted loading rate of vessel, barrels per hour.

V = Total volume of product tank, barrels.

(5) If $\Delta P < \Delta PM$, the vessel is vapor tight.

(6) If $\Delta P > \Delta PM$, the vessel is not vapor tight and the source of the leak must be identified and repaired prior to retesting.

§ 61.305 Reporting and recordkeeping.

(a) Each owner or operator of an affected facility subject to the provisions of this subpart shall keep an up-to-date, readily accessible record of the following data measured during each performance test, and also include the following data in the report of the initial performance test required under § 61.13. Where a steam generating unit or process heater with a design heat input capacity of 44 MW or greater is used to comply with § 61.302(b), a report containing performance test data need not be submitted, but a report containing the information in § 61.305(a)(3)(i) is required.

(1) Where an owner or operator subject to the provisions of this subpart is complying with § 61.302(b) through use of an incinerator:

(i) The average firebox temperature of the incinerator (or the average temperature upstream and downstream of the catalyst bed), measured at least every 2 minutes during a loading cycle if the total time period of the loading cycle is less than 3 hours and every 15 minutes if the total time period of the loading cycle is equal to or greater than 3 hours. The measured temperature shall be averaged over the loading cycle.

(ii) The percent reduction of benzene determined as specified in § 61.304(a) achieved by the incinerator.

(iii) The duration of the loading cycle.

(2) Where an owner or operator subject to the provisions of this subpart is complying with § 61.302 (b) and (c) through use of a smokeless flare or other flare design (i.e., steam-assisted, air-assisted or nonassisted), all visible emission readings, heat content determination, flow rate measurements, maximum permitted velocity calculations, and exit velocity determinations made during the performance test, continuous records of the flare pilot flame monitoring measured continuously during the loading cycle, duration of all loading cycles and records of all loading cycles during which the pilot flame is absent for each vent stream.

(3) Where an owner or operator subject to the provisions of this subpart is complying with § 61.302(b) through the use of a steam generating unit or process heater:

(i) A description of the location at which the vent stream is introduced into the steam generating unit or process heater.

(ii) The average combustion temperature of the steam generating unit or process heater with a design heat input capacity of less than 44 MW measured at least every 2 minutes during a loading cycle if the total time period of the loading cycle is less than 3 hours and every 15 minutes if the total time period of the loading cycle is equal to or greater than 3 hours. The measured temperature shall be averaged over the loading cycle.

(iii) The duration of the loading cycle.

(4) Where an owner or operator subject to the provisions of this subpart is complying with § 61.302(b) through the use of a carbon adsorption system, the control efficiency, R, of the carbon adsorption system, and all supporting performance test data and calculations used to determine that value.

(5) Each owner or operator subject to the provisions of this subpart shall submit with the initial performance test an engineering report describing in detail the vent system used to vent each affected vent stream to a control device. This report shall include all valves and vent pipes that could vent the stream to the atmosphere, thereby bypassing the control device, and identify which valves are car-sealed opened and which valves are car-sealed closed.

(b) Each owner or operator subject to the provisions of this subpart shall keep up-to-date, readily accessible continuous records of the equipment operating parameters specified to be monitored under § 61.303 (a), (c), and (d) as well as up-to-date, readily accessible records of periods of operation during which the parameter boundaries established during the most recent performance test are exceeded. The Administrator may at any time require a report of these data. Periods of operation during which the parameter boundaries established during the most recent performance tests are exceeded are defined as follows:

(1) For thermal incinerators, all loading cycles during which the average combustion temperature was more than 28°C below the average loading cycle combustion temperature during the most recent performance test at which compliance with § 61.302(b) was determined.

(2) For catalytic incinerators, all loading cycles during which the average temperature of the vent stream immediately before the catalyst bed is more than 28°C below the average temperature of the process vent stream during loading cycles during the most recent performance test at which compliance with § 61.302(b) was determined.

(3) All loading cycles during which the average combustion temperature was more than 28°C below the average combustion temperature during the most recent performance test at which compliance with § 61.302(b) was determined for steam generating units or process heaters with a design heat input capacity of less than 44 MW.

(4) For steam generating units or process heaters, whenever there is a change in the location at which the vent stream is introduced into the flame zone as required under § 61.302(b).

(5) For carbon adsorbers, all 3-hour periods of operation during which the average VOC concentration or reading of organics in the exhaust gases is more than 20 percent greater than the average exhaust gas concentration or reading measured by the organics monitoring device during the most recent determination of the recovery efficiency of the carbon adsorber that demonstrated that the facility was in compliance.

(c) If a vent system containing valves that could divert the emission stream away from the control device is used, each owner or operator subject to the provisions of this subpart shall keep for at least 2 years up-to-date, readily accessible continuous records of:

(1) All periods when flow is indicated if flow indicators are installed under § 61.303(g)(1).

(2) All times when maintenance is performed on car-sealed valves, when the car seal is broken, and when the valve position is changed (i.e., from open to closed for valves in the vent piping to the control device and from closed to open for valves that vent the stream directly or indirectly to the atmosphere bypassing the control device) if valves are monitored under § 60.303(g)(2).

(d) Each owner or operator of an affected facility subject to the provisions of this subpart who uses a steam generating unit or process heater with a design heat input capacity of 44 MW or greater to comply with § 61.302(b) shall keep an up-to-date, readily accessible record of all periods of operation of the steam generating unit or process heater. Examples of such records could include records of steam use, fuel use, or monitoring data collected pursuant to other State or Federal regulatory requirements.

(e) Each owner or operator of an affected facility subject to the provisions of this subpart shall keep up-to-date, readily accessible records of the flare pilot flame monitoring specified under § 61.303(b), as well as up-to-date, readily accessible records of any absence of the pilot flame during a loading cycle.

(f) Each owner or operator of an affected facility subject to the requirements of § 61.302 shall submit to the Administrator quarterly reports of the following information. The owner or operator shall submit the initial report within 90 days after the effective date of this subpart or 90 days after startup for a source that has an initial startup date after the effective date.

(1) Periods of operation where there were exceedances of monitored parameters recorded under § 61.305(b).

(2) All periods recorded under § 61.305(c)(1) when the vent stream is diverted from the control device.

(3) All periods recorded under § 61.305(d) when the steam generating unit or process heater was not operating.

(4) All periods recorded under § 61.305(e) in which the pilot flame of the flare was absent.

(5) All times recorded under § 61.305(c)(2) when maintenance is performed on car-sealed valves, when the car seal is broken, and when the valve position is changed.

(g) The owner or operator of an affected facility shall keep the vapor-tightness documentation required under § 61.302 (d) and (e) on file at the affected facility in a permanent form available for inspection.

(h) The owner or operator of an affected facility shall update the documentation file required under § 61.302 (d) and (e) for each tank truck, railcar, or marine vessel at least once per year to reflect current test results as determined by the appropriate method. The owner or operator shall include, as a minimum, the following information in this documentation:

(1) Test title;

(2) Tank truck, railcar, or marine vessel owner and address;

(3) Tank truck, railcar, or marine vessel identification number;

(4) Testing location;

(5) Date of test;

(6) Tester name and signature;

(7) Witnessing inspector: name, signature, and affiliation; and

(8) Test results, including, for railcars and tank trucks, the initial pressure up to which the tank was pressured at the start of the test.

(i) Each owner or operator of an affected facility complying with § 61.300(b) or § 61.300(d) shall record the following information. The first year after promulgation the owner or operator shall submit a report containing the requested information to the Director of the Emission Standards Division, (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711. After the first year, the owner or operator shall continue to record; however, no reporting is required. The information shall be made available if requested. The information shall include, as a minimum:

(1) The affected facility's name and address;

(2) The weight percent of the benzene loaded;

(3) The type of vessel loaded (i.e., tank truck, railcar, or marine vessel); and

(4) The annual amount of benzene loaded into each type of vessel.

(Approved by the Office of Management Budget under control number 2060-0182)

§ 61.306 Delegation of authority.

(a) In delegating implementation and enforcement authority to a State under section 112(d) of the Act, the authorities contained in paragraph (b) of this section shall be retained by the Administrator and not transferred to a State.

(b) Authorities which will not be delegated to States: No restrictions.

4. Subpart FF is added to read as follows:

Subpart FF—National Emission Standard for Benzene Waste Operations

Sec.

Subpart FF—National Emission Standard for Benzene Waste Operations

§ 61.340 Applicability.

(a) The provisions of this subpart apply to owners and operators of chemical manufacturing plants, coke by-product recovery plants, and petroleum refineries.

(b) The provisions of this subpart apply to owners and operators of facilities at which waste management units are used to treat, store, or dispose of waste generated by any facility listed in paragraph (a) of this section.

(c) At each facility identified in paragraph (a) or (b) of this section, the following waste is exempt from the requirements of this subpart:

(1) Waste in the form of gases or vapors that is emitted from process fluids;

(2) Waste that is contained in a segregated stormwater sewer system; and

(3) Waste that is not discharged from the process unit which generates the waste stream and, instead, is returned directly to the process. Examples of such waste are intermediate and product distillation reflux streams.

§ 61.341 Definitions.

Benzene concentration means the fraction by weight of benzene in a waste as determined in accordance with the procedures specified in § 61.355 of this subpart.

Chemical manufacturing plant means any facility engaged in the production of chemicals by chemical, thermal, physical, or biological processes for use as a product, co-product, by-product, or intermediate including but not limited to industrial organic chemicals, organic pesticide products, pharmaceutical preparations, paint and allied products, fertilizers, and agricultural chemicals. Examples of chemical manufacturing plants include facilities at which process units are operated to produce one or more of the following chemicals: benzenesulfonic acid, benzene, chlorobenzene, cumene, cyclohexane, ethylene, ethylbenzene, hydroquinone, linear alklylbenzene, nitrobenzene, resorcinol, sulfolane, or styrene.

Closed-vent system means a system that is not open to the atmosphere and is composed of piping, ductwork, connections, and, if necessary, flow inducing devices that transport gas or vapor from an emission source to a control device.

Coke by-product recovery plant means any facility designed and operated for the separation and recovery of coal tar derivatives (by-products) evolved from coal during the coking process of a coke oven battery.

Container means any portable waste management unit in which a material is stored, transported, treated, or otherwise handled. Examples of containers are drums, barrels, tank trucks, barges, dumpsters, tank cars, dump trucks, and ships.

Control device means an enclosed combustion device, vapor recovery system, or flare.

Cover means a device or system which is placed on or over a waste placed in a waste management unit so that the entire waste surface area is enclosed and sealed to minimize air emissions. A cover may have openings necessary for operation, inspection, and maintenance of the waste management unit such as access hatches, sampling ports, and gauge wells provided that each opening is closed and sealed when not in use. Example of covers include a fixed roof installed on a tank, a lid installed on a container, and an air-supported enclosure installed over a waste management unit.

External floating roof means a pontoon-type or double-deck type cover with certain rim sealing mechanisms that rests on the liquid surface in a waste management unit with no fixed roof.

Facility means all process units and product tanks that generate waste within a stationary source, and all waste management units that are used for waste treatment, storage, or disposal within a stationary source.

Fixed roof means a cover that is mounted on a waste management unit in a stationary manner and that does not move with fluctuations in liquid level.

Floating roof means a cover with certain rim sealing mechanisms consisting of a double deck, pontoon single deck, internal floating cover or covered floating roof, which rests upon and is supported by the liquid being contained, and is equipped with a closure seal or seals to close the space between the roof edge and unit wall.

Individual drain system means the system used to convey waste from a process unit, product storage tank, or waste management unit to a waste management unit. The term includes all process drains and common junction boxes, together their associated sewer lines and other junction boxes, down to the receiving waste management unit.

Internal floating roof means a cover that rests or floats on the liquid surface inside a waste management unit that has a fixed roof.

Liquid-mounted seal means a foam or liquid-filled primary seal mounted in contact with the liquid between the waste management unit wall and the floating roof continuously around the circumference.

Loading means the introduction of waste into a waste management unit but not necessarily to complete capacity (also referred to as filling).

No detectable emissions means less than 500 parts per million by volume (ppmv) above background levels, as measured by a detection instrument reading in accordance with the procedures specified in § 61.355(h) of this subpart.

Oil-water separator means a waste management unit, generally a tank or surface impoundment, used to separate oil from water. An oil-water separator consists of not only the separation unit but also the forebay and other separator basins, skimmers, weirs, grit chambers, sludge hoppers, and bar screens that are located directly after the individual drain system and prior to additional treatment units such as an air flotation unit, clarifier, or biological treatment unit. Examples of an oil-water separator incude an API separator, parallel-plate interceptor, and corrugated-plate interceptor with the associated ancillary equipment.

Petroleum refinery means any facility engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants, or other products through the distillation of petroleum, or through the redistillation, cracking, or reforming of unfinished petroleum derivatives.

Petroleum means the crude oil removed from the earth and the oils derived from tar sands, shale, and coal.

Point of waste generation means the location where samples of a waste stream are collected for the purpose of determining the waste flow rate, water content, or benzene concentration in accordance with procedures specified in § 61.355 of this subpart. For a chemical manufacturing plant or petroleum refinery, the point of waste generation is a location after the waste stream exits the process unit component, product tank, or waste management unit generating the waste, and before the waste is exposed to the atmosphere or mixed with other wastes. For a coke-by-product recovery plant subject to and complying with the control requirements of §§ 61.132, 61.133, or 61.134 of this part, the point of waste generation is a location after the waste stream exits the process unit component or waste management unit controlled by that subpart, and before the waste is exposed to the atmosphere. For other facilities subject to this subpart, the point of waste generation is a location after the waste enters the facility, and before the waste is exposed to the atmosphere or placed in a facility waste management unit.

Process unit means equipment assembled and connected by pipes or ducts to produce intermediate or final products. A process unit can be operated independently if supplied with sufficient fuel or raw materials and sufficient product storage facilities.

Process wastewater means water which come in contact with benzene during manufacturing or processing operations conducted within a process unit. Process wastewater is not organic wastes, process fluids, product tank drawdown, cooling tower blowdown, steam trap condensate, or landfill leachate.

Process wastewater stream means a waste stream that contains only process wastewater.

Product tank means a stationary unit that is designed to contain an accumulation of materials that are fed to or produced by a process unit, and is constructed primarily of non-earthen materials (e.g., wood, concrete, steel, plastic) which provide structural support.

Product tank drawdown means any material or mixture of materials discharged from a product tank for the purpose of removing water or other contaminants from the product tank.

Segregated stormwater sewer system means a drain and collection system designed and operated for the sole purpose of collecting rainfall runoff at a facility, and which is segregated from all other individual drain systems.

Sewer line means a lateral, trunk line, branch line, or other enclosed conduit used to convey waste to a downstream waste management unit.

Slop oil means the floating oil and solids that accumulate on the surface of an oil-water separator.

Surface impoundment means a waste management unit which is a natural topographic depression, man-made excavation, or diked area formed primarily of earthen materials (although it may be lined with man-made materials), which is designed to hold an accumulation of liquid wastes or waste containing free liquids, and which is not an injection well. Examples of surface impoundments are holding, storage, settling, and aeration pits, ponds, and lagoons.

Tank means a stationary waste management unit that is designed to contain an accumulation of waste and is constructed primarily of nonearthen materials (e.g., wood, concrete, steel, plastic) which provide structural support.

Treatment process means a stream stripping unit, thin-film evaporation unit, waste incinerator, or any other process used to comply with § 61.348 of this subpart.

Vapor-mounted seal means a foam-filled primary seal mounted continuously around the perimeter of a waste management unit so there is an annular vapor space underneath the seal. The annular vapor space is bounded by the bottom of the primary seal, the unit wall, the liquid surface, and the floating roof.

Waste means any material resulting from industrial, commercial, mining or agricultural operations, or from community activities that is discarded or is being accumulated, stored, or physically, chemically, thermally, or biologically treated prior to being discarded, recycled, or discharged.

Waste management unit means a piece of equipment, structure, or transport mechanism used in handling, storage, treatment, or disposal of waste. Examples of a waste management unit include a tank, surface impoundment, container, oil-water separator, individual drain system, steam stripping unit, thin-film evaporation unit, waste incinerator, and landfill.

Waste stream means the waste generated by a particular process unit, product tank, or waste management unit. The characteristics of the waste stream (e.g., flow rate, benzene concentration, water content) are determined at the point of waste generation. Examples of a waste stream include process wastewater, product tank drawdown, sludge and slop oil removed from waste management units, and landfill leachate.

Wastewater treatment system means any component, piece of equipment, or installation that receives, manages, or treats process wastewater, product tank drawdown, or landfill leachate prior to direct or indirect discharge in accordance with the National Pollutant Discharge Elimination System permit regulations under 40 CFR part 122. These systems typically include individual drain systems, oil-water separators, air flotation units, equalization tanks, and biological treatment units.

Water seal controls means a seal pot, p-leg trap, or other type of trap filled with water that has a design capability to create a water barrier between the sewer line and the atmosphere.

§ 61.342 Standards: General.

(a) An owner or operator of a facility at which the total annual benzene quantity from facility waste is less than 10 megagrams per year (Mg/yr) shall be exempt from the requirements of paragraphs (b) and (c) of this section. The total annual benzene quantity from facility waste is the sum of the annual benzene quantity for each waste streams at the facility that has a flow-weighted annual average water content greater than 10 percent. The total annual benzene quantity from facility waste shall be determined in accordance with the procedures specified in § 61.355(a) of this subpart.

(b) Each owner or operator of a facility at which the total annual benzene quantity from facility waste is equal to or grater than 10 Mg/yr as determined in paragraph (a) of this section shall be in compliance with the requirements of paragraphs (c) through (g) of this section no later than March 7, 1990 or by the initial startup for a new source with an initial startup after this date.

(c) Each owner or operator of a facility at which the total annual benzene quantity from facility waste is equal to or greater than 10 Mg/yr as determined in paragraph (a) of this section shall manage and treat the facility waste as follows:

(1) For each waste stream, the owner or operator shall:

(i) Remove or destroy the benzene contained in the waste using a treatment process or wastewater treatment system that complies with the standards specified in § 61.348 of this subpart.

(ii) Comply with the standards specified in §§ 61.343 through 61.347 of this subpart for each waste management unit that receives or manages the waste stream prior to and during treatment of the waste stream in accordance with paragraph (c)(1)(i) of this section.

(iii) Each waste management unit used to manage or treat waste streams that will be recycled to a process shall comply with the standards specified in §§ 61.343 through 61.347 of this subpart. Once the waste stream is recycled to a process, the material is no longer subject to paragraph (c) of this section.

(2) A waste stream is exempt from paragraph (c)(1) of this section provided that the owner or operator demonstrates initially and, thereafter, at least once per year that the flow-weighted annual average benzene concentration for the waste stream is less than 10 ppmw as determined by the procedures specified in § 61.355(c) of this subpart.

(3) A process wastewater stream is exempt from paragraph (c)(1) of this section provided that the owner or operator demonstrates initially and, thereafter, at least once per year that one of the following conditions is met:

(i) The process wastewater stream flow rate is less than 0.02 liters per mintue; or

(ii) The annual waste quantity of the process wastewater stream is less than 10 Mg/yr.

(d) As an alternative to the requirements specified in paragraph (c) of this section, an owner or operator of a facility at which the total annual benzene quantity from facility waste is equal to or greater than 10 Mg/yr as determined in paragraph (a) of this section may elect to manage and treat the facility waste as follows:

(1) The owner or operator shall manage and treat facility waste other than process wastewater in accordance with the requirements of paragraph (c)(1) of this section.

(2) The owner or operator shall manage and treat process wastewater in accordance with the following requirements:

(i) Process wastewater shall be treated to achieve a total annual benzene quantity from facility process wastewater less than 1 Mg/yr. Total annual benzene from facility process wastewater shall be determined by adding together the annual benzene quantity at the point of waste generation for each untreated process wastewater stream plus the annual benzene quantity exiting the treatment process for each process wastewater stream treated in accordance with the requirements of paragraph (c)(1)(i) of this section.

(ii) Each treated process wastewater stream identified in paragraph (d)(2)(i) of this section shall be managed and treated in accordance with paragraph (c)(1) of this section.

(iii) Each untreated process wastewater stream identified in paragraph (d)(2)(i) of this section is exempt from the requirements of paragraph (c)(1) of this section.

(e) Rather than treating the waste onsite, an owner or operator may elect to comply with paragraph (c)(1)(i) of this section by transferring the waste offsite to another facility where the waste is treated in accordance with the requirements of paragraph (c)(1)(i) of this section. The owner or operator transferring the waste shall:

(1) Comply with the standards specified in §§ 61.343 through 61.347 of this subpart for each waste management unit that receives or manages the waste prior to shipment of the waste offsite.

(2) Include with each offsite waste shipment a notice stating that the waste contains benzene which is required to be managed and treated in accordance with the provisions of this subpart.

(f) Compliance with this subpart will be determined by review of facility records and results from tests and inspections using methods and procedures specified in § 61.355 of this subpart.

(g) Permission to use an alternative means of compliance to meet the requirements of §§ 61.342 through 61.352 of this subpart may be granted by the Administrator as provided in § 61.353 of this subpart. § 61.343 Standards: Tanks.

(a) Except as provided in § 61.351 of this subpart, the owner or operator shall meet the following standards for each tank in which the waste stream is placed in accordance with § 61.342(c)(1)(ii) of this subpart. The standards in this section apply to the treatment of the waste stream in a tank, including dewatering.

(1) The owner or operator shall install, operate, and maintain a fixed-roof and closed-vent system that routes all organic vapors vented from the tank to a control device.

(i) The fixed-roof shall meet the following requirements:

(A) The cover and all openings (e.g., access hatches, sampling ports, and gauge wells) shall be designed to operate with no detectable emissions as indicated by an instrument reading of less than 500 ppmv above background, as determined initially and thereafter at least once per year by the methods specified in § 61.355(h) of this subpart.

(B) Each opening shall be maintained in a closed, sealed position (e.g., covered by a lid that is gasketed and latched) at all times that waste is in the tank except when it is necessary to use the opening for waste sampling or removal, or for equipment inspection, maintenance, or repair.

(ii) The closed-vent system and control device shall be designed and operated in accordance with the requirements of § 61.349 of this subpart.

(b) Each cover seal, access door, and all other openings shall be checked by visual inspection initially and quarterly thereafter to ensure that no cracks or gaps occur between the cover and tank wall and that access doors and other openings are closed and gasketed properly.

(c) Except as provided in § 61.350 of this subpart, when a broken seal or gasket or other problem is identified, or when detectable emissions are measured, first efforts at repair shall be made as soon as practicable, but not later than 45 calendar days after identification.

§ 61.344 Standards: Surface impoundments.

(a) The owner or operator shall meet the following standards for each surface impoundment in which waste is placed in accordance with § 61.342(c)(1)(ii) of this subpart:

(1) The owner or operator shall install, operate, and maintain on each surface impoundment a cover (e.g., air-supported structure or rigid cover) and closed-vent system that routes all organic vapors vented from the surface impoundment to a control device.

(i) The cover shall meet the following requirements:

(A) The cover and all openings (e.g., access hatches, sampling ports, and gauge wells) shall be designed to operate with no detectable emissions as indicated by an instrument reading of less than 500 ppmv above background, initially and thereafter at least once per year by the methods specified in § 61.355(h) of this subpart.

(B) Each opening shall be maintained in a closed, sealed position (e.g., covered by a lid that is gasketed and latched) at all times that waste is in the surface impoundment except when it is necessary to use the opening for waste sampling or removal, or for equipment inspection, maintenance, or repair.

(C) The cover shall be used at all times that waste is placed in the surface impoundment except during removal of treatment residuals in accordance with 40 CFR 268.4 or closure of the surface impoundment in accordance with 40 CFR 264.228. (Note: the treatment residuals generated by these activities may be subject to the requirements of this part.)

(ii) The closed-vent system and control device shall be designed and operated in accordance with § 61.349 of this subpart.

(b) Each cover seal, access hatch, and all other openings shall be checked by visual inspection initially and quarterly thereafter to ensure that no cracks or gaps occur and that access hatches and other openings are closed and gasketed properly.

(c) Except as provided in § 61.350 of this subpart, when a broken seal or gasket or other problem is identified, or when detectable emissions are measured, first efforts at repair shall be made as soon as practicable, but not later than 15 calendar days after identification.

§ 61.345 Standards: Containers.

(a) The owner or operator shall meet the following standards for each container in which waste is placed in accordance with § 61.342(c)(1)(ii) of this subpart:

(1) The owner or operator shall install, operate, and maintain a cover on each container used to handle, transfer, or store waste in accordance with the following requirements:

(i) The cover and all openings (e.g., bungs, hatches, and sampling ports) shall be designed to operate with no detectable emissions as indicated by an instrument reading of less than 500 ppmv above background, initially and thereafter at least once per year by the methods specified in § 61.355(h) of this subpart.

(ii) Each opening shall be maintained in a closed, sealed position (e.g., covered by a lid that is gasketed and latched) at all times that waste is in the container except when it is necessary to use the opening for waste loading, removal inspection, or sampling.

(2) Loading a pumpable waste into a container shall be performed by the owner or operator using a submerged fill pipe. The submerged fill pipe outlet shall extend to within two fill pipe diameters of the bottom of the container while the container is being loaded. During loading of the waste, the cover shall remain in place and all openings shall be maintained in a closed, sealed position except for those openings required for the submerged fill pipe and for venting of the container to prevent physical damage or permanent deformation of the container or cover.

(3) Treatment of a waste in a container, including aeration, thermal or other treatment, shall be performed by the owner or operator in a manner such that whenever it is necessary for the container to be open while the waste is being treated, the container is located under a cover (e.g., enclosure) with a

closed-vent system that routes all organic vapors vented from the container to a control device.

(i) The cover and all openings (e.g., doors, hatches) shall be designed to operate with no detectable emissions as indicated by an instrument reading of less than 500 ppmv above background, initially and thereafter at least once per year by the methods specified in § 61.355(h) of this subpart.

(ii) The closed-vent system and control device shall be designed and operated in accordance with § 61.349 of this subpart.

(b) Each cover and all openings shall be visually inspected initially and quarterly thereafter to ensure that they are closed and gasketed properly.

(c) Except as provided in § 61.350 of this subpart, when a broken seal or gasket or other problem is identified, first efforts at repair shall be made as soon as practicable, but not later than 15 calendar days after identification.

§ 61.346 Standards: Individual drain systems.

(a) Except as provided in paragraph (b) of this section, the owner or operator shall meet the following standards for each individual drain system in which waste is placed in accordance with § 61.342(c)(1)(ii) of this subpart:

(1) The owner or operator shall install, operate, and maintain on each drain system opening a cover and closed-vent system that routes all organic vapors vented from the drain system to a control device.

(i) The cover shall meet the following requirements:

(A) The cover and all openings (e.g., access hatches, sampling ports) shall be designed to operate with no detactable emissions as indicated by an instrument reading of less than 500 ppmv above background, initially and thereafter at least once per year by the methods specified in § 61.355(h) of this subpart.

(B) Each opening shall be maintained in a closed, sealed position (e.g., covered by a lid that is gasketed and latched) at all times that waste is in the drain system except when it is necessary to use the opening for waste sampling or removal, or for equipment inspection, maintenance, or repair.

(ii) The closed-vent system and control device shall be designed and operated in accordance with § 61.349 of this subpart.

(2) Each cover seal, access hatch, and all other openings shall be checked by visual inspection initially and quarterly thereafter to ensure that no cracks or gaps occur and that access hatches and other openings are closed and gasketed properly.

(3) Except as provided in § 61.350 of this subpart, when a broken seal or gasket or other problem is identified, or when detectable emissions are measured, first efforts at repair shall be made as soon as practicable, but not later than 15 calendar days after identification.

(b) As an alternative to complying with paragraph (a) of this section, an owner or operator may elect to comply with the following requirements:

(1) Each drain shall be equipped with water seal controls or a tightly sealed cap or plug.

(2) Each junction box shall be equipped with a cover and may have a vent pipe. The vent pipe shall be at least 90 cm (3 ft) in length and shall not exceed 10.2 cm (4 in) in diameter.

(i) Junction box covers shall have a tight seal around the edge and shall be kept in place at all times, except during inspection and maintenance.

(ii) One of the following methods shall be used to control emissions from the junction box vent pipe to the atmosphere:

(A) Equip the junction box with a system to prevent the flow of organic vapors from the junction box vent pipe to the atmosphere during normal operation. An example of such a system includes use of water seal controls. A flow indicator shall be installed, operated, and maintained on each junction box vent pipe to ensure that organic vapors are not vented from the junction box to the atmosphere during normal operation.

(B) Connect the junction box vent pipe to a closed-vent system and control device in accordance with § 61.349 of this subpart.

(3) Each sewer line shall not be open to the atmosphere and shall be covered or enclosed in a manner so as to have no visual gaps or cracks in joints, seals, or other emission interfaces.

(4) Equipment installed in accordance with paragraphs (b)(1), (b)(2), or (b)(3) of this section shall be inspected as follows:

(i) Each drain using water seal controls shall be checked by visual or physical inspection initially and thereafter quarterly for indications of low water levels or other conditions that would reduce the effectiveness of water seal controls.

(ii) Each drain using a tightly sealed cap or plug shall be visually inspected initially and thereafter quarterly to ensure caps or plugs are in place and properly installed.

(iii) Each junction box shall be visually inspected initially and thereafter quarterly to ensure that the cover is in place and to ensure that the cover has a tight seal around the edge.

(iv) The unburied portion of each sewer line shall be visually inspected initially and thereafter quarterly for indication of cracks, gaps, or other problems that could result in benzene emissions.

(5) Except as provided in § 61.350 of this subpart, when a broken seal, gap, crack or other problem is identified, first efforts at repair shall be made as soon as practicable, but not later than 15 calendar days after identification.

§ 61.347 Standards: Oil-water separators.

(a) Except as provided in § 61.352 of this subpart, the owner or operator shall meet the following standards for each oil-water separator in which waste is placed in accordance with § 61.342(c)(1)(ii) of this subpart:

(1) The owner or operator shall install, operate, and maintain a fixed-roof and closed-vent system that routes all organic vapors vented from the oil-water separator to a control device.

(i) The fixed-roof shall meet the following requirements:

(A) The cover and all openings (e.g., access hatches, sampling ports, and gauge wells) shall be designed to operate with no detectable emissions as indicated by an instrument reading of less than 500 ppmv above background, as determined initially and thereafter at least once per year by the methods specified in § 61.355(h) of this subpart.

(B) Each opening shall be maintained in a closed, sealed position (e.g., covered by a lid that is gasketed and latched) at all times that waste is in the oil-water separator except when it is necessary to use the opening for waste sampling or removal, or for equipment inspection, maintenance, or repair.

(ii) The closed-vent system and control device shall be designed and operated in accordance with the requirements of § 61.349 of this subpart.

(b) Each cover seal, access hatch, and all other openings shall be checked by visual inspection initially and quarterly thereafter to ensure that no cracks or gaps occur between the cover and oil-water separator wall and that access hatches and other openings are closed and gasketed properly.

(c) Except as provided in § 61.350 of this subpart, when a broken seal or gasket or other problem is identified, or when detectable emissions are measured, first efforts at repair shall be made as soon as practicable, but not later than 15 calendar days after identification.

§ 61.348 Standards: Treatment processes.

(a) Except as provided in paragraph (a)(5) of this section, the owner or operator shall treat the waste stream in accordance with the following requirements:

(1) The owner or operator shall design, install, operate, and maintain a treatment process that either:

(i) Removes benzene from the waste stream to a level less than 10 parts per million by weight (ppmw) on a flow-weighted annual average basis,

(ii) Removes benzene from the waste stream by 99 percent or more on a mass basis, or

(iii) Destroys benzene in the waste stream by incinerating the waste in a combustion unit that achieves a destruction efficiency of 99 percent or greater for benzene.

(2) Each treatment process complying with paragraphs (a)(1)(i) or (a)(1)(ii) of this section shall be designed and operated in accordance with the appropriate waste management unit standards specified in §§ 61.343 through 61.347 of this subpart. For example, if a treatment process is a tank, then the owner or operator shall comply with § 61.343 of this subpart.

(3) For the purpose of complying with the requirements specified in paragraph (a)(1)(i) of this section, the intentional or unintentional reduction in the benzene concentration of a waste stream by dilution of the waste stream with other wastes or materials is not allowed.

(4) An owner or operator may aggregate or mix together individual waste streams to create a combined waste stream for the purpose of facilitating treatment of waste to comply with the requirements of paragraph (a)(1) of this section except as provided in paragraph (a)(5) of this section.

(5) If an owner or operator aggregates or mixes any combination of process wastewater, product tank drawdown, or landfill leachate subject to § 61.342(c)(1) of this subpart together with other waste streams to create a combined waste stream for the purpose of facilitating management or treatment of waste in a wastewater treatment system, then the wastewater treatment system shall be operated in accordance with paragraph (b) of this section.

(b) The owner or operator that aggregates or mixes individual waste streams as defined in paragraph (a)(5) of this section for management and treatment in a wastewater treatment system shall comply with the following requirements:

(1) The owner or operator shall design and operate each waste management unit that comprises the wastewater treatment system in accordance with the appropriate standards specified in §§ 61.343 through 61.347 of this subpart.

(2) The provisions of paragraph (b)(1) of this section do not apply to any waste management unit that the owner or operator demonstrates to meet the following conditions initially and, thereafter, at least once per year:

(i) The benzene content of each waste stream entering the waste management unit is less than 10 ppmw on a flow-weighted annual average basis as determined by the procedures specified in § 61.355(c) of this subpart; and

(ii) The total annual benzene quantity contained in all waste streams managed or treated in exempt waste management units comprising the facility wastewater treatment systems is less than 1 Mg/yr. For this determination, total annual benzene quantity shall be calculated as follows:

(A) The total annual benzene quantity shall be calculated as the sum of the individual benzene quantities determined at each location where a waste stream first enters an exempt waste management unit. The benzene quantity discharged from an exempt waste management unit shall not be included in this calculation.

(B) The annual benzene quantity in a waste stream managed or treated in an enhanced biodegradation unit shall not be included in the calculation of the total annual benzene quantity, if the enhanced biodegradation unit is the first exempt unit in which the waste is managed or treated. A unit shall be considered enhanced biodegradation provided that the process generates biomass, some of which is recycled as well as periodically removed from the unit; and typically operates at a food-to-microorganism ratio in the range of 0.05 to 1.0 kg of biological oxygen demand per kg of biomass per day, a mixed liquor suspended solids ratio in the range of 1 to 8 grams per liter, and a residence time in the range of 3 to 36 hours.

(c) The owner and operator shall demonstrate that each treatment process or wastewater treatment system unit, except as provided in paragraph (d) of this section, achieves the appropriate conditions specified in paragraphs (a) or (b) of this section in accordance with the following requirements:

(1) Engineering calculations in accordance with requirements specified in § 61.356(e) of this subpart; or

(2) Performance tests conducted using the test methods and procedures that meet the requirements specified in § 61.355 of this subpart.

(d) A treatment process or waste stream is in compliance with the requirements of this subpart and exempt from the requirements of paragraph (c) of this section provided that the owner or operator documents that the treatment process or waste stream is in compliance with other regulatory requirements as follows:

(1) The treatment process is a hazardous waste incinerator for which the owner or operator has been issued a final permit under 40 CFR part 270 and complies with the requirements of 40 CFR part 264, subpart O;

(2) The treatment process is an industrial furnace or boiler burning hazardous waste for energy recovery for which the owner or operator has been issued a final permit under 40 CFR part 270 and complies with the requirements of 40 CFR part 266, subpart D;

(3) The waste stream is treated by a means or to a level that meets benzene-specific treatment standards in accordance with the Land Disposal Restrictions under 40 CFR part 268, and the treatment process is designed and operated with a closed-vent system and control device meeting the requirements of § 61.349 of this subpart;

(4) The waste stream is treated by a means or to a level that meets benzene-specific effluent limitations or performance standards in accordance with the Effluent Guidelines and Standards under 40 CFR parts 401–464, and the treatment process is designed and operated with a closed-vent system and control device meeting the requirements of § 61.349 of this subpart; or

(5) The waste stream is discharged to an underground injection well for which the owner or operator has been issued a final permit under 40 CFR part 270 and complies with the requirements of 40 CFR part 122.

(e) If the treatment process or wastewater treatment system unit has any openings (e.g., access doors, hatches, etc.), all such openings shall be sealed (e.g., gasketed, latched, etc.) and kept closed at all times when waste is being treated, except during inspection and maintenance.

(f) Each seal, access door, and all other openings shall be checked by visual inspections initially and quarterly thereafter to ensure that no cracks or gaps occur and that openings are closed and gasketed properly.

(g) Except as provided in § 61.350 of this subpart, when a broken seal or gasket or other problem is identified, first efforts at repair shall be made as soon as practicable, but not later than 15 calendar days after identification.

(h) Except for treatment processes complying with paragraph (d) of this section, the Administrator may request at any time an owner or operator demonstrate that a treatment process or wastewater treatment system unit meets the applicable requirements specified in paragraphs (a) or (b) of this section by conducting a performance test using the test methods and procedures as required in § 61.355 of this subpart.

(i) The owner or operator of a treatment process or wastewater treatment system unit that is used to comply with the provisions of this section shall monitor the unit in accordance with the applicable requirements in § 61.354 of this subpart.

§ 61.349 Standards: Closed-vent systems and control devices.

(a) For each closed-vent system and control device used to comply with standards in accordance with §§ 61.343 through 61.348 of this subpart, the owner or operator shall properly design, install, operate, and maintain the closed-vent system and control device in accordance with the following requirements:

(1) The closed-vent system shall:

(i) Be designed to operate with no detectable emissions as indicated by an instrument reading of less than 500 ppmv above background, as determined initially and thereafter at least once per year by the methods specified in § 61.355(h) of this subpart.

(ii) A flow indicator shall be installed on each vent stream to the control device to ensure that the vapors are being routed to the device. The flow indicator shall be installed in the event stream at the nearest feasible point to the control device inlet but before being combined with other vent streams.

(iii) All gauging and sampling devices shall be gas-tight except when gauging or sampling is taking place.

(2) The control device shall be designed and operated in accordance with the following conditions:

(i) An enclosed combustion device (e.g., a vapor incinerator, boiler, or process heater) shall meet one of the following conditions:

(A) Reduce the organic emissions vented to it by 95 weight percent or greater;

(B) Achieve a total organic compound concentration of 20 ppmv on a dry basis corrected to 3 percent oxygen; or

(C) Provide a minimum residence time of 0.5 seconds at a minimum temperature of 760°C. If a boiler or process heater issued as the control device, then the vent stream shall be introduced into the flame zone of the boiler or process heater.

(ii) A vapor recovery system (e.g., carbon absorption system or condenser) shall recover the organic emissions vented to it with an efficiency of 95 weight percent or greater.

(iii) A flare shall comply with the requirements of 40 CFR 60.18.

(b) Each closed-vent system and control device used to comply with this subpart shall be operated at all times when waste is placed in the waste management unit vented to the control device except when maintenance or repair of the waste management unit cannot be completed without a shutdown of the control device.

(c) An owner and operator shall demonstrate that each control device, except for a flare, achieves the appropriate conditions specified in paragraph (a)(2) of this section by using one of the following methods:

(i) Engineering calculations in accordance with requirements specified in § 61.356(f) of this subpart; or

(ii) Performance tests conducted using the test methods and procedures that meet the requirements specified in § 61.355 of this subpart.

(d) An owner or operator shall demonstrate compliance of each flare in accordance with paragraph (a)(2)(iii) of this section.

(e) The Administrator may request at any time an owner or operator demonstrate that a control device meets the applicable conditions specified in paragraph (a)(2) of this section by conducting a performance test using the test methods and procedures as required in § 61.355 of this subpart.

(f) Each closed-vent system and control device shall be visually inspected initially and quarterly thereafter. The visual inspection shall include inspection of ductwork and piping and connections to covers and control devices for evidence of visable defects such as holes in ductwork or piping and loose connections.

(g) Except as provided in § 61.350 of this subpart, if visible defects are observed during an inspection, or if other problems are identified, or if detectable emissions are measured, a first effort to repair the closed-vent system and control device shall be made as soon as practicable but no later than 5 calendar days after detection. Repair shall be completed no later than 15 calendar days after the emissions are detected or the visible defect is observed.

(h) The owner or operator of a control device that is used to comply with the provisions of this section shall monitor the control device in accordance with § 61.354(c) of this subpart.

§ 61.350 Standards: Delay of repair.

(a) Delay of repair of facilities or units that are subject to the provisions of this subpart will be allowed if the repair is technically impossible without a complete or partial facility or unit shutdown.

(b) Repair of such equipment shall occur before the end of the next facility or unit shutdown.

§ 61.351 Alternative standards for tanks.

(a) As an alternative to the standards for tanks specified in § 61.343 of this subpart, an owner or operator may elect to comply with one of the following:

(1) A fixed roof and internal floating roof meeting the requirements in 40 CFR 60.112b(a)(1);

(2) An external floating roof meeting the requirements of 40 CFR 60.112 (a)(2); or

(3) An alternative means of emission limitation as described in 40 CFR 60.114b.

(b) If an owner or operator elects to comply with the provisions of this section, then the owner or operator is exempt from the provisions of § 61.343 of this subpart applicable to the same facilities.

§ 61.352 Alternative standards for oil-water separators.

(a) As an alternative to the standards for oil-water separators specified in § 61.347 of this subpart, an owner or operator may elect to comply with one of the following:

(1) A floating roof meeting the requirements in 40 CFR 60.693–2(a); or

(2) An alternative means of emission limitation as described in 40 CFR 60.694.

(b) For portions of the oil-water separator where it is infeasible to construct and operate a floating roof, such as over the weir mechanism, a fixed roof vented to a vapor control device that meets the requirements in §§ 61.347 and 61.349 of this subpart shall be installed and operated.

(c) Except as provided in paragraph (b) of this section, if an owner or operator elects to comply with the provisions of this section, then the owner or operator is exempt from the provisions in § 61.347 of this subpart applicable to the same facilities.

§ 61.353 Alternative means of emission limitation.

(a) If, in the Administrator's judgment, an alternative means of emission limitation will achieve a reduction in benzene emissions at least equivalent to the reduction in benzene emissions achieved by the applicable requirements in §§ 61.342 through 61.349 of this subpart, the Administrator will publish in the Federal Register a notice permitting the use of the alternative means for purposes of compliance with that requirement. The notice may condition the permission on requirements related to the operation and maintenance of the alternative means.

(b) Any notice under paragraph (a) of this section shall be published only after public notice and an opportunity for a hearing.

(c) Any person seeking permission under this section shall collect, verify, and submit to the Administrator information showing that the alternative means achieves equivalent emission reductions.

§ 61.354 Monitoring of operations.

(a) Except for a treatment process or waste stream complying with § 61.348(d), the owner or operator shall monitor each treatment process or wastewater treatment system unit to ensure the unit is properly operated and maintained by one of the following monitoring procedures:

(1) Measure the benzene concentration of the waste stream exiting the treatment process complying with paragraph (a)(1)(i) of this section or the wastewater stream exiting the wastewater treatment unit complying with paragraph (b) of this section at least once per month by collecting and analyzing one or more samples using the procedures specified in § 61.355(c)(2) of this subpart.

(2) Install, calibrate, operate, and maintain according to manufacturer's specifications equipment to continuously monitor and record a process parameter (or parameters) for the treatment process or wastewater treatment system unit that indicates proper system operation. The owner or operator shall inspect at least once each operating day the data recorded by the monitoring equipment (e.g., temperature monitor or flow indicator) to ensure that the unit is operating properly.

(b) If an owner or operator complies with the requirements of § 61.348(b) of this subpart, then the owner or operator shall install, calibrate, operate, and maintain according to manufacturer's specifications equipment to continuously monitor and record the flow rate of each wastewater stream exiting the wastewater treatment system.

(c) An owner or operator subject to the requirements in § 61.349 of this subpart shall install, calibrate, maintain, and operate according to the manufacturer's specifications a device to continuously monitor the control device operation as specified in the following paragraphs, unless alternative monitoring procedures or requirements are approved for that facility by the Administrator. The owner or operator shall inspect at least once each operating day the data recorded by the monitoring equipment (e.g., temperature monitor or flow indicator) to ensure that the control device is operating properly.

(1) For a thermal vapor incinerator, a temperature monitoring device equipped with a continuous recorder. The device shall have an accuracy of ±1 percent of the temperature being monitored in °C or ±0.5°C, whichever is greater. The temperature sensor shall be installed at a representative location in the combustion chamber.

(2) For a catalytic vapor incinerator, a temperature monitoring device equipped with a continuous recorder. The device shall be capable of monitoring temperature at two locations, and have an accuracy of ±1 percent of the temperature being monitored in °C or ±0.5°C, whichever is greater. One temperature sensor shall be installed in the vent stream at the nearest feasible point to the catalyst bed inlet and a second temperature sensor shall be installed in the vent stream at the nearest feasible point to the catalyst bed outlet.

(3) For a flare, a monitoring device in accordance with 40 CFR 60.18(f)(2) equipped with a continuous recorder.

(4) For a boiler or process heater having a design heat input capacity less than 44 megawatts (MW), a temperature monitoring device equipped with a continuous recorder. The device shall have an accuracy of ±1 percent of the temperature being monitored in °C or ±0.5°C, whichever is greater. The temperature sensor shall be installed at a representative location in the combustion chamber.

(5) For a boiler or process heater having a design heat input capacity greater than or equal to 44 MW, a monitoring device equipped with a continuous recorder to measure a parameter(s) that indicates good combustion operating practices are being used.

(6) For a condenser, either: (i) A monitoring device equipped with a continuous recorder to measure the concentration level of the organic compounds in the exhaust vent stream from the condenser; or (ii) A temperature monitoring device equipped with a continuous recorder. The device shall be capable of monitoring temperature at two locations, and have an accuracy of ±1 percent of the temperature being monitored in °C or ±0.5°C, whichever is greater. One temperature sensor shall be installed at a location in the exhaust stream from the condenser, and a second temperature sensor shall be installed at a location in the coolant fluid exiting the condenser.

(7) For a carbon adsorption system that regenerates the carbon bed directly in the control device such as a fixed-bed carbon adsorber, either:

(i) A monitoring device equipped with a continuous recorder to measure the concentration level of the organic compounds in the exhaust vent stream from the carbon bed; or (ii) A monitoring device equipped with a continuous recorder to measure a parameter that indicates the carbon bed is regenerated on a regular, predetermined time cycle.

(8) For a vapor recovery system other than a condenser or carbon adsorption system, a monitoring device equipped with a continuous recorder to measure the concentration level of the organic compounds in the exhaust vent stream from the control device.

(d) For a carbon adsorption system that does not regenerate the carbon bed directly on site in the control device (e.g., a carbon canister), the concentration level of the organic compounds in the exhaust vent stream from the carbon adsorption system shall be monitored on a regular schedule, and the existing carbon shall be replaced with fresh carbon immediately when carbon breakthrough is indicated. The device shall be monitored on a daily basis or at intervals no greater than 20 percent of the design carbon replacement interval, whichever is greater. As an alternative to conducting this monitoring, an owner or operator may replace the carbon in the carbon adsorption system with fresh carbon at a regular predetermined time interval that is less than the carbon replacement interval that is determined by the maximum design flow rate and organic concentration in the gas stream vented to the carbon adsorption system.

(e) An alternative operation or process parameter may be monitored if it can be demonstrated that another parameter will ensure that the control device is operated in conformance with these standards and the control device's design specifications.

§ 61.355 Test methods, procedures, and compliance provisions.

(a) An owner or operator shall determine the total annual benzene quantity from facility waste by the following procedure:

(1) For each waste stream subject to this subpart having a flow-weighted annual average water content greater than 10 percent water, the owner or operator shall:

(i) Determine the annual waste quantity for each waste stream at the point of waste generation using the procedures specified in paragraph (b) of this section.

(ii) Determine the flow-weighted annual average benzene concentration for each waste stream at the point of waste generation using the procedures specified in paragraph (c) of this section.

(iii) Calculate the annual benzene quantity for each waste stream by multiplying the annual waste quantity of the waste stream times the flow-weighted annual average benzene concentration.

(2) Total annual benzene quantity from facility waste is calculated by adding together the annual benzene quantity for each waste stream.

(3) If the total annual benzene quantity from facility waste is equal to or greater than 10 Mg/yr, then the owner or operator shall comply with the requirements of § 61.342(c) or (d) of this subpart.

(4) If the total annual benzene quantity from facility waste is less than 10 Mg/yr but is equal to or greater than 1 Mg/yr, then the owner or operator shall:

(i) Comply with the recordkeeping requirements of § 61.356 and reporting requirements of § 61.357 of this subpart; and

(ii) Repeat the determination of total annual benzene quantity from facility waste at least once per year whenever there is a change in the process generating the waste that could cause the total annual benzene quantity from facility waste to increase to 10 Mg/yr or more.

(5) If the total annual benzene quantity from facility waste is less than 1 Mg/yr, then the owner or operator shall:

(i) Comply with the recordkeeping requirements of § 61.356 and reporting requirements of § 61.357 of this subpart; and

(ii) Repeat the determination of total annual benzene quantity from facility waste whenever there is a change in the process generating the waste that could cause the total annual benzene quantity from facility waste to increase to 1 Mg/yr or more.

(b) An owner or operator shall determine the annual waste quantity for each waste stream by one of the following methods:

(1) Selecting the highest annual quantity of waste managed from historical records representing the most recent 5 years of operation or, if the facility has been in service for less than 5 years but at least 1 year, from historical records representing the total operating life of the facility;

(2) Using the maximum design capacity of the waste management unit; or

(3) Measurements that are representative of maximum waste generation rates.

(c) An owner or operator shall determine the flow-weighted annual average benzene concentration for each waste stream by one of the following methods:

(1) *Knowledge of the waste*. The owner or operator shall provide sufficient information to document the flow-weighted annual average benzene concentration of each waste stream. Examples of information that could constitute knowledge include material balances, records of chemicals purchases, or previous test results provided the results are still relevant to the current waste stream conditions. If test data are used, then the owner or operator shall provide documentation describing the testing protocol and the means by which sampling variability and analytical variability were accounted for in the determination of the flow-weighted annual average benzene concentration for the waste stream.

(2) Measurements of the benzene concentration in the waste stream in accordance with the following procedures:

(i) Collect a minimum of three representative samples from each waste stream. Where feasible, samples shall be taken from an enclosed pipe prior to the waste being exposed to the atmosphere.

(ii) For waste in enclosed pipes, the following procedures shall be used:

(A) Samples shall be collected prior to the waste being exposed to the atmosphere in order to minimize the loss of benzene prior to sampling.

(B) A static mixer shall be installed in the process line or in a by-pass line unless the owner or operator demonstrates that installation of a static mixer in the line is not necessary to accurately determine the benzene concentration of the waste stream.

(C) The sampling tap shall be located within two pipe diameters of the static mixer outlet.

(D) Prior to the initiation of sampling, sample lines and cooling coil shall be purged with at least four volumes of waste.

(E) After purging, the sample flow shall be directed to a sample container and the tip of the sampling tube shall be kept below the surface of the waste during sampling to minimize contact with the atmosphere.

(F) Samples shall be collected at a flow rate such that the cooling coil is able to maintain a waste temperature less than 10°C.

(G) After filling, the sample container shall be capped immediately (within 5 seconds) to leave a minimum headspace in the container.

(H) The sample containers shall immediately be cooled and maintained at a temperature below 10°C for transfer to the laboratory.

(iii) When sampling from an enclosed pipe is not feasible, a minimum of three representative samples shall be collected in a manner to minimize exposure of the sample to the atmosphere and loss of benzene prior to sampling.

(iv) Each waste sample shall be analyzed using one of the following test methods for determining the benzene concentration in a waste stream:

(A) Method 8020, Aromatic Volatile Organics, in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication No. SW-846 (incorporation by reference as specified in § 61.18 of this part);

(B) Method 8021, Volatile Organic Compounds in Water by Purge and Trap Capillary Column Gas Chromatography with Photoionization and Electrolytic Conductivity Detectors in Series in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication No. SW-846 (incorporation by reference as specified in § 61.18 of this part);

(C) Method 8240, Gas Chromatography/Mass Spectrometry for Volatile Organics in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication No. SW-846 (incorporation by reference as specified in § 61.18 of this part);

(D) Method 8260, Gas Chromatography/Mass Spectrometry for Volatile Organics: Capillary Column Technique in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication No. SW-846 (incorporation by reference as specified in § 61.18 of this part);

(E) Method 602, Purgeable Aromatics, as described in 40 CFR part 136, appendix A, Test Procedures for Analysis of Organic Pollutants, for wastewaters for which this is an approved EPA methods; or

(F) Method 624, Purgeables, as described in 40 CFR part 136, appendix A, Test Procedures for Analysis of Organic Pollutants, for wastewaters for which this is an approved EPA method.

(v) The flow-weighted annual average benzene concentration shall be calculated by averaging the results of the sample analyses as follows:

$$\bar{C} = \frac{1}{Q_t} \times \sum_{i=1}^{n} (Q_i)(C_i)$$

Where:

$\bar{C}$=Flow-weighted annual average benzene concentration for waste stream, ppmw.

Q_t=Total annual waste quantity for waste stream, kg/yr.

n=Number of waste samples (at least 3).

Q_i=Annual waste quantity for waste stream represented by C_i, kg/yr.

C_i=Measured concentration of benzene in waste sample i, ppmw.

(d) An owner or operator using performance tests to demonstrate compliance of a treatment process with § 61.348(a)(1)(i) of this subpart shall measure the flow-weighted annual average benzene concentration of the waste stream existing the treatment process by collecting and analyzing a minimum of three representative samples of the waste stream using the procedure in paragraph (c)(2) of this section. The test shall be conducted under conditions that exist when the treatment process is operating at the highest inlet waste stream flow rate and benzene content expected to occur. Operations during periods of startup, shutdown, and malfunction shall not constitute representative conditions for the purpose of a test. The owner or operator shall record all process information as is necessary to document the operating conditions during the test.

(e) An owner or operator using performance tests to demonstrate compliance of a treatment process with § 61.348(a)(1)(ii) of this subpart shall determine the percent reduction of benzene in the waste stream on a mass basis by the following procedure:

(1) The test shall be conducted under conditions that exist when the treatment process is operating at the highest inlet waste stream flow rate and benzene content expected to occur. Operations during periods of startup, shutdown, and malfunction shall not constitute representative conditions for the purpose of a test. The owner or operator shall record all process information as is necessary to document the operating conditions during the test.

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

(3) The mass flow rate of benzene entering the treatment process (E_b) shall be determined by computing the product of the flow rate of the waste stream entering the treatment process, as determined by the inlet flow meter, and the benzene concentration of the waste stream, as determined using the sampling and analytical procedures specified in paragraph (c) of this section. Three grab samples of the waste shall be taken at equally spaced time intervals over a 1-hour period. Each 1-hour period constitutes a run, and the performance test shall consist of a minimum of 3 runs conducted over a 3-hour period. The mass flow rate of benzene entering the treatment process is calculated as follows:

$$E_b = \frac{K}{n \times 10^6}\left(\sum_{i=1}^{n} V_i C_i\right)$$

Where:

E_b=Mass flow rate of benzene entering the treatment process, kg/hour.

K=Density of the waste stream, kg/m³.

V_i=Average volume flow rate of waste entering the treatment process during each run i, m³/hour.

C_i=Average concentration of benzene in the waste stream entering the treatment process during each run i, ppmw.

n=Number of runs.

(4) The mass flow rate of benzene exiting the treatment process (E_a) shall be determined by computing the product of the flow rate of the waste stream exiting the treatment process, as determined by the inlet flow meter, and the benzene concentration of the waste stream, as determined using the sampling and analytical procedures specified in paragraph (c) of this section. Three grab samples of the waste shall be taken at equally spaced time intervals over a 1-hour period. Each 1-hour period constitutes a run, and the performance test shall consist of a minimum of 3 runs conducted over the same 3-hour period at which the mass flow rate of benzene entering the treatment process is determined. The mass flow rate of benzene exiting the treatment process is calculated as follows:

$$E_a = \frac{K}{n \times 10^6}\left(\sum_{i=1}^{n} V_i C_i\right)$$

Where:

E_a=Mass flow rate of benzene exiting the treatment process, kg/hour.

K=Density of the waste stream, kg/m³.

V_i=Average volume flow rate of waste exiting the treatment process during each run i, m³/hour.

C_i=Average concentration of benzene in the waste stream exiting the treatment process during each run i, ppmw.

n=Number of runs.

(5) The percent reduction across the treatment process shall be calculated as follows:

$$R = \frac{E_b - E_a}{E_b} \times 100$$

Where:

R=Control efficiency of the treatment process, percent.

E_b=Mass flow rate of benzene entering the treatment process, kg/hour.

E_a=Mass flow rate of benzene exiting the treatment process, kg/hour.

(f) An owner or operator using performance tests to demonstrate compliance of a treatment process with § 61.348(a)(1)(iii) of this subpart shall determine the benzene destruction efficiency for the combustion unit by the following procedure:

(1) The test shall be conducted under conditions that exist when the combustion unit is operating at the highest inlet waste stream flow rate and benzene content expected to occur. Operations during periods of startup, shutdown, and malfunction shall not constitute representative conditions for the purpose of a test. The owner or operator shall record all process information necessary to document the operating conditions during the test.

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

(3) The mass flow rate of benzene entering the combustion unit shall be determined by computing the product of the flow rate of the waste stream entering the combustion unit, as determined by the inlet flow meter, and the benzene concentration of the waste stream, as determined using the sampling procedures in paragraph (c) of this section. Three grab samples of the waste shall be taken at equally spaced time intervals over a 1-hour period. Each 1-hour period constitutes a run, and the performance test shall consist of a minimum of 3 runs conducted over a 3-hour period. The mass flow rate of benzene into the combustion unit is calculated as follows:

$$E_b = \frac{K}{n \times 10^6}\left(\sum_{i=1}^{n} V_i C_i\right)$$

Where:

E_b=Mass flow rate of benzene into the combustion unit, kg/hour.

K=Density of the waste stream, kg/m³.

V_i=Average volume flow rate of waste entering the combustion unit during each run i, m³/hour.

C_i=Average concentration of benzene in the waste stream entering the combustion unit during each run i, ppmw.

n=Number of runs.

(4) The mass flow rate of benzene exiting the combustion unit exhaust stack shall be determined as follows:

(i) The time period for the test shall not be less than 3 hours during which at least 3 stack gas samples are collected and be the same time period at which the mass flow rate of benzene entering the treatment process is determined. Each sample shall be collected over a 1-hour period (e.g., in a tedlar bag) to represent a time-integrated composite sample and each 1-hour period shall correspond to the periods when the waste feed is sampled.

(ii) A run shall consist of a 1-hour period during the test. For each run:

(A) The reading from each measurement shall be recorded;

(B) The volume exhausted shall be determined using method 2, 2A, 2C, or 2D from appendix A of 40 CFR part 60, as appropriate.

(C) The average benzene concentration in the exhaust downstream of the combustion unit shall be determined using method 18 from appendix A of 40 CFR part 60.

(iii) The mass of benzene emitted during each run shall be calculated as follows:

$$M_i = KVC(10^{-6})$$

Where:

M_i = Mass of benzene emitted during run i, kg.

V = Volume of air-vapor mixture exhausted at standard conditions, m^3.

C = Concentration of benzene measured in the exhaust, ppmv.

K = Conversion factor = 3.24 kg/m^3 for benzene.

(iv) The benzene mass emission rate in the exhaust shall be calculated as follows:

$$E_a = \left(\sum_{i=1}^{n} M_i \right) / T$$

Where:

E_a = Mass flow rate of benzene emitted, kg/hour.

M_i = Mass of benzene emitted during run i, kg.

T = Total time of all runs, hour.

n = Number of runs.

(5) The benzene destruction efficiency for the combustion unit shall be calculated as follows:

$$R = \frac{E_b - E_a}{E_b} \times 100$$

Where:

R = Benzene destruction efficiency for the combustion unit, percent.

E_b = Mass flow rate of benzene into the combustion unit, kg/hour.

E_a = Mass flow of benzene from the combustion unit, kg/hour.

(g) An owner or operator using performance tests to demonstrate compliance of a wastewater treatment system unit with § 61.348(b)(1) of this subpart shall measure the flow-weighted annual average benzene concentration of the wastewater stream exiting the unit by collecting and analyzing a minimum of three representative samples of the waste stream using the procedures in paragraph (c)(2) of this section. The test shall be conducted under conditions that exist when the wastewater treatment system is operating at the highest inlet wastewater stream flow rate and benzene content expected to occur. Operations during periods of startup, shutdown, and malfunction shall not constitute representative conditions for the purpose of a test. The owner or operator shall record all process information as is necessary to document the operating conditions during the test.

(h) An owner or operator shall test equipment for compliance with no detectable emissions as required in §§ 61.343 through 61.347, and § 61.349 of this subpart in accordance with the following requirements:

(1) Monitoring shall comply with method 21 from appendix A of 40 CFR part 60.

(2) The detection instrument shall meet the performance criteria of method 21.

(3) The instrument shall be calibrated before use on each day of its use by the procedures specified in method 21.

(4) Calibration gases shall be:

(i) Zero air (less than 10 ppm of hydrocarbon in air); and

(ii) A mixture of methane or n-hexane and air at a concentration of approximately, but less than, 10,000 ppm methane or n-hexane.

(5) The background level shall be determined as set forth in method 21.

(6) The instrument probe shall be traversed around all potential leak interfaces as close as possible to the interface as described in method 21.

(7) The arithmetic difference between the maximum concentration indicated by the instrument and the background level is compared to 500 ppm for determining compliance.

(i) An owner or operator using a performance test to demonstrate compliance of a control device with the organic reduction efficiency requirement specified under § 61.349(a)(2) of this subpart shall use the following procedures:

(1) The test shall be conducted under conditions that exist when the waste management unit vented to the control device is operating at the highest load or capacity level expected to occur. Operations during periods of startup, shutdown, and malfunction shall not constitute representative conditions for the purpose of a test. The owner or operator shall record all process information necessary to document the operating conditions during the test.

(2) Sampling sites shall be selected using method 1 or 1A from appendix A of 40 CFR part 60, as appropriate.

(3) The mass flow rate of organics entering and exiting the control device shall be determined as follows:

(i) The time period for the test shall not be less than 3 hours during which at least 3 stack gas samples are collected. Samples of the vent stream entering and exiting the control device shall be collected during the same time period. Each sample shall be collected over a 1-hour period (e.g., in a tedlar bag) to represent a time-integrated composite sample.

(ii) A run shall consist of a 1-hour period during the test. For each run:

(A) The reading from each measurement shall be recorded;

(B) The volume exhausted shall be determined using method 2, 2A, 2C, or 2D from appendix A of 40 CFR part 60, as appropriate;

(C) The organic concentration in the vent stream entering and exiting the control shall be determined using method 18 from appendix A of 40 CFR part 60.

(iii) The mass of organics entering and exiting the control device during each run shall be calculated as follows:

$$M_{aj} = K\, V_{aj} \left(\sum_{i=1}^{n} C_{ai} MW_i \right) (10^{-6})$$

$$M_{bj} = K\, V_{bj} \left(\sum_{i=1}^{n} C_{bi} MW_i \right) (10^{-6})$$

Where:

M_{aj} = Mass of organics in the vent stream entering the control device during run j, kg.

M_{bj} = Mass of organics in vent stream exiting the control device during run j, kg.

V_{aj} = Volume of vent stream entering the control device during run j at standards conditions, m^3.

V_{bj} = Volume of vent stream exiting the control device during run j at standards conditions, m^3.

C_{ai} = Organic concentration of compound i measured in the vent stream entering the control device as determined by Method 18, ppm by volume on a dry basis.
C_{bi} = Organic concentration of compound i measured in the vent stream exiting the control device as determined by method 18, ppm by volume on a dry basis.
MW_i = Molecular weight of organic compound i in the vent stream kg/kg-mol.
n = Number of organic compounds in the vent stream.
K = Conversion factor for molar volume = 0.0416 kg-mol/m³ (at 293°K and 760 mm Hg).
10^{-6} = Conversion from ppm, ppm^{-1}.

(iv) The mass flow rate of organics entering and exiting the control device shall be calculated as follows:

$$E_a = \left(\sum_{j=1}^{n} M_{aj} \right) / T$$

$$E_b = \left(\sum_{j=1} M_{bj} \right) / T$$

Where:
E_a = Mass flow rate of organics entering the control device, kg/hour.
E_b = Mass flow rate of organics exiting the control device, kg/hour.
M_{aj} = Mass of organics in the vent stream entering the control device during run j, kg.
M_{bj} = Mass of organics in vent stream exiting the control device during run j, kg.
T = Total time of all runs, hour.
n = Number of runs.

(4) The organic reduction efficiency for the control device shall be calculated as follows:

$$R = \frac{E_b - E_a}{E_b} \times 100$$

Where:
R = Total organic reduction efficiency for the control device, percent.
E_b = Mass flow rate of organics entering the control device, kg/hr.
E_a = Mass flow rate of organics exiting the control device, kg/hr.

§ 61.356 Recordkeeping requirements.

(a) Each owner or operator of a facility subject to the provisions of this subpart shall comply with the recordkeeping requirements of this section. Each record shall be maintained in a readily accessible location at the facility site for a period not less than two years from the date the information is recorded unless otherwise specified.

(b) Each owner or operator shall maintain records that identify each waste stream at the facility subject to this subpart, and indicate whether or not the waste stream is controlled for benzene emissions in accordance with this subpart. In addition the owner or operator shall maintain the following records:

(1) For each waste stream not controlled for benzene emissions in accordance with this subpart, the records shall include all test results, measurements, calculations, and other documentation used to determine the following information for the waste stream: waste stream identification, water content, whether or not the waste stream is a process wastewater stream, annual waste quantity, range of benzene concentrations, annual average flow-weighted benzene concentration, and annual benzene quantity.

(2) For each process wastewater stream not contolled for benzene emissions in accordance with § 61.342(c)(3) of this subpart, the records shall include all measurements, calculations, and other documentation used to determine that the continuous flow of process wastewater is less than 0.02 liters per minute or the annual waste quantity of process wastewater is less than 10 Mg/yr.

(3) For each facility where process wastewater streams are controlled for benzene emissions in accordance with § 61.342(d) of this subpart, the records shall include for each treated process wastewater stream all measurements, calculations, and other documentation used to determine the annual benzene quantity in the process wastewater stream exiting the treatment process.

(4) For each facility where wastewater streams are controlled for benzene emissions in accordance with § 61.348(b)(1)(i) of this subpart, the records shall include all measurements, calculations, and other documentation used to determine the annual benzene quantity in the wastewater streams exiting wastewater treatment systems at the facility.

(c) An owner or operator transferring waste off-site to another facility for treatment in accordance with § 61.342(e) of this subpart shall maintain documentation for each offsite waste shipment that includes the following information: date waste is shipped offsite, quantity of waste shipped offsite, name and address of the facility receiving the waste, and a copy of the notice sent with the waste shipment.

(d) An owner or operator using control equipment in accordance with § 61.343 through 61.347 of this subpart shall maintain engineering design documentation for all control equipment that is installed on the waste management unit. The documentation shall be retained for the life of the control equipment. If a cover is used, then the documentation shall include the following information: cover type, name of company manufacturing or fabricating the cover, manufacturer model number, cover dimensions, materials used to fabricate cover, mechanism used to install cover on the waste management unit and seal the cover perimeter; type, dimensions, and location of each opening; and mechanism used to close and seal each opening. If a control device is used, then the owner or operator shall maintain the control device records required by paragraph (f) of this section.

(e) An owner or operator using a treatment process or wastewater treatment system unit in accordance with § 61.348 of this subpart shall maintain the following records. The documentation shall be retained for the life of the unit.

(1) A statement signed and dated by the owner or operator certifying that the unit is designed to operate at the documented performance level when the waste stream entering the unit is at the highest waste stream flow rate and benzene content expected to occur.

(2) If engineering calculations are used to determine treatment process or wastewater treatment system unit performance, then the owner or operator shall maintain the complete design analysis for the unit. The design analysis shall include the following information: a list of all information references and sources used in preparing the documentation; design specifications, drawings, schematics, and piping and instrumentation diagrams; and other documentation necessary to demonstrate the unit performance.

(3) If performance tests are used to determine treatment process or wastewater treatment system unit performance, then the owner or operator shall maintain all test information necessary to demonstrate the unit performance.

(i) A description of the unit including the following information: type of treatment process; manufacturer name and model number; and for each waste stream entering and exiting the unit, the waste stream type (e.g., process wastewater, sludge, slurry, etc.), and the design flow rate and benzene content.

(ii) Documentation describing the test protocol and the means by which sampling variability and analytical variability were accounted for in the determination of the unit performance. The description of the test protocol shall include the following information: sampling locations, sampling method, sampling frequency, and analytical procedures used for sample analysis.

(iii) Records of unit operating conditions during each test run including all key process parameters.

(iv) All test results.

(4) If a control device is used, then the owner or operator shall maintain the control device records required by paragraph (f) of this section.

(f) An owner or operator using a closed-vent system and control device in accordance with § 61.349 of this subpart shall maintain the following records. The documentation shall be retained for the life of the control device.

(1) A statement signed and dated by the owner or operator certifying that the closed-vent system and control device is designed to operate at the documented performance level when the waste management unit vented to the control device is or would be operating at the highest load or capacity expected to occur.

(2) If engineering calculations are used to determine control device performance in accordance with § 61.349(c) of this subpart, then a design analysis for the control device that includes:

(i) A list of all information references and sources used in preparing the documentation.

(ii) Specifications, drawings, schematics, and piping and instrumentation diagrams prepared by the owner or operator, or the control device manufacturer or vendor that describe the control device design based on acceptable engineering texts. The design analysis shall address the following vent stream characteristics and control device operating parameters:

(A) For a thermal vapor incinerator, the design analysis shall consider the vent stream composition, constituent concentrations, and flow rate. The design analysis shall also establish the design minimum and average temperature in the combustion zone and the combustion zone residence time.

(B) For a catalytic vapor incinerator, the design analysis shall consider the vent stream composition, constituent concentrations, and flow rate. The design analysis shall also establish the design minimum and average temperatures across the catalyst bed inlet and outlet.

(C) For a boiler or process heater, the design analysis shall consider the vent stream composition, constituent concentrations, and flow rate. The design analysis shall also establish the design minimum and average flame zone temperatures, combustion zone residence time, and description of method and location where the vent stream is introduced into the flame zone.

(D) For a flare, the design analysis shall consider the vent stream composition, constituent concentrations, and flow rate. The design analysis shall also consider the requirements specified in 40 CFR 60.18.

(E) For a condenser, the design analysis shall consider the vent stream composition, constituent concentrations, flow rate, relative humidity, and temperature. The design analysis shall also establish the design outlet organic compound concentration level, design average temperature of the condenser exhaust vent stream, and the design average temperatures of the coolant fluid at the condenser inlet and outlet.

(F) For a carbon adsorption system that regenerates the carbon bed directly on-site in the control device such as a fixed-bed adsorber, the design analysis shall consider the vent stream composition, constituent concentrations, flow rate, relative humidity, and temperature. The design analysis shall also establish the design exhaust vent stream organic compound concentration level, number and capacity of carbon beds, type and working capacity of activated carbon used for carbon beds, design total steam flow over the period of each complete carbon bed regeneration cycle, duration of the carbon bed steaming and cooling/drying cycles, design carbon bed temperature after regeneration, design carbon bed regeneration time, and design service life of carbon.

(G) For a carbon adsorption system that does not regenerate the carbon bed directly on-site in the control device such as a carbon canister, the design analysis shall consider the vent stream composition, constituent concentrations, flow rate, relative humidity, and temperature. The design analysis shall also establish the design exhaust vent stream organic compound concentration level, capacity of carbon bed, type and working capacity of activated carbon used for carbon bed, and design carbon replacement interval based on the total carbon working capacity of the control device and source operating schedule.

(3) If performance tests are used to determine control device performance in accordance with § 61.349(c) of this subpart:

(i) A description of how it is determined that the test is conducted when the waste management unit or treatment process is operating at the highest load or capacity level. This description shall include the estimated or design flow rate and organic content of each vent stream and definition of the acceptable operating ranges of key process and control parameters during the test program.

(ii) A description of the control device including the type of control device, control device manufacturer's name and model number, control device dimensions, capacity, and construction materials.

(iii) A detailed description of sampling and monitoring procedures, including sampling and monitoring locations in the system, the equipment to be used, sampling and monitoring frequency, and planned analytical procedures for sample analysis.

(iv) All test results.

(g) An owner or operator shall maintain a record for each visual inspection required by §§ 61.343 through 61.347 of this subpart that identifies a problem (such as a broken seal, gap of other problem) which could result in benzene emissions. The record shall include the date of the inspection, waste management unit and control equipment location where the problem is identified, a description of the problem, a description of the corrective action taken, and the date the corrective action was completed.

(h) An owner or operator shall maintain a record for each test of no detectable emissions required by §§ 61.343 through 61.347 and § 61.349 of this subpart. The record shall include the following information: date the test is performed, background level measured during test, and maximum concentration indicated by the instrument reading measured for each potential leak interface. If detectable emissions are measured at a leak interface, then the record shall also include the waste management unit, control equipment, and leak interface location where detectable emissions were measured, a description of the problem, a description of the corrective action taken, and the date the corrective action was completed.

(i) For each treatment process and wastewater treatment system unit operated to comply with § 61.348, the owner or operator shall maintain documentation that includes the following information regarding the unit operation:

(1) Dates of startup and shutdown of the unit.

(2) If measurements of waste stream benzene concentration are performed in accordance with § 61.354(a)(1) of this subpart, the owner or operator shall maintain records that include date each test is performed and all test results.

(3) If a process parameter is continuously monitored in accordance with § 61.354(a)(2) of this subpart, the owner or operator shall maintain records that include a description of the operating parameter (or parameters) to be monitored to ensure that the unit will be operated in conformance with these standards and the unit's design specifications, and an explanation of the criteria used for selection of that parameter (or parameters). This documentation shall be kept for the life of the unit.

(4) Periods when the unit is not operated as designed.

(j) For each control device, the owner or operator shall maintain documentation that includes the following information regarding the control device operation:

Dates of startup and shutdown of the closed-vent system and control device.

(2) A description of the operating parameter (or parameters) to be monitored to ensure that the control device will be operated in conformance with these standards and the control device's design specifications and an explanation of the criteria used for selection of that parameter (or parameters). This documentation shall be kept for the life of the control device.

(3) Periods when the closed-vent system and control device is not operated as designed including periods when a flare pilot does not have a flame.

(4) If a thermal vapor incinerator is used, then the owner or operator shall maintain continuous records of the temperature of the gas stream in the combustion zone of the incinerator and records of all 3-hour periods of operation during which the average temperature of the gas stream in the combustion zone is more than 28 °C below the design combustion zone temperature.

(5) If a catalytic vapor incinerator is used, then the owner or operator shall maintain continuous records of the temperature of the gas stream both upstream and downstream of the catalyst bed of the incinerator, records of all 3-hour periods of operation during which the average temperature measured before the catalyst bed is more than 28 °C below the design gas stream temperature, and records of all 3-hour periods of operation during which the average temperature difference across the catalyst bed is less than 80 percent of the design temperature difference.

(6) If a boiler or process heater is used, then the owner or operator shall maintain records of each occurrence when there is a change in the location at which the vent stream is introduced into the flame zone as required by § 61.349(a)(2)(i)(C) of this subpart. For a boiler or process heater having a design heat input capacity less than 44 MW, the owner or operator shall maintain continuous records of the temperature of the gas stream in the combustion zone of the boiler or process heater and records of all 3-hour periods of operation during which the average temperature of the gas stream in the combustion zone is more than 28 °C below the design combustion zone temperature. For a boiler or process heater having a design heat input capacity greater than or equal to 44 MW, the owner or operator shall maintain continuous records of the parameter(s) monitored in accordance with the requirements of § 61.354(b)(5) of this subpart.

(7) If a flare is used, then the owner or operator shall maintain continuous records of the flare pilot flame monitoring and records of all periods during which the pilot flame is absent.

(8) If a condenser is used, then the owner or operator shall maintain continuous records of the parameters selected shall maintain continuous records of the parameters selected to be monitored in accordance with § 61.354(c)(6) of this subpart. If concentration of organics in the control device outlet gas stream is monitored, then the owner or operator shall record all 3-hour periods of operation during which the concentration of organics in the exhaust stream is more than 20 percent greater than the design value. If the temperature of the condenser exhaust stream and coolant fluid is monitored, then the owner or operator shall record all 3-hour periods of operation during which the temperature of the condenser exhaust vent stream is more than 6 °C above the design average exhaust vent stream temperature, or the temperature of the coolant fluid existing the condenser is more than 6 °C above the design average coolant fluid temperature at the condenser outlet.

(9) If a carbon adsorber is used, then the owner or operator shall maintain continuous records of the concentration of organics in the control device outlet gas stream. If concentration of organics in the control device outlet gas stream is monitored, then the owner or operator shall record all 3-hour periods of operation during which the concentration of organics in the exhaust stream is more than 20 percent greater than the design value. If the carbon bed regeneration interval is monitored, then the owner or operator shall each occurrence when the vent stream continues to flow through the control device beyond the predetermined carbon bed regeneration time.

(10) If a carbon adsorber that is not regenerated directly on site in the control device is used, then the owner or operator shall maintain records of dates and times when the control device is monitored, when breakthrough is measured, and shall record the date and time then the existing carbon in the control device is replaced with fresh carbon.

(11) If an alternative operational or process parameter is monitored for a control device, as allowed in § 61.354(b) of this subpart, then the owner or operator shall maintain records of the continuously monitored parameter, including periods when the device is not operated as designed.

(k) An owner or operator who elects to install and operate the control equipment in § 61.351 of this subpart shall comply with the recordkeeping requirements in 40 CFR 60.115b.

(l) An owner or operator who elects to install and operate the control equipment in § 61.352 of this subpart shall maintain records of the following:

(1) The date, location, and corrective action for each visual inspection required by 40 CFR 60.693-2(a)(5), during which a broken seal, gap, or other problem is identified that could result in benzene emissions.

(2) Results of the seal gap measurements required by 40 CFR 60.693-2(a).

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§ 61.357 Reporting requirements.

(a) Each owner or operator subject to this subpart shall submit to the Administrator within 90 days after the effective date of this subpart, or by the initial startup for a new source with an initial startup after the effective date, a report that summarizes the regulatory status of each waste stream subject to this subpart and is determined by the procedures specified in § 61.355(c) of this subpart to contain benzene. The report shall include the following information:

(1) Total annual benzene quantity from facility waste determined in accordance with § 61.355(a) of this subpart.

(2) A table identifying each waste stream and whether or not the waste stream will be controlled for benzene emissions in accordance with the requirements of this subpart.

(3) For each waste stream identified as not being controlled for benzene emissions in accordance with the requirements of this subpart the following information shall be added to the table:

(i) Whether or not the water content of the waste stream is greater than 10 percent;

(ii) Whether or not the waste stream is a process wastewater stream, product tank drawdown, or landfill leachate;

(iii) Annual waste quantity for the waste stream;

(iv) Range of benzene concentrations for the waste stream;

(v) Annual average flow-weighted benzene concentration for the waste stream; and

(vi) Annual benzene quantity for the waste stream.

(b) If the total annual benzene quantity from facility waste is less than 1 Mg/yr, then the owner or operator shall submit to the Administrator a report that updates the information listed in paragraphs (a)(1) through (a)(3) of this section whenever there is a change in the process generating the waste stream that could cause the total annual benzene quantity from facility waste to increase to 10 Mg/yr or more.

(c) If the total annual benzene quantity from facility waste is less than 10 Mg/yr but is equal to or greater than 1 Mg/yr, then the owner or operator shall submit to the Administrator a report that updates the information listed in paragraphs (a)(1) through (a)(3) of this section. The report shall be submitted annually and whenever there is a change in the process generating the waste stream that could cause the total annual benzene quantity from facility waste to increase to 10 Mg/yr or more.

(d) If the total annual benzene quantity from facility waste is equal to or greater than 10 Mg/yr, then the owner or operator shall submit to the Administrator the following reports:

(1) Within 2 years after March 7, 1990, or by the date of initial startup for a new source with an initial startup after the effective date, a certification that the equipment necessary to comply with these standards has been installed and that the required initial inspections or tests have been carried out in accordance with this subpart.

(2) Beginning on the date that the equipment necessary to comply with these standards has been certified in accordance with paragraph (d)(1) of this section, the owner or operator shall submit annually to the Administrator a report that updates the information listed in paragraphs (a)(1) through (a)(3) of this section.

(3) If an owner or operator elects to comply with the alternative requirements of § 61.342(d) of this subpart, then he shall include in the report required by paragraph (d)(2) of this section a table presenting the following information for each process wastewater stream:

(i) Whether or not the process wastewater stream is being controlled for benzene emissions in accordance with the requirements of this subpart;

(ii) For each process wastewater stream identified as not being controlled for benzene emissions in accordance with the requirements of this subpart, the table shall report the following information for the process wastewater stream as determined at the point of waste generation: annual waste quantity, range of benzene concentrations, annual average flow-weighted benzene concentration, and annual benzene quantity;

(iii) For each process wastewater stream identified as being controlled for benzene emissions in accordance with the requirements of this subpart, the table shall report the following information for the process wastewater stream as determined at the exit to the treatment process: Annual waste quantity, range of benzene concentrations, annual average flow-weighted benzene concentration, and annual benzene quantity.

(4) If an owner or operator complys with the requirements of § 61.348(b) of this subpart, then he shall include in the report required by paragraph (d)(2) of this section a table presenting the annual benzene quantity in each wastewater stream exiting wastewater treatment systems at the facility.

(5) Beginning 3 months after the date that the equipment necessary to comply with these standards has been certified in accordance with paragraph (d)(1) of this section, the owner or operator shall submit quarterly to the Administrator a certification that all of the required inspections have been carried out in accordance with the requirements of this subpart.

(6) Beginning 3 months after the date that the equipment necessary to comply with these standards has been certified in accordance with paragraph (d)(1) of this section, the owner or operator shall submit a report quarterly to the Administrator that includes:

(i) If a treatment process or wastewater treatment system unit is monitored in accordance with § 61.354(a)(1) of this subpart, then each period of operation during which the concentration of benzene in the monitored waste stream exiting the unit is equal to or greater than 10 ppmw.

(ii) If a treatment process or wastewater treatment system unit is monitored in accordance with § 61.354(a)(2) of this subpart, then each 3-hour period of operation during which the average value of the monitored parameter is outside the range of acceptable values or during which the unit is not operating as designed.

(iii) For a control device monitored in accordance with § 61.354(c) of this subpart, each period of operation monitored during which any of the following conditions occur, as applicable to the control device:

(A) Each 3-hour period of operation during which the average temperature of the gas stream in the combustion zone of a thermal vapor incinerator, as measured by the temperature monitoring device, is more than 28°C below the design combustion zone temperature.

(B) Each 3-hour period of operation during which the average temperature of the gas stream immediately before the catalyst bed of a catalytic vapor incinerator, as measured by the temperature monitoring device, is more than 28°C below the design gas stream temperature, and any 3-hour period during which the average temperature difference across the catalyst bed (i.e., the difference between the temperatures of the gas stream immediately before and after the catalyst bed), as measured by the temperature monitoring device, is less than 80 percent of the design temperature difference.

(C) Each 3-hour period of operation during which the average temperature of the gas stream in the combustion zone of a boiler or process heater having a design heat input capacity less than 44 MW, as mesured by the temperature monitoring device, is more than 28°C below the design combustion zone temperature.

(D) Each 3-hour period of operation during which the average concentration of organics in the exhaust gases from a carbon adsorber, condenser, or other vapor recovery system is more than 20 percent greater than the design exhaust gas concentration level.

(E) Each 3-hour period of operation during which the temperature of the condenser exhaust vent stream is more than 6°C above the design average exhaust vent stream temperature, or the temperature of the coolant fluid exiting the condenser is more than 6°C above the design average coolant fluid temperature at the condenser outlet.

(F) Each period in which the pilot flame of a flare is absent.

(G) Each occurrence when there is a change in the location at which the vent stream is introduced into the flame zone of a boiler or process heater as required by § 61.349(a)(2)(i)(C) of this subpart.

(H) Each occurrence when the carbon in a carbon adsorber system that is regenerated directly on site in the control device is not regenerated at the predetermined carbon bed regeneration time.

(I) Each occurrence when the carbon in a carbon adsorber system that is not regenerated directly on site in the control device is not replaced at the predetermined interval specified in § 61.354(c) of this subpart.

(7) Beginning one year after the date that the equipment necessary to comply with these standards has been certified in accordance with paragraph (d)(1) of this section, the owner or operator shall submit annually to the Administrator a report that summarizes all inspections required by §§ 61.342 through 61.352 of this subpart during which detectable emissions are measured or a problem (such as a broken seal, gap or other problem) that could result in benzene emissions is identified, including information about the repairs or corrective action taken.

(e) An owner or operator electing to comply with the provisions of §§ 61.351 or 61.352 of this subpart shall notify the Administrator of the alternative standard selected in the report required under § 61.07 or § 61.10 of this part.

(f) An owner or operator who elects to install and operate the control equipment in § 61.351 of this subpart shall comply with the reporting requirements in 40 CFR 60.115b.

(g) An owner or operator who elects to install and operate the control equipment in § 61.352 of this subpart shall submit initial and quarterly reports that identify all seal gap measurements, as required in 40 CFR 60.693–2(a), that are outside the prescribed limits.

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§ 61.358 Delegation of authority.

(a) In delegating implementation and enforcement authority to a State under section 112(d) of the Clean Air Act, the authorities contained in paragraph (b) of this section shall be retained by the Administrator and not transferred to a State.

(b) Alternative means of emission limitation under § 61.353 of this subpart will not be delegated to States.

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