

ENVIRONMENTAL PROTECTION AGENCY**40 CFR Parts 60, 260, 264, 265, 270, and 271**

[AD-FRL-3611-4]

RIN 2060-AB94

Hazardous Waste Treatment, Storage, and Disposal Facilities; Organic Air Emission Standards for Tanks, Surface Impoundments, and Containers**AGENCY:** Environmental Protection Agency (EPA).**ACTION:** Proposed rule.

SUMMARY: The EPA is today proposing new standards and amendments to existing standards that would further reduce air emissions from hazardous waste management units subject to regulation under the Resource Conservation and Recovery Act (RCRA) as amended. New standards are proposed for hazardous waste treatment, storage, and disposal facilities (TSDF) subject to permitting requirements under RCRA subtitle C that would require organic emission controls be installed and operated on tanks, surface impoundments, containers, and certain miscellaneous units if any hazardous waste having a volatile organic concentration equal to or greater than 500 parts per million by weight (ppmw) is placed in the unit. In addition, EPA is proposing amendments that would add the relevant emission control requirements specified by the air emission standards under RCRA for certain TSDF treatment unit process vents (40 CFR 265 subpart AA), TSDF equipment leaks (40 CFR 265 subpart BB), and TSDF tanks, surface impoundments, and containers (proposed today as 40 CFR 265 subpart CC) to the requirements that a hazardous waste generator must comply with pursuant to 40 CFR 262.34(a) in order to exempt certain accumulation tanks and containers from the RCRA subtitle C permitting requirements. Also, EPA is proposing an amendment to 40 CFR 270.4 that would require the owner or operator of a TSDF already issued a permit under RCRA subtitle C to comply with the air emission standards for interim status facilities (40 CFR part 265) until the facility's permit is reviewed or reissued by EPA.

Today's action is proposed under the authority of RCRA sections 3002 and 3004, and is the second phase of a three-phased regulatory program to control air emissions from the treatment, storage, and disposal of hazardous waste. The first phase was completed with the

promulgation of final standards controlling organic emissions from certain TSDF treatment unit process vents and TSDF equipment leaks (55 FR 25454, June 21, 1990). For the third phase, EPA will assess the residual risk that remains after implementation of the standards developed in the first two phases and, if necessary, will develop additional standards or guidance to protect human health and the environment from TSDF air emissions.

DATES: *Comments.* The EPA will accept comments from the public on the proposed standards until September 20, 1991. If requested, a public hearing will be held on this proposed rulemaking to provide interested parties an opportunity for oral presentations of data or views concerning the proposed standards. See section XI of this preamble for the schedule and location of this public hearing.

ADDRESSES: *Background Information Document.* The background information document (BID) for the proposed standards may be obtained from U.S. EPA Library (MD-35), Research Triangle Park, North Carolina 27711; telephone (919) 541-2777. Please refer to "Hazardous Waste TSDF—Background Information for Proposed RCRA Air Emission Standards" (EPA-450/3-89-23).

Docket. The official record for the proposed standards is contained in Docket No. F-91-CESP-FFFFF. This docket is available for public inspection between the hours of 8 a.m. and 4 p.m., Monday through Friday, excluding legal holidays, at the EPA RCRA Docket Office (OS-305), room 2427, U.S. Environmental Protection Agency, 401 M Street SW., Washington, DC 20460. A reasonable fee may be charged for copying.

Comments. Written comments regarding the proposed standards may be mailed to the Docket Clerk (OS-305), U.S. Environmental Protection Agency, 401 M Street SW., Washington, DC 20460. Please refer to Docket Number F-91-CESP-FFFFF, Air Emission Standards for Organics Control.

FOR FURTHER INFORMATION CONTACT: RCRA Hotline, toll free at (800) 424-9346, or at (202) 382-3000, or the following EPA staff. For information concerning regulatory aspects, contact Ms. Gail Lacy, Standards Development Branch, Emission Standards Division (MD-13), U.S. EPA, Research Triangle Park, NC 27711, telephone (919) 541-5261. For information concerning technical aspects, contact Ms. Michele Aston, Chemicals and Petroleum Branch, Emission Standards Division (MD-13), U.S. EPA Research Triangle

Park, NC 27711, telephone (919) 541-2363. For information concerning the test methods, contact Mr. Terry Harrison, Emission Measurement Branch, Technical Support Division (MD-14), U.S. EPA, Research Triangle Park, NC 27711, telephone (919) 541-5233.

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I. SUMMARY OF TODAY'S PROPOSAL

The EPA is proposing today new standards and amendments to existing standards that would further reduce air emissions from hazardous waste management units subject to regulation under the Resource Conservation and Recovery Act (RCRA) as amended by the Hazardous and Solid Waste Amendments (HSWA). Specifically, EPA is proposing:

(a) New standards, subpart CC, to be added to 40 CFR parts 264 and 265 that would require owners and operators of hazardous waste treatment, storage, and disposal facilities (TSDF) subject to the RCRA subtitle C permitting requirements to install and operate organic emission controls on certain tanks, surface impoundments, and containers.

(b) Two new test methods to be added to both 40 CFR part 60 Appendix A—“Standards of Performance for New Stationary Sources Reference Methods” and EPA Publication No. SW-846, “Test Methods for Evaluating Solid Waste,

Physical/Chemical Methods,” that would be used for determining the volatile organic content and vapor-phase organic concentration in waste samples.

(c) An amendment to 40 CFR 264.601 that would require the permit terms and provisions for a miscellaneous unit being permitted under 40 CFR 264 subpart X to include the appropriate emission control requirements specified by the air emission standards for certain TSDF treatment unit process vents (40 CFR 264 subpart AA), TSDF equipment leaks (40 CFR 264 subpart BB), and TSDF tanks, surface impoundments, and containers (proposed today as 40 CFR 264 subpart CC).

(d) An amendment to 40 CFR 270.4 that would require the owner or operator of a TSDF already issued a permit under RCRA subtitle C to comply with the air emission standards for interim status facilities (40 CFR part 265) until the facility's permit is reviewed or is reissued by EPA.

(e) Amendments to 40 CFR 265 subparts I and J that would add the relevant emission control requirements specified by the air emission standards for certain TSDF treatment unit process vents (40 CFR part 265 subpart AA), TSDF equipment leaks (40 CFR 265 subpart BB), and TSDF tanks, surface impoundments, and containers (proposed today as 40 CFR 265 subpart CC) to the requirements that a hazardous waste generator must comply with pursuant to 40 CFR 262.34(a) in order to exempt tanks and containers accumulating waste on-site for no more than 90 days from the RCRA subtitle C permitting requirements. The EPA may implement these requirements for hazardous waste generators as HSWA requirements; thereby making the standards applicable to generators as Federal law.

(f) Amendments to 40 CFR 264 subparts AA and BB and to 40 CFR part 265 subparts AA and BB that would require owners and operators using carbon adsorption systems to comply with the standards to certify that the spent carbon removed from the system is either: (1) Regenerated or reactivated by a process that minimizes the release of organics to the atmosphere by using effective control devices such as those now required by 40 CFR part 264 subpart AA, or (2) incinerated in a thermal treatment device that complies with the requirements of 40 CFR part 264 subpart O. The same provision is included in the standards proposed today as subpart CC to 40 CFR parts 264 and 265.

A. Proposed TSDF Tank, Surface Impoundment, and Container Standards

1. Need for Standards

Nationwide organic emissions from TSDF are estimated to be approximately 1.8 million megagrams per year (Mg/yr) (2,000,000 tons per year). These organic emissions can contain toxic chemical compounds as well as ozone precursors. Cancer and other adverse noncancer human health effects can result from exposure to these organic emissions. The nationwide TSDF organic emissions are estimated to result in 140 excess incidences of cancer per year nationwide and a 2×10^{-2} maximum lifetime individual risk of cancer. In addition, these emissions contribute to formation of ozone which causes adverse impacts on human health (e.g., lung damage) and the environment (e.g., reduction in crop yields). Excessive ambient ozone concentrations are a major air quality problem in many large cities throughout the United States.

In 1984, Congress passed the Hazardous and Solid Waste Amendments (HSWA) to the Resource Conservation and Recovery Act (RCRA) of 1976. Section 3004(n) of HSWA 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. Standards are being proposed by EPA under the authority of sections 3002 and 3004 of RCRA to reduce organic emissions from certain hazardous waste management units.

2. Proposed Standards

Standards proposed today would apply to owners and operators of permitted and interim status TSDF using tanks, surface impoundments, and containers to manage hazardous waste, as well as to hazardous waste generators using tanks and containers to accumulate large quantities of waste on-site. At these affected facilities, the proposed standards would require that specific organic emission controls (primarily application of covers with, where appropriate, control devices) be installed and operated on tanks, surface impoundments, and containers into which is placed hazardous waste having a volatile organic concentration equal to or greater than 500 parts per million by weight (ppmw). The volatile organic concentration of the waste would be determined before the waste is exposed to the atmosphere or mixed with other waste at a point as near as possible to the site where the waste is generated. This allows an owner or operator to reduce the volatile organic

concentration for a specific waste to a level less than 500 ppmw through pollution prevention adjustments and other engineering techniques. Under today's proposal, if a waste stream is not determined to have a volatile organic concentration less than 500 ppmw, then the specified organic emission controls would need to be used on every tank, surface impoundment, and container into which that waste stream is subsequently placed at the affected facility. However, if during the course of treating a waste (using a means other than by dilution or evaporation into the atmosphere) the organic concentration of the waste decreases below 500 ppmw, emission controls would not be required on the subsequent downstream tanks, surface impoundments, and containers that manage this waste. The EPA encourages the use of pollution prevention techniques and treatment processes as a means of achieving the goals of today's proposed standards.

a. Tank Control Requirements. The owner or operator of a permitted or interim status TSDF tank, and the large quantity generator accumulating hazardous waste on-site in a tank for 90 days or less pursuant to 40 CFR 262.34(a), would be required to use tank organic emission controls if any hazardous waste with a volatile organic content of 500 ppmw or more is placed in the tank. The control equipment requirements would be to install, operate, and maintain either a cover connected through a closed vent system to a control device, an external floating roof, or a fixed roof with an internal floating roof. However, an owner or operator would be allowed to use a cover without a closed vent system and control device on tanks that satisfy all of the following conditions: (1) The hazardous waste placed in the tank remains quiescent (i.e., is not mixed, agitated, or aerated); (2) no waste fixation, heat using, or heat generating process is conducted in the tank; and (3) the tank capacity is either less than 75 cubic meters (m^3) (approximately 20,000 gallons); the tank capacity is less than 151 m^3 (approximately 40,000 gallons) and the waste organic vapor pressure is less than 27.6 kilopascals (approximately 4.0 pounds per square inch); or the capacity of the tank is equal to or greater than 151 m^3 and the waste organic vapor pressure is less than 5.2 kilopascals (approximately 0.75 pounds per square inch).

b. Surface Impoundment Control Requirements. The owner or operator of permitted and interim status TSDF surface impoundments would be

required to use organic emission controls if hazardous waste with a volatile organic content of 500 ppmw or more is placed in the surface impoundment. The control equipment requirements would be to install, operate, and maintain a cover (e.g., air-supported enclosure) connected through a closed vent system to a control device. An owner or operator would be allowed to use a contact cover (e.g. floating membrane cover) without a closed vent system and control device on surface impoundments that satisfy both of the following conditions: (1) The hazardous waste placed in the surface impoundment remains quiescent (i.e., is not mixed, agitated, or aerated); and (2) no waste fixation, heat using, or heat generating process is conducted in the surface impoundment.

c. Container Control Requirements. The owner or operator of a permitted or interim status TSDF using containers, and the large quantity generator accumulating hazardous waste on-site in containers for 90 days or less pursuant to 40 CFR 262.34(a) would be required to use container organic emission controls if hazardous waste with a volatile organic content of 500 ppmw or more is placed in the container. Containers used for handling, preparing, or storing hazardous waste would be required to be tightly covered except when loading or unloading wastes. During container loading operations, submerged fill of pumpable hazardous waste would be required. For waste fixation operations performed directly in containers, the proposed standards would require that the container be placed in an enclosure vented through a closed vent system to a control device during the mixing of the binder with the waste.

d. Closed Vent System and Control Device Requirements. The closed vent system used to comply with the control requirements would be required by the proposed standards to be designed, installed, operated, and maintained so that there are no detectable emissions from the system, as determined by visual inspection and by monitoring using Reference Method 21 in 40 CFR part 60, appendix A. Each control device would be required to reduce the organics in the gas stream vented to it by at least 95 percent. An alternative to this requirement for enclosed combustion devices would be to reduce total organics concentration in the combustion device exhaust gas stream to 20 ppm by volume (ppmv) corrected to 3 percent oxygen on a dry basis. To document that a control device achieves the required performance level, the owner or operator would be required to

maintain on-site either documentation of the control device engineering design calculations or results of control device source tests.

e. Waste Determination

Requirements. Waste determinations would only be required if an owner or operator chooses to place waste with a volatile organic concentration less than 500 ppmw in a tank, surface impoundment, or container not equipped with the specified organic emission controls, or place the waste with an organic vapor pressure below the specified limits in a tank using a cover without a closed vent system and control device. It is EPA's intention that these exceptions apply only to those units for which the owner or operator is reasonably certain that the volatile organic content or organic vapor pressure of the waste placed in the unit consistently remains below the applicable limit. The owner or operator would be required to perform periodic waste determinations using either direct measurement or knowledge of the waste. Direct measurement of the waste volatile organic concentration or organic vapor pressure would be performed using the EPA test methods and procedures being proposed as part of today's rulemaking. Knowledge of the waste would need to be supported by documentation that shows that the waste volatile organic concentration or organic vapor pressure is below the specified limit under all conditions. These direct measurement or knowledge assessments would be made for individual waste streams upstream of the affected unit or units, before the waste is exposed directly or indirectly to air and before it is mixed with other wastes. The waste determinations would need to be performed initially by the effective date of the standards and repeated at least annually and, additionally, every time there is a change in the waste being managed or in the operation that generates or treats the waste that may affect the regulatory status of the waste.

f. Monitoring and Inspection

Requirements. To ensure that emission control equipment is properly operated and maintained, the proposed standards would require the owner or operator to monitor and inspect the emission control equipment at specified intervals. Continuous monitoring of control device operation would be required. This would involve the use of automated instrumentation to measure critical operating parameters that indicate whether the control device is operating correctly or is malfunctioning. Other types of emission control equipment

such as covers would need to be checked by weekly visual inspections and semiannual equipment leak monitoring to ensure that equipment is being used properly (e.g., covers are closed and latched except when workers require access to a tank or container) and the equipment is being maintained in good condition (e.g., no holes or gaps have developed in cover seals).

g. Recordkeeping Requirements. The owner or operator would be required to record certain information documenting emission control equipment performance and maintenance. These records would be maintained in the facility operating log or other files kept at the facility site, and would be available for review by EPA or authorized State enforcement personnel during on-site inspections. The information to be collected and recorded would include the results of all waste determinations for volatile organic concentration and organic vapor pressure; design or performance information for closed vent systems and control devices; and emission control equipment inspection and monitoring results.

h. Reporting Requirements. The owner or operator would not be required to submit any reports to EPA unless: (1) a waste exceeds the 500 ppmw volatile organic concentration or, for certain tank applications, the vapor pressure limit, and the waste is placed in a unit without proper emission controls; or (2) a control device malfunction is not corrected within 24 hours of detection. If either of these events (referred to in this preamble as "exceedances") occur, the owner or operator would be required to maintain a record of the exceedance. For an exceedance involving waste organic concentration or organic vapor pressure, the owner or operator would be required to submit a report to EPA within 30 calendar days after the waste determination was made explaining why the waste was not managed in accordance with the requirements of the standards. For exceedances involving control device malfunctions that are not corrected within 24 hours, the owner or operator would be required to submit a report to EPA on a semiannual basis describing all of the exceedances that occurred during the past 6-month period and explaining why each exceedance occurred.

3. Summary of Impacts. The implementation of today's proposed standards for TSDF tanks, surface impoundments, and containers would achieve substantial reductions in organic emissions. The proposed standards are estimated to reduce

nationwide organic emissions by 1.7 million Mg/yr. This magnitude of emission reduction is expected to have a significant positive impact on the formation of ambient ozone by eliminating emissions of a significant quantity of ozone precursors.

The proposed standards are also estimated to reduce the annual cancer incidence and the risk to the maximum exposed individual of contracting cancer posed by toxic constituents contained in the organic emissions from TSDF. The cancer risk to the entire exposed population nationwide (i.e., annual cancer incidence) is estimated to be reduced from 140 cases per year to a level of 8 cases per year. The maximum individual risk (MIR) parameter is estimated to be reduced from a level of 2×10^{-2} to a level of 5×10^{-4} . As discussed in sections III and V of this preamble, uncertainties exist in the procedures for estimating these cancer risk parameters for a variety of reasons. Nevertheless, the estimates represent a level of residual risk that is higher than the range of target risk levels for other promulgated RCRA standards. Therefore, EPA is evaluating individual toxic constituents contained in TSDF organic emissions to determine if further risk reductions can be achieved by controlling those toxic constituents in a separate rulemaking.

The total nationwide capital investment to implement the proposed standards at TSDF is estimated to be approximately \$960 million. The estimated nationwide annualized cost is estimated to be approximately \$360 million. Prices for commercial hazardous waste management services are estimated to increase by less than 1 percent. The nationwide quantity of waste handled by commercial hazardous waste management companies is projected to be reduced by less than 1 percent. Few, if any, facility closures are anticipated. Job losses in the hazardous waste industry are estimated to be less than 1.5 percent. Furthermore, this impact on employment does not reflect positive employment effects on industries producing the emission control equipment that would be used to comply with the proposed standards. No significant impacts are expected on small businesses.

B. Proposed Test Methods

1. Waste Volatile Organic Concentration Test Method

Today's proposed standards would allow a hazardous waste to be placed in a waste management unit not required to comply with certain control

requirements provided an owner or operator determines that all waste placed in the unit has a volatile organic concentration less than 500 ppmw. One method by which the owner or operator could perform the waste determination is by direct measurement of the waste's volatile organic concentration. The test method for determining the volatile organic concentration of a waste, Reference Method 25D, is being proposed today for addition to 40 CFR part 60 appendix A. The identical test method would also be added to "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (EPA Publication No. SW-846) as Test Method 5100.

The proposed test method would require representative grab samples of the waste to be collected as near as possible to the point where the waste is generated and before the point where the waste is first exposed to the atmosphere. Each sample is transferred to a container holding polyethylene glycol (PEG) and cooled to minimize loss of the volatile organics. In the laboratory, water is added to the PEG/sample mixture, and the resulting mixture is heated and purged with a stream of nitrogen (6 liters per minute at 75 °C). The purged gas stream is analyzed by directing one bleed stream to a flame ionization detector to measure the waste organic carbon content and the other bleed stream to an electrolytic conductivity detector to measure the waste halogen content. The mass of the organic carbon, calculated as methane, and halogens, calculated as chlorine, are converted by calculation to a concentration by weight of volatile organics.

2. Waste Vapor-Phase Organic Concentration Test Method

Today's proposed standards would require that organic emission controls be used on a tank into which is placed a hazardous waste containing 500 ppmw or more of volatile organics. Certain of these tanks may be equipped with a cover without a control device provided the tank volume is less than 75 m³ or, if the volume is larger than this size, the wastes managed in the tank have an organic vapor pressure less than specified limits. Determination of the waste organic vapor pressure would involve the testing of the waste to measure the vapor-phase organic concentration of the waste and calculating the waste organic vapor pressure. A test method for determining vapor-phase organic concentration and, ultimately, waste organic vapor pressure, Reference Method 25E, is being proposed today for addition to 40

CFR part 60 appendix A. The identical test method would also be added to "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (EPA Publication No. SW-846) as Test Method 5110.

The proposed test method would require collection of a waste sample at the tank inlet in a headspace sample vial and transfer of the vial to a balanced pressure headspace sampler, which pressurizes the sample vial and injects a phase sample into a flame ionization detector (FID) for analysis of organic carbon. Helium is used to pressurize the sample vial, and release of the pressure injects the sample directly into the FID. The FID response is used to measure the concentration of organic carbon in the phase sample as propane. This vapor-phase organic concentration (expressed as propane) is then converted, by a calculation procedure specified in the method, to the waste organic vapor pressure.

C. Proposed Control Requirements for TSDF Miscellaneous Units

Owners and operators obtain permits to operate hazardous waste management units or technologies that are not specifically regulated elsewhere under 40 CFR part 264 by following promulgated standards under 40 CFR 264 subpart X. Permits for these units (referred to as "miscellaneous units") are issued on a case-by-case basis and must contain such terms and provisions to protect human health and the environment per the generic performance standards specified in 40 CFR 264.601. Today's proposed standards would amend § 264.601 to require that the permit terms and provisions for a miscellaneous unit being permitted under Subpart X include the appropriate emission control requirements specified by the air emission standards for certain TSDF treatment unit process vents (40 CFR 264 subpart AA), TSDF equipment leaks (40 CFR 264 subpart BB), and TSDF tanks, surface impoundments, and containers (proposed today as 40 CFR 264 subpart CC).

D. Proposed Implementation of Air Emission Standards Under RCRA at TSDF

Under current EPA practice, new RCRA standards typically apply to interim status facilities on their effective date but generally have not applied to already-permitted facilities until the facilities' permits have been modified or renewed. This practice, often referred to as the "permit-as-a-shield" policy, is discussed more fully in Section X of this preamble.

The EPA is proposing to except the control of air emissions under RCRA section 3004(n) from the "permit-as-a-shield" policy. Therefore, final air emission standards would apply to all TSDF upon the effective date (i.e., 6 months after promulgation) regardless of the status of their permit. Facilities that have already been issued a final permit before the effective date of the final standards would be required to comply with the interim status (40 CFR part 265) requirements of the final rules until the permit is reviewed or is reissued. All facilities for which permits are issued after the effective date of the final rule would be required to incorporate the requirements of the final rule in the Part B permit application and comply with the 40 CFR part 264 rules. New facilities and new units at existing facilities would be required to demonstrate in their part B permit application the means by which the requirements of the final rule will be met.

The rules would take effect 6 months after promulgation and would require that facilities implement the control and monitoring requirements by the effective date. Facilities that would be required to install control equipment would be allowed up to 18 months after the effective date to complete the design and installation if they can document that installation of the emission controls cannot be completed by the effective date. In this case, owners and operators would be required to develop an implementation schedule that indicates dates by which the design and installation of the necessary emission controls would be completed. The implementation plan would be required to be entered into the operating record.

E. Proposed Control Requirements for Hazardous Waste Generator Accumulation Tanks and Containers

Standards proposed today would affect hazardous waste generators accumulating hazardous waste on-site in tanks and containers for 90 days or less pursuant to 40 CFR 262.34(a). These tanks and containers are exempt from the RCRA subtitle C permitting requirements provided the generators comply with certain requirements including the provisions of 40 CFR 265 subpart J for tanks and 40 CFR 265 subpart I for containers. Today's proposal would amend 40 CFR 265 subparts I and J to add compliance with the organic emission control requirements relevant to tanks and containers specified in the air emission standards for certain TSDF treatment unit process vents (40 CFR part 264 subpart AA), TSDF equipment leaks (40

CFR 264 subpart BB), and TSDF tanks, surface impoundments, and containers (proposed today as 40 CFR 264 subpart CC). Therefore, generators accumulating waste in tanks and containers pursuant to 40 CFR 262.34(a) would be required to comply with additional tank and container control requirements in order to maintain permit-exempt status for these units.

Today's proposal would not apply to the accumulation of up to 55 gallons of hazardous waste or one quart of acutely hazardous waste listed in 40 CFR 261.33(e) in containers at or near the point of generation pursuant to 40 CFR 262.34(c). Also, today's proposal would not apply to small quantity generators of between 100 and 1,000 kilograms of hazardous waste in a calendar month who accumulate the waste in tanks and containers pursuant to § 262.34 (d) or (e).

Generator accumulation tanks and containers collect hazardous waste near the point where the waste is generated and the potential to release organics is greatest. If these units are open to the atmosphere, the majority of the organics in the waste may be emitted to the atmosphere before the waste is transferred to a TSDF waste management unit subject to the control requirements of today's proposal. Under these conditions, organic emissions from large quantity generator accumulation tanks and containers could be substantial and, consequently, decrease the organic emission reductions that are potentially achievable by requiring organic emission controls for TSDF tanks, surface impoundments, and containers.

If EPA were to delay implementation of the requirements on generator accumulation tanks and containers, then the controls at TSDF might be rendered significantly less useful, that is, no controls would be required until after significant amounts of organics had already been released from hazardous wastes into the atmosphere. Therefore, in order to effectively regulate the emissions from hazardous waste at TSDF, EPA is seeking comment on incorporating requirements at generator sites as a part of the HSWA rules proposed today. Any waste that is determined to pose an air emissions problem would thereby be controlled in all States from the time it is generated until it is treated, stored, or disposed.

A separate analysis was performed of the human health, environmental, and economic impacts expected to result from implementing the proposed control requirements on 90-day tanks and containers. The proposed standards are estimated to reduce nationwide organics emissions from 90-day tanks and

containers from a baseline level of approximately 259 thousand Mg/yr to 4 thousand Mg/yr. Estimated annual cancer incidence is expected to be reduced by approximately 21 cases per year to a level of less than 1 case per year. A nationwide capital investment of approximately \$41 million would be required to implement the proposed standards. The annualized cost is estimated to be approximately \$10 million. Because of small cost increases to waste generators using 90-day tanks and containers, the prices of goods and services could rise slightly. The impacts of the proposed standards on the volume of wastes stored and numbers of jobs are estimated to be negligible, and employment dislocations and plant closures are unlikely.

F. Proposed Requirements for Carbon Adsorption Systems

To use carbon adsorption systems as effective control devices for reducing organic emissions from TSDF sources requires that the activated carbon in the system periodically be regenerated or replaced with fresh carbon when it becomes saturated. There is an opportunity for the organics adsorbed on the carbon to be released to the atmosphere unless the carbon regeneration or disposal is conducted under controlled conditions. There would be no environmental benefit in controlling organic emissions from TSDF sources using a carbon adsorption system if the organics controlled at one site are subsequently released to the atmosphere at another site where the carbon is sent for regeneration or disposal. To avoid this situation, requirements are proposed today that would require owners or operators using carbon adsorption systems for compliance with control device requirements in subparts AA, BB, and CC of both 40 CFR parts 264 and 265 to certify that carbon removed from the system is either: (1) Regenerated or reactivated by a process that minimizes the release of organics to the atmosphere by using effective control devices such as those now required in subpart AA, or (2) incinerated in a thermal treatment device that complies with the requirements of 40 CFR part 264 subpart O.

II. BACKGROUND

A. Regulatory Authority

Today's proposal is made under the authority of sections 3002 and 3004 of the Resource Conservation and Recovery Act (RCRA) of 1976 as amended by the Hazardous and Solid Waste Amendments (HSWA) of 1984.

Section 3004(n) of RCRA, a provision added by HSWA, directs EPA to " * * * promulgate regulations for the monitoring and control of air emissions from hazardous waste treatment, storage, and disposal facilities, including but not limited to open tanks, surface impoundments, and landfills, as may be necessary to protect human health and the environment." The standards being proposed today implement this congressional directive by establishing nationwide regulations for the monitoring and control of air emissions from certain waste management units at TSDF subject to RCRA subtitle C permitting requirements.

The EPA is also proposing today amendments that would add to the requirements that a hazardous waste generator must comply with pursuant to 40 CFR 262.34(a) in order to exempt certain tanks and containers accumulating waste on-site from the RCRA subtitle C permitting requirements. The EPA may implement these requirements for hazardous waste generators under authority of RCRA section 3004(n), thereby making the standards applicable to hazardous waste generators as Federal law.

B. Phased Implementation of Section 3004(n)

Air emissions from TSDF sources are composed of many different types of chemical compounds. Some of these individual chemical compounds, referred to here as "constituents," are known or suspected to be toxic to humans at certain levels of exposure. It would be preferable to develop standards to control air emissions from all TSDF sources at the same time in order to best integrate implementation of the standards. However, because of the nationwide diversity and complexity of TSDF, it is a very difficult task to characterize TSDF emission sources, emission quantities, and potential emission controls. Extensive effort is required to fully understand which TSDF emission sources need to be regulated and how to best apply emission controls to those sources. Rather than delay implementation of standards until all TSDF sources could be investigated, EPA decided to implement RCRA section 3004(n) using a phased approach so that standards could be implemented for certain TSDF emission sources as quickly as possible.

The EPA is addressing TSDF air emissions primarily by implementing RCRA section 3004(n) in a phased approach through nationwide standards and, as necessary, using EPA's omnibus permitting authority under RCRA

section 3005(c)(3) while these standards are being developed (see 55 FR 25492). The omnibus permitting authority allows EPA permit writers to require, on a site-by-site basis, emission controls that are more stringent than those specified by a standard. This authority is used by EPA for those situations in which regulations have not been developed or in which unusual circumstances necessitate additional controls to protect human health and the environment.

The EPA uses the omnibus permitting authority to impose permit conditions beyond those mandated by regulations. The omnibus permitting authority is primarily used to address special site-specific circumstances that are judged necessary for protection of public health and the environment, and not to apply baseline standards that should be met by all TSDF. It is not appropriate to use omnibus permitting authority in lieu of setting standards under RCRA section 3004(n) for several reasons. First, section 3004(n) directs EPA to promulgate regulations for controlling TSDF air emissions, as necessary, to protect human health and the environment. Section 3004(n) does not allow EPA to disregard this congressional directive to promulgate regulations because section 3005(c)(3) is available to EPA permit writers, nor does section 3005(c)(3) relieve EPA of its requirement to promulgate regulations under section 3004(n). Second, establishing nationwide standards ensures that all TSDF owners and operators comply with the same set of minimum requirements. These nationwide requirements facilitate the permitting of TSDF by allowing the owner and operator seeking a permit to know in advance what control requirements, at a minimum, need to be included in the facility design in order to be issued a permit to operate. Finally, using a case-by-case permitting process for the application of air emission controls to most TSDF would require extensive industry and EPA resources, and increase the time period before controls are in place on all TSDF.

For the first phase of EPA's program to regulate air emissions under RCRA section 3004(n), EPA identified the need to develop standards for certain hazardous waste treatment processes early to coincide with the development of regulations under RCRA section 3004(m) restricting the land disposal of untreated hazardous wastes. These land disposal restrictions establish standards that require certain hazardous waste to be treated to reduce specific hazardous waste properties (e.g., concentrations of individual toxic constituents) before the waste can be placed in a land disposal

unit. To address concerns about air emissions from the treatment processes expected to be used to comply with the land disposal restrictions, EPA developed air emission standards under RCRA section 3004(n) for certain treatment processes based on existing air emission standards promulgated under the Clean Air Act for similar types of air emission sources. The first phase was completed with the promulgation of final RCRA standards to reduce organic emissions vented from the treatment of hazardous wastes by distillation, fractionation, thin-film evaporation, solvent extraction, steam stripping, and air stripping, as well as from leaks in certain piping and equipment used for hazardous waste management processes (55 FR 25454, June 21, 1990).

Today's proposal is the second phase of EPA's program to regulate air emissions under RCRA section 3004(n), and addresses organic emissions from TSDF tanks, surface impoundments, containers, and certain miscellaneous units. In both the first and second phases, standards are developed that control organic emissions as a class (as opposed to constituent-by-constituent). The regulation of organics as a class is relatively straightforward because it can be accomplished by a single standard, whereas the control of individual toxic constituents will require multiple standards for which the EPA has not completed sufficient analysis at this time. Implementation of today's proposal would substantially reduce emissions of ozone precursors as well as toxic constituents while EPA analyzes the human health and environmental impacts associated with individual toxic constituents that compose the organic emissions as part of the third phase of the program. This approach continues the approach used in the first phase where the " * * * standards achieve significant reductions in emissions and risk and, that after control, the vast majority of facilities are well within the risk range of other RCRA standards" (55 FR 25470).

For the third phase, EPA may issue regulations to address the risk remaining after promulgation of the first two phases. The EPA has initiated an effort to update and improve the data base used for analyzing the human health and environmental impacts resulting from TSDF air emissions. The EPA expects that, if regulations are necessary in the third phase, they will likely pose controls on individual toxic constituents. The EPA believes that the control of organics as a class followed by controls for individual toxic constituents, if

necessary, will result in comprehensive standards that are protective of human health and the environment.

C. Relationship of Today's Proposed Standards to Other RCRA Rules

1. Hazardous Waste Toxicity Characteristics

One of the procedures by which EPA defines wastes as "hazardous" is by identifying properties or "characteristics" of wastes which, if exhibited by a waste, indicate that the waste will pose hazards to human health and the environment if its management is not controlled. Recently, EPA issued final rules modifying the procedure to determine if a waste exhibits the characteristic of toxicity (55 FR 11798, March 29, 1990). Amendments to 40 CFR part 261 added 25 organic constituents to the toxicity characteristic list of constituents in 40 CFR 261.24 and replaced the Extraction Procedure (EP) in appendix II with the Toxicity Characteristic Leaching Procedure (TCLP). These changes are effective September 25, 1990, and will likely result in large quantities of wastewater and additional quantities of sludges and solids being identified as hazardous waste. The estimated nationwide impacts presented today for the proposed standards do not include the additional impacts resulting from the new toxicity characteristic constituent list and TCLP. However, the additional waste types and quantities would be subject to the control requirements of today's proposed standards.

The EPA requests comments (including data and supporting documentation) on how these additional waste types and quantities would affect the emission control, risk, and cost impacts associated with this rulemaking. The EPA will update the analysis before promulgation of this rule based on additional documented data received or gathered by EPA.

2. Land Disposal Restrictions (LDR)

The EPA has already promulgated and is continuing to develop LDR that require hazardous wastes to be treated to reduce the toxicity or mobility of the waste before it can be placed in a land disposal unit. The affected land disposal units include certain surface impoundments, and all waste piles, landfills, and land treatment units that do not meet the statutory no migration standards. Surface impoundments used for treatment of hazardous waste are exempt from the LDR if treatment residues that do not meet the treatment standards are removed for subsequent

management within one year of placement in the surface impoundment.

The LDR establish specific treatment standards that must be achieved before placing the waste in the land disposal unit. Treatment standards are expressed as either concentration limits or specified technologies. These standards are developed on the basis of using the best demonstrated available technology (BDAT). When an LDR 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 an LDR treatment standard is expressed as a specific technology or technologies, the owner or operator must treat the waste using the specified technologies prior to land disposal.

The EPA is developing the LDR in stages. Waste specific prohibitions on land disposal have been promulgated for certain spent solvent wastes (40 CFR 268.30); dioxin-containing hazardous wastes (40 CFR 268.31); the "California list" wastes (40 CFR 268.32); "First Third" set of listed wastes (40 CFR 268.33); "Second Third" set of listed wastes (40 CFR 268.34); and, recently, the "Third Third" set of listed wastes (55 FR 22520, June 1, 1990). The TSDF air emission standards being proposed today would be promulgated after the date that LDR are in effect for all wastes identified or listed as hazardous as of November 8, 1984.

3. Existing TSDF Air Emission Standards

The EPA has already developed RCRA standards to control organic emissions from certain hazardous waste treatment processes. Air emissions from thermal destruction treatment processes (i.e., hazardous waste incinerators) presently are regulated by 40 CFR 264 subpart O. Air emissions from other types of noncombustion treatment processes are controlled by the air standards for TSDF treatment unit process vents and equipment leaks (subparts AA and BB in 40 CFR parts 264 and 265). Today's proposed standards would control air emissions from TSDF sources not regulated by these other RCRA rules.

The 40 CFR 264 subpart O standards establish three performance standards for hazardous waste incinerators limiting emissions of organics, particulate matter, and hydrogen chloride. Organic emissions are controlled by requiring a hazardous waste incinerator to achieve a destruction and removal efficiency (DRE) of 99.99 percent for each principal

organic hazardous constituent designated for each waste feed. The EPA has proposed amendments to these regulations to improve control of toxic metals, hydrogen chloride, and residual organic emissions (55 FR 17682; April 27, 1990). In addition, EPA has promulgated rules to establish emission controls for boilers and furnaces burning hazardous wastes (56 FR 7134, February 21, 1991).

The Subpart AA standards in 40 CFR parts 264 and 265 are applicable to vents used for distillation, fractionation, evaporation, solvent extraction, air stripping, and steam stripping waste operations that manage hazardous waste with a total organics concentration equal to or greater than 10 parts per million by weight (ppmw). The affected vents include all vents on the process units, vents on condensers serving these units, and vents on tanks through which the organic emissions from the process units are vented. These standards require owners or operators of TSDF that use the affected waste treatment processes to either: (a) Reduce total organic emissions from all affected vents at the facility to less than 1.4 kilograms per hour (3 pounds per hour) and 2,800 kilograms per year (3.1 tons per year), or (b) install and operate a control device(s) that reduces total organic emissions from all affected vents at the facility by 95 percent by weight or, for enclosed combustion control devices, to a total organic compound concentration of 20 parts per million by volume (ppmv) expressed as the sum of actual compounds present.

The Subpart BB standards in 40 CFR parts 264 and 265 control emissions resulting from leaks associated with certain types of TSDF process equipment. These standards require implementation of a leak detection and repair program for pumps and valves, and the installation and operation of certain equipment on compressors, pressure-relief devices, sampling connection systems, open-ended valves or lines, flanges or other connectors, and associated air emission control devices. The requirements apply to TSDF where the equipment specified above contains or contacts hazardous waste which contains organic concentrations of 10 percent or greater by weight.

4. Corrective Actions

Under the authority of RCRA section 3004(u), EPA has proposed regulations to address releases of hazardous waste or hazardous constituents from solid waste management units (SWMU's) that pose a threat to human health and the environment (55 FR 30798; July 27, 1990). Because this authority applies to contamination of soil, water, and air

media, organic emissions from SWMU's at some TSDF would be addressed by the corrective action program. The proposed regulations would establish health-based trigger levels measured at the TSDF boundary for determining whether further remedial studies are required to assess air emissions from a particular SWMU. Health-based cleanup standards would then be set for air emission levels that exceed acceptable health-based levels at the point at which actual exposure occurs. When such exposure is determined either through monitoring or modeling techniques, corrective action would be required to reduce such emissions at the point of exposure.

The corrective action program is designed to achieve site-specific solutions based on an examination of a particular TSDF and its environmental setting. It is not intended to set national standards that regulate organic emissions from all TSDF. At sites where there are releases from SWMU's to the atmosphere, organic emissions will be controlled based on site-specific exposure concerns. Furthermore, releases from the SWMU's that contain nonhazardous solid wastes will also be subject to corrective action. Therefore, for air emissions, corrective action, in a sense, is designed to address expeditiously threats to human health and the environment that are identified prior to implementation of the more comprehensive standards being proposed today. In addition, in some respects, since corrective action can address a wider universe of SWMU's, it will also address some exposure concerns that today's proposed standards do not address.

5. Hazardous Waste Transporters

Regulations in 40 CFR part 263 establish standards which apply to persons transporting hazardous waste within the United States if the transportation requires a manifest under 40 CFR part 262. For a portion of these standards, EPA has adopted certain relevant regulations of the Department of Transportation (DOT) governing the transportation of hazardous materials (49 CFR parts 171 through 179). Compliance with the existing 40 CFR part 263 and 49 CFR parts 171-179 standards is expected to effectively control organic emissions during transit of hazardous wastes to TSDF. Therefore, the standards proposed today would not apply to hazardous waste transporters.

D. Relationship of Today's Proposed Standards to CERCLA

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) as amended by the Superfund Amendments and Reauthorization Act of 1986 (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 applicable or relevant and appropriate requirements (ARAR's) to the specific CERCLA site. In addition, the National Contingency Plan (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)). Today's proposed standards may be considered ARAR's for certain on-site remedial and removal actions.

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). "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 that their use is well suited to the particular site (53 FR 51478).

Some waste management activities used for remedial and removal actions to clean up hazardous organic substances require the use of tanks, surface impoundments, and containers. For example, hazardous organic liquids and surface waters contaminated with

hazardous organic wastes may be treated on-site using destruction, detoxification, or removal processes that occur in tanks or surface impoundments. On-site solvent washing of soils contaminated with hazardous organic sludges may be performed in a tank or container. Hazardous wastes in leaking drums may be repacked in new containers for treatment and disposal off-site.

The organic emission control requirements proposed today would be "applicable" to on-site remedial and removal actions that use tanks, surface impoundments, and containers to manage substances identified or listed under RCRA as hazardous waste and containing more than 500 ppmw of volatile organics. In addition, off-site storage, treatment, and disposal of all wastes classified under RCRA as hazardous waste must be performed at a TSDF permitted under RCRA subtitle C. Thus, CERCLA wastes that are defined as hazardous under RCRA, contain more than 500 ppmw of volatile organics, and are shipped off-site for management in tanks, surface impoundments, and containers, would be subject to today's proposed standards like any similar RCRA hazardous waste. Also, the proposed standards may be "relevant and appropriate" to on-site CERCLA removal and remedial actions that use tanks, surface impoundment, and containers to manage substances which contain volatile organics that are not covered by this rule (e.g., hazardous wastes with volatile organic concentrations less than 500 ppmw, or nonhazardous wastes containing volatile organics).

On the other hand, today's proposed standards do not specify control requirements for waste piles, landfills, and land treatment units which manage hazardous wastes at TSDF. Therefore, the proposed standards would not be "applicable" to excavation, capping of wastes, land treatment, land farming, in-situ treatment activities, and other activities involving waste piles and landfills at CERCLA sites. Although in most cases EPA does not expect the proposed standards to be "relevant and appropriate" to these types of units at CERCLA sites, remedial and removal actions performed in waste piles may be similar in nature and scale to the waste management activities performed in surface impoundments; and waste fixation may involve the same basic process and air emission mechanism regardless of whether the mixing of the waste and binder is conducted in a tank, surface impoundment, container, waste pile, landfill, or land treatment unit.

Thus, the EPA expects that the proposed standards may be "relevant and appropriate" for (1) storage of waste containing more than 500 ppmw volatile organics in waste piles, and (2) fixation of wastes containing more than 500 ppmw volatile organics in landfills, waste piles, or land treatment units.

III. Sources and Emissions

A. Overview of Source Category

Hazardous waste TSDF are facilities where hazardous wastes are treated, stored, and/or disposed. The hazardous waste may be generated at the same site where the TSDF is located or may be generated off-site and transported to the TSDF for management. The EPA has conducted a number of surveys to collect information about the TSDF industry. Data from these surveys indicate that there are more than 2,300 TSDF, and approximately 96 percent of the hazardous waste managed at TSDF is generated and managed on the same site. The survey data identify more than 150 different industries, primarily manufacturing, that generate hazardous waste. Approximately 500 TSDF are commercial facilities that manage hazardous waste generated by others.

The types of hazardous wastes managed at TSDF and the waste management processes used are highly variable from one facility to another. The physical characteristics of wastes managed at TSDF include dilute wastewaters (representing more than 90 percent by weight of the total waste managed), organic and inorganic sludges, and organic and inorganic solids. Waste management processes differ according to waste type and include storage and treatment in tanks, surface impoundments, and waste piles; handling or storage in containers such as drums, tank trucks, tank cars, and dumpsters; and disposal of waste by incineration, land treatment, injection into deep wells, or placement in landfills. In addition, hazardous waste may be managed in miscellaneous units that do not meet the RCRA definition of any of the processes listed above. Hazardous waste may also be handled in research, development, and demonstration units pursuant to requirements specified in 40 CFR 270.65.

The remainder of this section describes TSDF emission sources, discusses the analytical basis for estimating TSDF emissions and other impacts, and presents the rationale for selecting the hazardous waste management units to be controlled by today's proposed standards.

B. Analytical Basis for Impacts Estimation

1. Approach

Sufficient data concerning the wastes managed and waste management practices used are not available to perform a site-by-site impact analysis of each TSDF location in the United States. Therefore, EPA used computer models to estimate total organic air emissions from TSDF, the risk of contracting cancer posed by exposure to toxic constituents contained in these organic emissions, and the costs to control the emissions. To compare different regulatory strategies for controlling TSDF organic air emissions, EPA developed a national impacts model. This model calculates nationwide impacts through summation of approximate individual facility results. The primary objective and intended use of the national impacts model are to provide reasonable estimates of TSDF impacts on a national level. Because of the complexity of the hazardous waste management industry and lack of detailed information about every TSDF location, the national impacts model was developed to use nationwide average data for the TSDF locations where the site-specific data were incomplete or not available. Consequently, the national impacts model estimates are not considered by EPA to be accurate on an individual facility basis. However, on a nationwide basis, the national impact model estimates are a reasonable approximation and provide the best basis presently available for evaluating different regulatory strategies for controlling TSDF air emissions.

The national impacts model is not suitable for evaluating certain health impacts because the health effect parameters used to measure these impacts are not cumulative on a nationwide basis and are only meaningful for a specific site. Therefore, a second model was used to evaluate the cancer and noncancer health impacts resulting from exposure of the public to the organic emissions released from a specific TSDF site that was selected to represent a reasonable worst case analysis.

2. National Impacts Model

a. Overview. The national impacts model is a complex computer program that processes a wide variety of information and data concerning the TSDF industry in the United States. The data processed by the model include results from nationwide surveys of the TSDF industry, characterizations of TSDF processes and wastes, as well as

engineering simulations of the relationships between: (1) Waste management unit type, the quantity and composition of the waste managed in the unit, and the air emission mechanism; (2) air emission control technology, control efficiencies, and associated capital and operating costs, and (3) population exposure to TSDF air emissions and resulting nationwide cancer incidence.

The national impacts model computer code is composed of subroutines that identify for each TSDF location in the data base the types of waste management units used and the volumes and characteristics of wastes managed; assign chemical properties to the waste types and emission controls to the waste management unit types; and calculate uncontrolled emissions, emission reductions, control costs, and health impacts. The computer logic is also designed to perform waste stream mass balances to account for the reduction in the organic content of the waste stream resulting from biodegradation and volatilization prior to the management of the waste in downstream units; test each waste stream for volatile organic content and vapor pressure based on models derived from laboratory tests; determine total organics by volatility class for each waste stream; and check for waste form, waste code, and management unit compatibility.

The input data required to run the national impacts model was assembled into specific input data files. The content of the major data files are briefly described below along with how the information is used by the national impacts model. A detailed description of the data files and the national impacts model is presented in appendices to the background information document (BID).

The computer model accesses the input data files and retrieves the information or data required to perform a particular calculation. When data needed for a calculation are missing for a TSDF location, the computer model logic assigns appropriate default values in order to complete the calculation. The default value assigned to a particular parameter for input into the model was selected based on national average data. For example, a given quantity of a waste is reported in the input data base as being processed in treatment tanks at a particular TSDF location but no other information is available about the tanks. Because the air emissions from managing this quantity of waste vary depending on the type of treatment tanks used (e.g., open-top, covered, aerated), the national impacts model

distributes this waste quantity among the different treatment tank subcategories using national average distribution frequencies computed based on treatment tank management practices used nationwide at the TSDF locations for which this information is available. The need to make certain assumptions about waste characteristics and management practices used at some TSDF introduces a degree of uncertainty into the impact analysis. Because the actual conditions at a particular TSDF location may vary significantly from national average conditions, EPA does not consider the national impacts model estimates to be accurate on an individual facility basis. However, considering the large number of TSDF in the United States, EPA believes that using national average values for TSDF locations where some site-specific data are not available provides a reasonable approach for approximating nationwide TSDF impacts.

b. TSDF Industry Profile Data. The industry profile data file identifies the name, location, primary standard industrial classification (SIC) code, waste management processes, waste types, and annual waste throughputs for each active TSDF located in the United States with a few exceptions. The data file does not include TSDF that manage less than 0.01 Mg/yr (22 lb/yr) of hazardous waste or that manage exclusively State-designated hazardous wastes (rather than wastes designated as hazardous under RCRA). The industry profile data file also does not include facilities where all available data were classified as confidential business information. The exclusion of these active facilities from the data file does not significantly affect the nationwide impact estimates results because the excluded facilities are either very small emission sources or account for only a very small percentage of the facilities managing more than 0.01 Mg/yr.

The industry data were obtained from three principal sources: a 1986 screening survey of hazardous waste treatment, storage, disposal, and recycling facilities (referred to here as the "1986 screening survey"); the hazardous waste data management system's RCRA Part A permit applications; and a 1981 survey of hazardous waste generators and TSDF regulated under RCRA. The 1986 screening survey covered more than 5,000 potential TSDF nationwide. Data from that survey for more than 2,300 facilities were incorporated into the industry profile data base for use in the industry analysis. Surveyed facilities that were not included in the data base

were omitted primarily because they were found to be inactive. These facilities include former TSDF that have ceased all hazardous waste management operations, TSDF that are closing and did not manage waste in 1985, and facilities that do not treat, store, dispose of, or recycle hazardous waste.

The 1986 screening survey contained the most recent industry information available at the time EPA performed its analysis. Therefore, data from this survey were the primary source used to identify currently active TSDF, their waste quantities, and their operating waste management processes. However, because that survey did not contain site-specific information that identifies specific waste codes and the processes by which they are managed, the other two data sources were used as the basis for the waste data and other site-specific data. The industry data are used in the impacts model to define the location and the SIC code for each facility, and to identify the waste management units used at each facility as well as the types and quantities of hazardous waste managed in each unit.

c. Waste Characterization Data. The waste characterization data file consists of waste data representative of typical hazardous wastes handled by TSDF, classified by SIC code. For each SIC code, the waste characterization data file identifies the waste types typically managed by the industry sector (using RCRA waste codes), the physical/chemical forms of the waste managed (e.g., inorganic sludges, organic liquids, etc.), and the typical chemical composition (i.e., the constituents and their concentrations) for each listed waste type. The hazardous waste data are assigned to the specific TSDF locations listed in the industry profile data base by the SIC code and the RCRA waste codes identified for each facility.

Information compiled for the waste characterization data file was obtained primarily from five existing data bases: (1) The previously mentioned 1981 survey of hazardous waste generators and TSDF regulated under RCRA, (2) the Office of Solid Waste Industry Studies Data Base (ISDB), (3) a hazardous waste data base for wastes having RCRA waste codes beginning with the letter "K," (4) the waste stream data base for the Office of Solid Waste "Waste—Environment—Technology" (WET) model, and (5) a data base developed by the State of Illinois Environmental Protection Agency. Information from EPA field reports was also used. The data file contains one waste

characterization for each waste code in each SIC code even where different data were available. When explicit data were not available, approximations were used to fill in the missing data. For example, when waste composition data were not available for a particular waste stream, default chemical composition values (derived from information in data bases for similar waste stream applications) were substituted for the missing data. The waste characterization data file is used in the national impacts model to identify representative compositions for hazardous wastes managed at a TSDF.

More than 4,000 waste constituents were identified from the waste data as being managed nationwide at TSDF. To reduce the total number of chemical constituents assessed by the national impacts model, surrogate waste categories were defined to represent different groupings of constituents that share similar chemical, physical, and biological properties affecting organic emissions. Each surrogate waste category was defined to represent a subset of actual organic compounds based on vapor pressure, Henry's law constant, and biodegradability. When a particular chemical compound is indicated in the waste characterization data base to be managed at a specific TSDF location, property data defined for the surrogate waste category to which that compound has been assigned are used for developing air emission factors.

d. Air Emission Data. Air emission factors are used by the national impacts model to calculate the quantity of volatile organics contained in a particular waste that would be emitted to the atmosphere when the waste is placed in a particular type of waste management unit. Emission factors for the national impacts model were derived using emission models to calculate emission factors for the different surrogate waste categories when managed in the different types of waste management units. The emission models were either developed specifically for this analysis or adapted from models described in the literature. The models used are described in an EPA report entitled "Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)—Air Emission Models," which was prepared as a part of the background study for the standards proposed today. Predictions using the emission models were compared with field test data. In general, the emission factors estimated by the models agreed with the measured emission rates within an order of magnitude. Considering that the emission factors are used by the

national impacts model to represent nationwide average emission rates, this level of agreement between the emission factors and measured emission rates is reasonable. A description of the individual emission models used and a summary of the comparisons of measured and estimated emissions for each model are presented in appendix C of the BID.

Using the emission models, organic emissions were estimated by surrogate waste category for representative model units for each waste management unit type (e.g., aerated treatment tanks) that span the range of design characteristics and operating practices typically used nationwide. The model unit emission estimates for a particular waste management unit type were then combined into weighted emission factors by surrogate waste category to represent a "national average model unit" by calculating the weighted average of the emissions estimates using the nationwide distribution of the unit sizes (e.g., waste management unit capacity) as the basis for weighting. These weighted emission factors are expressed in terms of the quantity of organic emissions per megagram of waste throughput managed. The weighted emission factors were then compiled into an emission factor data file for use by the national impacts model. A detailed discussion of the emission factor data file is presented in Appendix D of the BID.

e. Health Effects Data. The EPA uses the Human Exposure Model (HEM) to estimate the magnitude and location of long-term average ambient concentrations of an air pollutant in the vicinity of an emitting source, and to estimate the number of people living in the vicinity of this source. The HEM incorporates an atmospheric dispersion model that includes local meteorological data with a population distribution estimate based on 1980 Bureau of Census data to calculate public exposure. The HEM output was adapted for use by the national impacts model to estimate annual cancer incidence (i.e., the number of cancer cases per year nationwide resulting from exposure to TSDF emissions) for the population living within 50 kilometers of each TSDF. The HEM was applied to TSDF by first running the model for each individual TSDF location listed in the industry profile data file using a standardized set of parameters for all locations. The HEM results were then compiled into an incidence data file which was subsequently adjusted by the national impacts model to reflect the individual TSDF site-specific conditions

based on estimated total annual organic emissions from each TSDF and a composite unit risk factor. The individual facility incidence estimates were then summed to obtain a nationwide cancer incidence value.

A unit risk estimate for a carcinogen is defined as the lifetime cancer risk occurring in a hypothetical population in which all individuals are exposed throughout their lifetime (assumed to be 70 years) to an average of 1 µg/m³ of the pollutant in the air they breathe. Unit risk estimates are typically derived by mathematical extrapolation from studies of people exposed in their workplace or from animal studies. The linear non-threshold model is considered to be a viable model for any carcinogen, and unless there is evidence to the contrary, it is used as the primary basis for risk extrapolation to the low levels of exposure in the ambient air. The unit risk values estimated by this method provide a plausible, upperbound limit on public risk at lower exposure levels if the exposure is accurately quantified; that is, the true risk is unlikely to be higher than the calculated level and could be substantially lower. A more detailed discussion of the unit risk estimate method used by EPA is presented in appendix E of the BID.

To address the difficulty of dealing with the large number of toxic chemicals that are managed at TSDF nationwide, EPA used a composite unit risk estimate approach. Because individual unit risk factors have not been developed for all of these toxic chemicals, EPA could only include those carcinogens for which factors were available in the computation of the composite unit risk factor. The composite unit risk factor used for the nationwide impact estimates was calculated as the weighted average of the individual unit risk factors for 52 organic compounds that have been identified as carcinogens and are managed at TSDF. Each unit risk factor for a specific compound was weighted on the basis of the estimated nationwide emissions for that compound to account for the varying quantities in which the different organic compounds are emitted from TSDF. The specific calculations of the composite unit risk factor are presented in appendix E of the BID.

Uncertainties exist in the composite unit risk factor because of difficulties in averaging unit risk factors for specific constituents. For example, approximately one-half of the composite unit risk factor value is contributed by the estimated dioxin emissions from TSDF. The individual unit risk factor for dioxin is substantially higher than the

individual factors for the other 51 compounds used to calculate the composite unit risk factor. Survey data used by EPA for the national impacts analysis indicated that some TSDF manage dioxin-containing wastes. However, the majority of TSDF are not expected to manage these wastes. The potency of the dioxin in these wastes may vary significantly depending on the particular dioxin isomer present. Because the survey data does not identify isomer forms in the waste, EPA made the conservative assumption that the dioxin is present in its most potent isomer form (i.e., tetrachlorodibenzo(2,3,7,8)-p-dioxin). There is controversy in the scientific community about the mechanism by which dioxin causes cancer. If EPA has modified the method by which it estimates risk from dioxin by the time EPA is reassessing the impact analysis for this rule, EPA will use the new methodology. In contrast, certain dioxin-containing wastes (e.g. waste codes F020, F021, F023, F026, F027, and F028) were not included in the survey data because these wastes were listed after the survey was completed. Thus, the computed composite unit risk factor does not account for dioxin emissions from all dioxin-containing wastes managed in TSDF. The EPA is requesting comments regarding the methodology used to address the computation of a composite unit risk factor.

f. Emission Control Data. Data files were assembled containing information about emission controls applicable to each type of TSDF waste management unit for calculating nationwide controlled emissions, control costs, and other environmental impacts. For the emission controls selected for a particular regulatory strategy, these files provide emission control efficiencies, and capital investment and annual operating cost factors. Emission control efficiencies were selected for each emission control type and TSDF waste management unit application using the best available information from field source tests, laboratory test data, empirical emission models, and theoretical chemistry relationships. These emission control efficiencies are discussed further in Section IV and appendices D and H of the BID.

The nationwide costs to the TSDF industry of implementing a particular regulatory strategy are calculated as a function of the waste quantities identified in the industry profile data base. Cost estimates were first prepared for national average model TSDF waste management units using standard cost

engineering procedures and practices. The same model units defined for the air emission estimates were used for the control cost estimates. These control estimates were divided by the model unit waste throughput to obtain a capital investment factor and an annual cost factor. The appropriate cost factors for the emission controls that would be required by a particular regulatory strategy for each waste management unit type are then multiplied by the total nationwide waste quantity tabulated by the national impacts model for the waste management unit type. These cost values were then summed to obtain total nationwide capital investment and annual cost impacts to the TSDF industry. A detailed description of the cost estimating procedure used for each emission control and waste management unit combination is presented in appendix H of the BID.

The emission controls used to reduce TSDF air emissions may create additional environmental impacts (e.g., disposal of saturated carbon from carbon adsorption systems, nitrogen oxide air emissions from thermal vapor incinerators) as well as energy impacts (e.g., fuel consumption to produce steam for carbon regeneration). These cross-media impacts (i.e., water and solid waste impacts), secondary air impacts (i.e., other air pollutant emissions resulting from the application of organic emission controls), and energy impacts were calculated for the regulatory options using the same basic approach used to estimate control costs except factors appropriate for estimating air, water, solid waste, and energy impacts were developed. A detailed description of the procedure used to estimate cross-media, secondary air emission, and energy impacts is presented in appendix K of the BID.

g. National Impacts Model Baseline Simulation. To estimate the nationwide human health and environmental impacts expected to occur if a new standard is promulgated, EPA calculates the impacts from implementing the standard (e.g., organic emission reduction) with respect to the impacts that would occur in the absence of implementing the standard. Often, the current levels of air emissions from a source and the associated health impacts are used as the reference point or "baseline" from which the emission reduction and other impacts are determined. However, because of other EPA rulemakings under RCRA presently in progress, the level of nationwide TSDF organic emissions by the time today's proposed regulation would be promulgated is expected to be

significantly different from the current emission level. The existing RCRA air emission standards and LDR described in section II will affect organic emissions from many TSDF emission sources. Therefore, EPA established the baseline level of organic emissions from which the impacts of today's proposed regulation are determined assuming that the existing RCRA air emission standards and LDR have been implemented. Other organic emission control requirements applicable to TSDF, such as the RCRA corrective action program and any State standards, were not included in the baseline calculations because these requirements are site-specific rather than nationwide control requirements and, thus, are difficult to characterize.

The LDR for many listed wastes have only recently been finalized and many of the treatment standards are expressed as performance standards for certain constituents in the treatment residue rather than as specific technology requirements. Therefore, EPA is not certain at this time as to how the LDR will ultimately impact TSDF air emissions. For the nationwide impact analysis, EPA first needed to forecast the approaches TSDF owners and operators would most likely choose to implement the LDR for specific wastes types. Using available information, EPA made certain assumptions regarding the general or average response of the hazardous waste management industry to complying with the LDR. These assumptions are: (1) All wastes currently land treated will be incinerated with the exception of high-solids content waste mixtures, (2) all organic liquids and organic sludges/slurries currently placed in landfills and waste piles will be incinerated, (3) all dilute aqueous liquids, aqueous sludges/slurries, and high-solids content waste mixtures will be converted by waste fixation into a solid material and then placed in a landfill, (4) all treatment surface impoundments will either be maintained as surface impoundments and dredged once a year or converted to open tanks, and for both cases it is assumed that there will be no change in emissions, emission reduction, and costs of control, (5) all waste fixation processes will use a chemical process involving the mixing of the waste with a binder to form a mixture that upon curing yields a solid material, and (6) the waste management unit treating a waste to comply with the LDR treatment standards is the last unit prior to disposal of the waste in the waste management sequence used at a particular TSDF site (i.e., LDR treatment

unit is located downstream of all other waste storage and treatment units).

The need to use assumptions about how TSDF owners and operators will comply with the LDR adds uncertainty to the national impacts estimates. The EPA selected a combination of LDR assumptions to represent a plausible yet conservative TSDF waste management sequence to apply organic emission controls. For example, because the analysis assumes that treatment to comply with the LDR occurs as the last step prior to disposal at every TSDF location, the national impacts model calculates the cost of using organic emission controls on every tank, surface impoundment, and container used at a particular TSDF site to manage a waste stream selected for regulation. In actuality, EPA expects that at many TSDF sites, the owner or operator would treat the waste to comply with the LDR (as well as for other reasons) at an earlier step in the waste management sequence reducing the organic content of the waste and, thus, likely avoiding the need to use emission controls on the downstream tanks, surface impoundments, and containers. Similarly, the analysis assumes that all dilute aqueous liquids, aqueous sludges/slurries, and high-solids content waste mixtures containing organics are treated at each TSDF site using a waste fixation process. As a result of this assumption, the national impacts model calculates the cost of applying enclosures and control devices to control organic emissions from the fixation of these wastes. Recent surveys conducted by EPA suggest that TSDF owners and operators may choose to use other treatment processes and may fixate significantly less quantities of wastes containing organics than is calculated by the national impacts model.

To be able to consider the degree of uncertainty in EPA's assumptions for estimating nationwide impacts in the selection of the final standards, EPA is requesting comment from TSDF owners and operators as to how they are currently or are planning to comply with other hazardous waste management regulatory requirements such as the land disposal restrictions. Specifically, information is requested regarding the extent to which TSDF owners and operators are continuing to use land treatment units for liquid, slurry, and sludge type wastes; using waste incineration for disposal of organic liquids and organic sludges/slurries; stabilizing dilute aqueous liquids and aqueous sludges/slurries by waste fixation for disposal in landfill; replacing treatment surface impoundments with

tanks; and locating LDR treatment units upstream of other storage and treatment units. Prior to finalizing this rule, EPA will reevaluate the assumption on what an owner or operator would do in response to the land disposal restrictions. If appropriate, EPA will modify the treatment model used to estimate the effects of this rule.

3. Site-Specific Impacts Model

The national impacts model is not appropriate for evaluating certain health impacts because these health parameters are only meaningful for a specific site. Therefore, EPA used a second site-specific model to evaluate the maximum lifetime cancer risk to the most exposed individual, and both long-term (chronic) and short-term (acute) noncancer health effects for a specific TSDF site. This site was chosen to represent conditions near the upper end of the range of expected exposures to toxic constituents in TSDF organic emissions.

The TSDF site was selected for the analysis on the basis of: (1) the availability of sufficient information to characterize it for detailed emission modeling and dispersion modeling, (2) the presence of a variety of emission sources, and (3) the management of sufficient waste volumes to maximize emissions. Emission models were used to estimate the magnitude of the organic emissions from each source. Dispersion models were used to estimate ambient concentrations of organics that people would be exposed to around the facility as a result of the facility emissions. Site-specific data inputs to the modeling effort included physical details of each waste management unit, the hazardous waste types and volumes handled by the units, the physical location of the units relative to the property line of the facility, and local meteorological data. Additional details on the detailed facility modeling are presented in Appendix J of the BID.

Estimation of the ambient concentrations of organics that people would be exposed to around the facility as a result of the facility emissions allowed site-specific cancer and noncancer health effects to be evaluated. A composite unit risk factor was applied to the estimated ambient organic concentrations to estimate maximum individual cancer risk. The same composite unit risk factor used to estimate nationwide cancer incidence was also used for the site-specific modeling. Reference doses were applied to the estimated ambient organic concentrations to evaluate noncancer health effects.

C. TSDF Organic Emission Sources

1. Tanks

Tanks are used at TSDF for storage and for treatment of hazardous waste. Most TSDF storage tanks are presently either open-top (i.e., uncovered) or are covered and vented to the atmosphere. A few storage tanks are vented to a control device. Emissions from tanks occur as a result of evaporation at the liquid surface of the waste. For open tanks, the evaporated organics (i.e., vapors) are dispersed into the atmosphere by diffusion, wind, or displacement during tank filling. Covering a tank lowers organic emissions, but emissions still occur through the cover vents as a result of the displacement of vapors during filling operations or by diurnal temperature changes. Emissions from treatment tanks that use aeration, agitation, or mixing operations tend to be higher than for storage tanks. However, emissions from tanks used for treatment processes such as clarification, sedimentation, or neutralization where no mechanical mixing is involved and the waste remains in a "quiescent" state are similar to emissions from storage tanks.

As a group, tanks comprise the largest TSDF organic emission source. Estimated current nationwide organic emissions from storage tanks at TSDF are approximately 756,000 Mg/yr. Current nationwide organic emissions from treatment tanks managing quiescent wastes (referred to here as "quiescent treatment tanks") are estimated to be approximately 48,000 Mg/yr. Current nationwide organic emissions from treatment tanks managing nonquiescent wastes (referred to here as "nonquiescent treatment tanks") are estimated to be approximately 440,000 Mg/yr. The EPA does not expect that additional controls will be applied to TSDF tanks as result of existing RCRA rules with the exception of some tanks used as an integral component of treatment processes regulated by subpart AA of 40 CFR parts 264 and 265 (e.g., condensate receiving tanks used with batch distillation processes). Therefore, baseline emissions are estimated to be the same as current emissions.

2. Surface Impoundments

Surface impoundments are also a large source of TSDF organic emissions. Similar to open-top tanks, emissions from surface impoundments are released directly to the atmosphere from the exposed waste surface. Current organic emissions from storage and quiescent treatment surface impoundments are estimated to be approximately 210,000

Mg/yr nationwide. Current nationwide organic emissions from nonquiescent treatment impoundments are estimated to be approximately 74,000 Mg/yr.

For the purpose of estimating baseline emissions, EPA assumed that surface impoundments would either be converted to open-top tanks or, for certain treatment impoundments, would be dredged annually to comply with the LDR. Because surface impoundments and open-top tanks have similar air emission mechanisms, EPA assumed that baseline emissions for surface impoundments would be the same as current emissions.

3. Containers

Another TSDF organic emission source is the release of organics from the storage of waste in containers that are not tightly closed and during the transfer of waste into the containers. Containers include drums, tank trucks, railroad tank cars, and dumpsters. Although existing RCRA regulations requiring containers to be closed during storage (Subpart I in 40 CFR 264 and 265) help reduce organic emissions, organic emissions will occur from gaps between the container lip and the cover unless a tight-fitting cover is used. Emissions during container loading operations occur when liquid or sludge wastes are poured into a container, displacing an equal volume of air that is saturated or nearly saturated with organics from inside the container to the ambient air. Current organic emissions associated with the transfer and storage of waste in containers are estimated to be approximately 85,000 Mg/yr. Because additional controls will not be applied to TSDF containers as result of existing RCRA rules, this emission estimate is also assumed to represent emissions at baseline.

4. Waste Fixation

As a result of LDR, certain liquid, slurry, and sludge hazardous wastes are now treated at TSDF using a waste fixation process (also referred to as waste solidification or stabilization) so that the waste can be placed in a hazardous waste landfill. The term "waste fixation," as used in this preamble, refers to a chemical process in which the free water in the waste reacts with a binder (commonly cement kiln or lime kiln dust) to form a solid material that immobilizes specific metal and organic contaminants in the waste.

Waste fixation involves first mixing the waste with the binder material. The simplest mixing procedure used at TSDF involves dumping the waste into an open-top tank, surface-impoundment, waste pile, or dumpster; adding the

binder to the waste; and mixing the materials together using a backhoe or other construction machinery. A similar procedure is used but on a smaller scale for fixating waste directly in drums. At some TSDF, open mixing of the waste and binder has been replaced by the use of enclosed mechanical mixing devices such as a pug mill or a ribbon blender. Following mixing, the mixture is cured by holding the mixture for a sufficient period of time (usually 24 to 48 hours) to allow the mixture to harden. The waste is then tested, and if it meets the appropriate treatment standards, the waste is placed in a landfill.

Organic emissions from waste fixation occur when organics in the waste volatilize and are released to the atmosphere during mixing and curing. Current emissions from waste fixation operations are estimated at approximately 2,000 Mg/yr. Baseline emissions are estimated to increase significantly above the current level because of the assumption that the TSDF industry will respond to the LDR by using waste fixation to convert dilute aqueous liquids, aqueous sludges/slurries and high-solids content waste mixtures into solid materials that can be placed in a landfill. Baseline emissions from waste fixation are estimated to increase to approximately 180,000 Mg/yr.

5. Land Treatment Units

Land treatment involves treating the waste by spreading a waste on top of or injecting it into the soil, and then tilling the soil for the purpose of allowing soil bacteria to decompose organic material and fixing the metals in the soil matrix. A waste may be dewatered to lower its water content before being applied to the soil. Organic emissions are generated from land treatment operations during application, tilling, and decomposing, both from direct volatilization of organics that are land treated and from volatile organics that are formed during the decomposition of heavy organics. If a dewatering device is used, emissions may also occur from this device, for example, from the vacuum pump exhaust (on vacuum filters), as well as from the filter cake collection system. However, the major emission source is the soil surface in the land treatment operation itself. Current emissions from land treatment operations are estimated at approximately 73,000 Mg/yr. Baseline emissions from land treatment are estimated to be reduced to zero assuming that in response to LDR: (1) All wastes currently land treated with the exception of high-solids content

waste mixtures will instead be incinerated, and (2) the high-solids content waste mixtures will be treated by waste fixation and then landfilled.

6. Landfills

A hazardous waste landfill generally is an excavated, lined pit into which wastes are placed for permanent disposal. Emissions can occur from both active and closed landfill facilities. Only emissions from active landfills were estimated by the national impacts model. Although EPA continues to evaluate emissions from closed landfills, emissions from these sources are difficult to estimate because of the need for information related to the waste types and quantities as well as when the waste was buried at the site. In an active landfill, whether open or covered with earth, the landfill surface is the major emission point. Emissions occur from the landfill surface as a result of the evaporation of organics and the diffusion of the vapors up to the landfill surface and into the air. Other activities generating emissions at an active site include waste transport, unloading, and spreading. Current nationwide organic emissions from active landfills are estimated at approximately 40,000 Mg/yr. Although the amount of waste landfilled after implementation of the LDR is estimated to increase over current levels due to increased waste fixation, emissions are estimated to be substantially reduced because of the assumptions that: (1) The LDR treatment standards will require that the fixated wastes contain no free organics, and (2) all organic liquid and organic sludge/slurry wastes currently placed in landfills will instead be incinerated in response to the LDR. Baseline emissions from active landfills are estimated to be approximately 2,100 Mg/yr.

7. Waste Piles

A waste pile is used for the short-term storage of wastes. As with landfills, organic emissions can be released due to volatilization from the waste pile surface. The EPA estimated that current emissions from waste piles are approximately 130 Mg/yr. For baseline, it is assumed that all organic liquid and

organic sludge/slurry wastes currently placed in waste piles will instead be incinerated in response to the LDR. Baseline emissions from waste piles are estimated to be approximately 33 Mg/yr.

8. Hazardous Waste Incinerators

Organic emissions are released from the exhaust stacks of hazardous waste incinerators as well as boilers and industrial furnaces used to burn hazardous waste. Current emissions from hazardous waste incinerators are estimated to be 880 Mg/yr. For baseline it is assumed that increased quantities of waste will be incinerated in response to the LDR. Organic emissions from hazardous waste incinerators are regulated by RCRA standards in 40 CFR 264 subpart O, and air emissions from boilers and industrial furnaces burning hazardous waste are regulated under recently promulgated RCRA standards (56 FR 7134, February 21, 1991). At baseline, organic emissions from the incineration of hazardous wastes are estimated to increase to a level of approximately 1,100 Mg/yr.

9. Treatment Unit Process Vents

Organic emissions are also released from the process vents of distillation, fractionation, evaporation, solvent extraction, air stripping, and steam stripping units used to treat hazardous wastes containing volatile organics. Current organic emissions from these sources are estimated to be approximately 8,100 Mg/yr. Air emission standards for process vents (Subpart AA in 40 CFR parts 264 and 265) are in effect and are estimated to reduce process vent emissions to approximately 900 Mg/yr at baseline.

10. TSDF Equipment leaks

Emissions from equipment leaks occur when waste leaks from seals, gaskets, sampling connections or other openings in waste handling processes. Equipment leak emissions from TSDF handling waste having an organic content of 10 percent or more are estimated at approximately 26,200 Mg/yr. Air emission standards for equipment leaks (Subpart BB in 40 CFR parts 264 and 265) are in effect and are estimated to reduce

these organic emissions to approximately 7,200 Mg/yr at baseline.

D. Particulate Matter Emissions

The EPA conducted a study to determine the magnitude of fugitive emissions of contaminated particulate matter from TSDF and to determine if these emissions pose a threat to human health or the environment. Fugitive emission sources of contaminated particulate matter identified included active landfills, dry surface impoundments, waste storage piles, land treatment areas for liquid wastes, and stabilization or solidification areas for liquid wastes. Eight TSDF were surveyed and sampled to assess the potential magnitude of particulate emissions, the degree of contamination of the particulate matter, and the health risks posed by these emissions. The results of these site surveys were scaled up to assess nationwide impacts. The conclusion of this assessment was that there is no major nationwide health problem associated with TSDF particulate emissions but that there is the potential for site-specific problems. Consequently, rather than developing additional nationwide standards, EPA has developed a technical guidance document (EPA publication no. 450/3-89-019) to supplement existing particulate standards which can be used to identify and correct site-specific health problems associated with fugitive particulate matter emissions. While EPA believes that this approach to fugitive emissions is appropriate, but because there may be alternative approaches that EPA has not considered, the public is requested to comment on the appropriateness and effectiveness of the selected approach.

E. Selection of Sources for Control

The EPA's objective in selecting TSDF organic emission sources for control by today's proposed standards is to control the major TSDF air emission sources that are not already addressed, either directly or indirectly, by other RCRA standards. Table 1 presents a summary of the nationwide TSDF organic emission estimates by emission source type.

TABLE 1.—NATIONWIDE TSDF ORGANIC EMISSIONS ESTIMATES

Emission Source Type	Number of TSDF with source type	Nationwide organic emissions (thousand Mg/yr)	
		Current	Baseline
Tanks (a)			
Storage and quiescent treatment.....	911	800	810
Nonquiescent treatment.....	291	440	440

TABLE 1.—NATIONWIDE TSDF ORGANIC EMISSIONS ESTIMATES—Continued

Emission Source Type	Number of TSDF with source type	Nationwide organic emissions (thousand Mg/yr)	
		Current	Baseline
Surface Impoundments:			
Storage and quiescent treatment.....	270	210	210
Nonquiescent treatment.....	127	74	74
Containers ^(a)	1,440	85	85
Waste Fixation ^(c)	158	2	180
Land Treatment Units.....	54	73	0 ^(d)
Landfills.....	90	40	2 ^(d)
Waste Piles.....	57	<1	<1 ^(d)
Hazardous Waste Incinerators.....	158	1	1 ^(e)
Treatment Unit Process Vents ^(e)	450	8	1 ^(e)
TSDF Equipment Leaks.....	1,440	28	7 ^(e)
TOTAL		1,760	1,811

^(a) Estimates do not include generator accumulation tanks.
^(b) Estimates do not include generator accumulation containers.
^(c) Waste solidification process involving the mixing of a waste and a binder in a tank, surface impoundment, container, or other type of hazardous waste management unit.
^(d) Baseline estimate assumes waste will be treated to remove or destroy organics prior to placement in the unit to comply with land disposal restrictions.
^(e) Organic emissions regulated by existing RCRA standards.
^(f) Distillation, fractionation, evaporation, solvent extraction, air stripping, and steam stripping waste treatment processes.

Total nationwide organic emissions from TSDF at baseline are estimated to be approximately 1.8 million Mg/yr. These emissions represent approximately 12 percent of total nationwide, stationary source emissions of organic compounds. The emission estimates presented in Table 1 indicate that at baseline the major TSDF organic emission sources will be tanks, surface impoundments, containers, and waste fixation operations. On the basis of these nationwide organic emission estimates, EPA selected TSDF tanks, surface impoundments, and containers for control by today's proposed standards. Because waste fixation is commonly performed in tanks, surface impoundments, and containers, controlling these units would also reduce organic emissions from waste fixation operations. Also, as discussed in Section VIII, EPA selected for control by today's proposed standards certain tanks and containers used by hazardous waste generators to accumulate waste on-site for short periods of time.

The EPA did not select land treatment, landfills, or waste piles for control by today's proposed standards. The LDR (refer to Section II) require treatment of certain hazardous wastes to reduce the toxicity or mobility of specific waste constituents before the waste can be placed in a land disposal unit. Because LDR are generally performance standards that can be complied with using one of several methods and many are not yet promulgated, it was necessary for EPA to make certain assumptions about how the TSDF industry will respond to LDR. The EPA assumed that LDR will require the organics in the waste to be removed

or destroyed prior to placement in a land treatment unit, landfill, or waste pile resulting in the low organic emission levels shown in Table 1. Based on this analysis, EPA concluded that additional control requirements for air emissions from land treatment units, landfills, and waste piles should not be proposed at this time. As more LDR are promulgated and the protectiveness of the LDR with respect to TSDF air emissions can be better assessed, EPA will review this decision and, if necessary, develop additional air emission standards for land disposal units.

As discussed in section II, EPA has already promulgated air emission standards under RCRA to control organic emissions from certain types of hazardous waste treatment processes including hazardous waste incinerators, nonthermal destruction treatment unit process vents, and TSDF equipment leaks. The baseline organic emissions from these sources as shown in Table 1 will be very low. Subpart O in 40 CFR Part 264 establishes organic emission performance standards for hazardous waste incinerators and other thermal destruction treatment processes. Subpart AA in 40 CFR part 264 sets organic emission performance standards applicable to distillation, fractionation, evaporation, solvent extraction, air stripping, and steam stripping waste treatment processes. Subpart BB in 40 CFR part 264 regulates organic emissions resulting from leaks associated with certain types of equipment used for hazardous waste management units. For these reasons, additional standards are not proposed for these sources.

IV. Emission Controls

A. Selection of Emission Controls

The EPA identified several emission control technology approaches that can be used to reduce organic emissions from hazardous waste tanks, surface impoundments, and containers. These include: (1) Containment and control of the organic emissions released from the waste as it is managed in tanks, surface impoundments, and containers; and (2) pretreatment of the waste to remove or destroy the organics in the waste prior to placement of the waste in tanks, surface impoundments, or containers.

Containment and control of the organic emissions released from the waste involve the application of add-on emission controls to individual tanks, surface impoundments, and containers. Organic vapors can be suppressed by applying a cover that directly contacts the waste medium, thereby creating a physical barrier at the waste surface which inhibits the volatilization of organics. However, the potential remains that the volatile organics retained in the waste could ultimately be released to the atmosphere from a point further downstream in the management of the waste unless other emission control measures are used in conjunction with the covers. Another method for containing the volatile organics is to form a closed vapor space above the waste surface by erecting an enclosure over the entire waste management unit or, for some types of open-top units, installing a cover. Where this containment method is used in combination with a closed vent system and a control device (e.g., carbon

adsorbers, vapor incinerators, condensers), organic vapors released from the waste and contained in the vapor space are captured and treated (i.e., removed or destroyed).

Pretreatment of the hazardous waste removes or destroys organics in the waste and, thus, reduces organic emissions from all subsequent waste management units handling waste without the need to use add-on emission controls for each of these units. For example, if a waste is pretreated by steam stripping to remove organics, the quantity of organic emissions from all activities that subsequently manage the waste will be reduced relative to the quantity of emissions that would have occurred without pretreatment because of the reduction in the volatile organic content of the waste. Similarly, if a waste is incinerated then there are no additional waste handling steps (other than the disposal of ash and other noncombustible residuals remaining after the waste is incinerated), and thus there are no subsequent waste management units that are sources of organic emissions.

To select the emission control technologies to be further evaluated for the development of organic emission standards for hazardous waste tanks, surface impoundments, and containers, EPA considered the possible fates of waste placed in these units. All hazardous waste ultimately is either recycled as a product, treated for disposal, land disposed, or discharged to a wastewater disposal system. The EPA evaluated the suitability of using an organic emission containment and control approach (i.e., application of covers and enclosures with, where appropriate, control devices) for hazardous waste tanks, surface impoundments, and containers with respect to how other EPA rulemakings would impact overall organic emissions from the activities that ultimately may be used to manage a waste.

For wastes that are eventually recycled as products (e.g., organic solvents, fuel), containment and control of the volatile organics released from waste while it is managed in tanks, surface impoundments, and containers prior to being recycled would be suitable since the organics are reused. As discussed in Sections II and III, organic emissions from waste that ultimately is treated and disposed or is land disposed are impacted by existing standards under RCRA regulating organic emissions from certain hazardous waste treatment processes, and by the ongoing development of the LLR. The EPA is assuming that these

standards will require waste be managed in such a manner that the organics in the waste are destroyed or removed by treatment units controlled for organic emissions prior to disposal. Therefore, based on this assumption, use of organic emission containment and control for hazardous waste tanks, surface impoundments, and containers would also be suitable for waste that is ultimately treated and disposed, or land disposed.

Using an organic emission containment and control approach for waste that is managed in tanks, surface impoundments, and containers, and then discharged to a wastewater treatment system may not be suitable without other regulatory requirements. Other EPA control programs are being implemented or are in development (e.g., prevention of significant deterioration (PSD) and new source review requirements, publication of control technique guidelines (CTG), new rulemakings under the Clean Air Act) which will affect the discharge of certain hazardous wastes which contain volatile organics by establishing discharge standards for these wastes or air emission standards for wastewater treatment units used to treat the waste. Therefore, eventually, if not already, hazardous waste managed in tanks, surface impoundments, and containers, and then discharged to a wastewater treatment system, will be affected by other regulatory requirements. For today's proposal, EPA is assuming that the control equipment required by these other EPA control programs when implemented will result in waste being managed in such a manner that the organics in the waste are destroyed or removed by treatment units controlled for organic emissions prior to discharge to a wastewater treatment system. Based on this assumption, use of organic emission containment and control for hazardous waste tanks, surface impoundments, and containers would also be suitable for waste that is ultimately discharged as wastewater.

Based on the key assumptions described above, EPA concluded that organic emission containment and control in combination with the other EPA rulemakings will provide an integrated approach to reducing organic emissions from TSDF tanks, surface impoundments, and containers. Once more LDR and organic emission control requirements affecting wastewater discharge are promulgated and the protectiveness of these standards with respect to organic emissions can be better assessed, EPA will review the assumptions used as the basis for

selecting organic emission containment and control as the emission control technology approach for hazardous waste tanks, surface impoundments, and containers. If these assumptions are no longer valid and additional standards are found to be necessary under section 3004 of RCRA to protect human health and the environment, then EPA will investigate alternative emission control technology approaches that can be used to reduce organic emissions from TSDF tanks, surface impoundments, and containers.

B. Covers and Enclosures

Covers or enclosures reduce organic emissions by suppressing the generation and loss of vapors containing the organics. Appropriate types of covers include fixed roofs, internal floating roofs, and external floating roofs for tanks; covers for containers; and floating synthetic membranes for surface impoundments. Enclosures are structures erected over the entire waste management unit such as an air-supported structure over a surface impoundment or an enclosed building over a drum handling and storage area. However, enclosures are not suitable for organic emissions control without being vented through a control device because air must be continuously or periodically vented from an air-supported structure or enclosed building to maintain organic vapor concentrations inside the structure below lower explosive limits.

A fixed roof is a rigid cover that typically is equipped with pressure/vacuum vents to allow the tank to operate at a slight positive pressure. Fixed roofs are applicable for controlling emissions from storage tanks and certain types of treatment tanks, and can reduce emissions by 86 to 99 percent depending on the volatility and concentration of organics in the waste. Fixed roofs may also be used for emission controls on mixed or aerated tanks. For these sources, large dome-shaped roofs would be used to allow room for operation of surface-mounted aerators or agitators. However, for tanks in which mixed or aerated processes are conducted, fixed roofs would not be an effective emission control without the addition of a closed vent system and control device.

External floating roofs are rigid covers that float on top of the waste in a tank. A flexible seal is installed along the roof rim to control volatilization of organics from the space between the roof deck and the tank wall. These roofs are applicable to certain storage or treatment tanks and are capable of reducing emissions by 93 to 97 percent

relative to open tanks. External floating roofs may not be appropriate for tanks storing certain corrosive or solvent wastes because of potential incompatibilities between the waste and the roof seal. This type of roof also is not appropriate for treatment tanks requiring the use of equipment placed on or above the waste surface.

Internal floating roofs are similar to external floating roofs except that internal floating roofs are used in conjunction with a fixed roof. These roofs can be applied to tanks that already have a fixed roof or can be applied along with a fixed roof to uncovered tanks. The control efficiency of internal floating roofs used in conjunction with fixed roofs is estimated to range from about 93 percent to 97 percent relative to fixed roof tanks. As with external floating roofs, internal floating roofs may not be applicable to tanks containing certain corrosive or solvent wastes because of potential incompatibilities between the waste and the roof seal.

Similar to using a fixed roof tank to manage hazardous waste, placing a cover over a surface impoundment reduces the release of volatile organics contained in the waste by preventing waste mixing due to wind blowing across the unit. One type of cover available for application to surface impoundments is a floating membrane cover. A floating membrane cover consists of large sheets of synthetic, flexible membrane material that float on the surface of a liquid or sludge. Individual, standard dimension sheets can be seamed or welded together to form covers applicable to any size surface impoundment. Floating membrane covers have been used for many years to cover the surface of potable water reservoirs. More recently, use of floating membrane covers has been extended to applications that require the cover to be airtight such as covering anaerobic sludge lagoons.

The effectiveness of using a floating membrane cover for organic emission control is a function of the amount of leakage from the cover fittings and seams as well as the losses resulting from the permeation of the membrane material by volatile organic compounds contained in the waste. The successful application of floating membrane covers to anaerobic sludge impoundments demonstrates that leakage from fittings and seams can be reduced to very low levels by using a membrane material with adequate thickness, installing proper seals on cover fittings and vents, and following good installation practices to ensure that the seams are properly

welded and to prevent tearing or puncturing the membrane material. Consequently, for a properly installed floating membrane cover, the organic emission control effectiveness is expected to be primarily determined by the permeability of the cover to the organic constituents in the waste.

Permeability is a measure of resistance of a membrane material to the organics passing through the membrane. Permeation of a membrane material is a three-step process that involves the adsorption of the organics by the material, diffusion of the organics through the material, and evaporation of the organics on the air side of the membrane. The permeability of a floating membrane cover is a function of the organic composition and concentration of the waste managed in the surface impoundment as well as the cover material composition and thickness.

No source test data are available to measure the effectiveness of a floating membrane cover in controlling organic emissions from a surface impoundment. However, the effectiveness of using floating membrane covers applied to representative TSDF surface impoundments has been estimated using experimental test data and theoretical mass transfer relationships. These estimates suggest that a flexible membrane cover fabricated from high density polyethylene (HDPE) can be an effective organic emission control for hazardous waste managed in TSDF surface impoundments. For example, the organic emission control levels estimated for a 2.5 mm HDPE floating membrane cover range from approximately 50 percent to over 95 percent depending on the organic constituents in the waste and the waste retention time in the surface impoundment.

For surface impoundment applications where installation of a floating membrane cover is not possible, such as a treatment surface impoundment using surface aerators, the impoundment could be covered with an air-supported structure. An air-supported structure is a plastic-reinforced fabric shell that is inflated and, therefore, requires no internal rigid supports. Large fans are used to blow air continuously or intermittently through the structure and out a vent system. The vent system can discharge directly to the atmosphere or be connected to an add-on control device. Not venting the enclosure to a control device would make the air-supported structure useless for organics emission control.

The effectiveness of an air-supported structure in controlling organic emissions depends on the amount of leakage from the structure and the efficiency of the control device. Operating experience with air-supported structures has shown that with proper installation and maintenance, leakage can be limited to very low levels. Thus, the overall organic emission control efficiency for TSDF applications using an air-supported structure would be approximately equivalent to the efficiency of the control device used. Large areas can be enclosed by air-supported structures and, thus, would be suitable for use at TSDF area sources such as surface impoundments.

Rigid enclosures, much like conventional buildings, may be constructed of metal or other materials and would be appropriate for enclosing waste management operations such as surface impoundments or container storage areas. Rigid enclosures reduce emissions by reducing the mixing effects of wind and heating effects of sunlight on the organic volatilization rate for waste placed in the unit enclosed by the structure.

C. Submerged Loading

Submerged loading is a work practice that reduces emissions during container loading. During loading of liquid waste into containers, if the fill pipe is lowered only partially into the container, waste flows from the end of the pipe that is above the liquid level in the container, and significant turbulence and vapor-liquid contact occur when the falling liquid splashes on the surface of the liquid already in the container. This technique is referred to as splash loading and results in organic vapor generation and emissions to the atmosphere through the container opening used for waste loading. The induced turbulence, evaporation, and liquid entrainment is substantially reduced by the use of submerged loading in which the end of the fill pipe is positioned below the liquid surface of the waste in the container. This control technique is applicable to the loading of liquid wastes and many sludges into containers of all types. It is estimated to reduce emissions from TSDF container-loading operations by approximately 65 percent relative to splash loading.

D. Control Devices

1. Use of Closed Vent System with Control Device

A variety of control devices are available that are capable of achieving high organic emission control

efficiencies. Organic removal control devices extract the organics from the gas stream and recover the organics for potential recycling or reuse. Organic destruction control devices destroy the organics in the gas stream by oxidation of the organic compounds, primarily to carbon dioxide (CO₂) and water. The type of control device best suited for reducing emissions from a particular covered or enclosed waste management unit depends on the size of the unit and the characteristics of the organic vapor stream vented from the unit.

To achieve the maximum potential control device organic emission reduction efficiency, the vent system used to convey the organic vapors from the covered or enclosed waste management unit to a control device must be closed so that no organic vapors can escape directly to the atmosphere prior to the vapor stream entering the control device. A closed vent system consists of piping, connections and, in some cases, a flow inducing device (e.g., a fan or blower) to transport the vapor stream.

2. Organic Removal Control Devices

Adsorption, condensation, or absorption processes can be used to extract the organics from a gas stream. Considering organic vapor stream characteristics, the organic removal control devices most likely to be used for TSDF waste management units are carbon adsorbers and condensers.

Carbon adsorption is the process by which organic molecules in a gas stream are retained on the surface of carbon particles. The gas stream is passed through a bed of carbon particles that have been processed or "activated" to have a very porous structure. However, activated carbon has a finite capacity for adsorbing the organics. When the carbon becomes saturated (i.e., all of the carbon surface is covered with organic material), there is no further organic emission control because all of the organic vapors pass through the carbon bed. At this point, the adsorbed organics must be either regenerated (i.e., the organics desorbed from the carbon surface) or the spent carbon replaced with fresh carbon before organic emission control can resume.

Two types of carbon adsorption systems most frequently used for organic emission control are fixed-bed carbon adsorbers and carbon canisters. Fixed-bed carbon adsorbers are used for controlling organic vapor streams with flow rates ranging from 30 to over 3,000 m³/min (1,000 to over 100,000 ft³/min). When the carbon becomes saturated, the carbon is regenerated directly in the bed by passing steam through the

carbon bed. The steam heats the carbon particles, which releases the organic molecules into the steam flow. The resulting steam and organic mixture is condensed to recover the organics and separate the water for discharge to a wastewater treatment unit. Because most waste management units vent organic vapors 24 hours per day, fixed-bed carbon adsorber systems would need to be used with two or more carbon beds so that at least one bed is always available for adsorption while other beds are being regenerated.

In contrast to a fixed-bed carbon adsorber, a carbon canister is a very simple device consisting of a drum filled with activated carbon and fitted with inlet and outlet pipes. Use of carbon canisters is limited to controlling organic emissions from TSDF waste management units venting vapor streams with intermittent or low continuous flow rates such as storage tanks or quiescent treatment tanks. Once the carbon becomes saturated by the organic vapors, the spent carbon canister must be removed and replaced with a fresh carbon canister. The spent carbon is then returned to a carbon vendor for regeneration or disposal depending on site-specific factors.

The design of a carbon adsorption system depends on the inlet gas stream characteristics including organic composition and concentrations, flow rate, and temperature. Good carbon adsorber performance requires that: (1) The adsorber is charged with an adequate quantity of high-quality activated carbon; (2) the gas stream receives appropriate preconditioning (e.g., cooling, filtering) before entering the carbon bed; and (3) the carbon beds are regenerated before breakthrough occurs (i.e., before the carbon becomes saturated). Emission test data for full-sized, fixed-bed carbon adsorbers operating in industrial applications have been compiled by EPA. Analysis of these data indicates that for well-designed and well-operated carbon adsorbers, continuous organic removal efficiencies of at least 95 percent are achievable over long periods.

For carbon adsorption systems requiring steam to regenerate spent carbon, secondary air emission impacts could result if the steam is produced in a direct-fired boiler. These emissions include carbon monoxide (CO) and nitrogen oxides (NO_x), as well as possibly sulfur oxides (SO_x) and particulate matter if oil or coal is burned in the boiler. Spent carbon which no longer is suitable for use in carbon adsorption systems and cannot be regenerated must be disposed as a solid waste. The quantities of solid waste and

secondary air emissions generated are small relative to the reduction in organic emissions.

Condensers convert organic gases or vapors to liquid form by lowering the temperature or increasing the pressure. For TSDF organic emission control applications, surface condensers are most likely to be used. Surface condensers most often consist of a shell-and-tube-type heat exchanger. The organic vapor stream flows into a cylindrical shell and condenses on the outer surface of tubes that are chilled by a coolant flowing inside the tubes. The coolant used depends on the saturation temperature or dewpoint of the particular organic compounds in the gas stream. The condensed organic liquids are pumped to a tank for recycling or reuse.

The performance of a condenser is dependent upon the gas stream organic composition and concentrations as well as the condenser operating temperature. Condensation can be an effective control device for gas streams having high concentrations of organic compounds with high-boiling points. However, condensation is not effective for gas streams containing low organic concentrations or composed primarily of low-boiling point organics because the organics cannot be readily condensed at normal condenser operating temperatures. For example, data from a condenser field test indicate an organic removal efficiency over 99 percent for 1,2-dichloroethane (high boiling point organic), but an organic removal efficiency of only 6 percent for vinyl chloride (low boiling point organic). Use of surface condensers for TSDF organic emissions would produce no cross-media or secondary air emission impacts other than any impacts attributed to the generation of electricity needed to power the equipment.

2. Organic Destruction Control Devices

Organic destruction control devices include thermal vapor incinerators, catalytic incinerators, flares, boilers, or process heaters. Because of applicability restrictions, a particular type of combustion device may not be suitable for controlling certain organic vapor streams vented from covered or enclosed TSDF waste management units.

Thermal vapor incineration is a controlled oxidation process that occurs in an enclosed chamber. The organic destruction efficiency for a thermal vapor incinerator is primarily a function of combustion zone temperature, the period of time the organics remain in the combustion zone (i.e., residence time),

and the degree of turbulent mixing in the combustion zone. When designed and operated to achieve the proper mix of combustion zone temperature, residence time, and turbulence, thermal vapor incinerators can achieve organic destruction efficiencies of 98 percent and higher for all types of organic vapor streams.

The performance of a thermal vapor incinerator is affected by the heating value of the organic vapor stream to be controlled. Concentrated organic vapor streams normally have sufficient heating value to sustain combustion. However, dilute organic vapor streams such as can be vented from TSDF storage and quiescent treatment tanks used to manage dilute aqueous waste have low heating values. Consequently, the continuous addition of a supplemental fuel (e.g., natural gas or fuel oil) to boost the heating value of these vapor streams is required in order to maintain combustion zone temperatures in the range necessary for 98 percent organic destruction efficiency. Supplemental fuel may also be necessary for incinerating variable organic vapor streams in order to maintain flame stability. Thus, use of thermal vapor incinerators to control dilute or variable organic vapor streams may require substantial fuel consumption.

Using good thermal vapor incinerator design and operating practices limit CO emissions to very low levels. However, the combustion temperature levels required to achieve good organic vapor destruction efficiency also results in the formation of NO_x. Emission source test data indicate that NO_x emissions from thermal vapor incinerators are very low for concentrated organic vapor streams that do not require the addition of large quantities of supplemental fuel. The need to continuously add supplemental fuel in order to incinerate dilute organic vapor streams may increase NO_x emissions to levels associated with industrial boilers or process heaters burning similar quantities of the same fuel. If compounds containing chlorine are present in the organic vapor stream, hydrogen chloride will be formed when the vapors are incinerated. Similarly, the presence of sulfur compounds in the vapor stream results in the formation of SO_x. Although not addressed by this rulemaking, both HCl and SO_x emissions can be controlled by venting the incinerator exhaust gases through a wet scrubber. The scrubber effluent would increase the total TSDF wastewater to be handled by wastewater treatment units.

Catalytic vapor incineration is essentially a flameless combustion

process that can be used to control certain types of organic vapor streams. The organic vapor stream is passed through a metal or alloy-based catalyst bed that promotes organic oxidation reactions at temperatures in the range of 320 to 360 °C (600 to 1,200 °F). Temperatures below this range slow down or stop the oxidation reactions. Consequently, the organic vapor stream from the emission source is first preheated by passing the organic vapors through a heat exchanger and, if necessary, mixing the organic vapors with hot combustion gases from auxiliary burners fired using natural gas. Catalytic incinerator organic destruction efficiencies of 98 percent or more can be obtained by using the appropriate catalyst bed volume to gas flow rate for certain organic vapor streams.

The applicability of catalytic incineration to controlling organic vapor streams is restricted to fewer organic vapor stream compositions and concentrations than can be controlled by thermal vapor incinerators. The incinerator catalysts are very susceptible to rapid deactivation by halogens or sulfur. Thus, catalytic vapor incineration is not suitable for organic vapor streams containing halogen or sulfur compounds. Also, oxidation of vapor streams with high organic contents can produce high temperatures that shorten catalyst life or may even cause catalyst failure. Consequently, certain concentrated organic vapor streams may not be suitable for catalytic incineration.

In general, catalytic vapor incinerators have neither the NO_x air emission impacts nor the potential HCl and SO_x air emission impacts associated with thermal vapor incinerators because of the lower operating temperatures and the applicability restrictions. If auxiliary burners are required to preheat the organic vapor stream, small quantities of NO_x may be emitted from the auxiliary burner flame zone. Because the incinerator catalyst must be periodically replaced with fresh catalyst, the spent catalyst is either returned to a catalyst vendor for recycling or disposed as a solid waste.

Unlike vapor incinerators, flares are open combustion devices. The ambient air surrounding the flare provides the oxygen needed for combustion. A natural-gas-fired pilot burner ignites the organic vapor stream. Steam- or air-assisted flares can achieve an organic destruction efficiency of at least 98 percent on organic vapor streams having a heat content greater than 11 megajoules per cubic meter (300 Btu/ft³) when designed and operated according

to EPA's guidelines specified in 40 CFR 60.18. Flares are not suitable for use on organic vapor streams that contain halogens or sulfur compounds because the acid gases formed from these compounds during combustion cause severe corrosion and excess wear of the flare tips. Emission source test results indicate that NO_x emissions from flares are very low for concentrated organic vapor streams that do not require the addition of large quantities of supplemental fuel.

An existing industrial boiler or process heater can also be used for organic vapor destruction. The organic vapor stream is either premixed with a gaseous fuel and fired using the existing burner configuration, or fired separately through a special burner or burners that are retrofitted to the combustion unit. Studies of burning hazardous organic waste vapors in industrial boilers and process heaters indicate organic destruction efficiencies of 98 percent or more. Because a boiler or process heater normally is already firing natural gas or other fuel to provide steam or heat for a manufacturing process, using an existing boiler or process heater may allow organic vapor streams with lower heating values to be burned without the need to use additional fuel. However, because plant operations require these combustion units to be on-line for long periods of time, industrial boilers and process heaters are suitable for controlling only organic vapor streams that do not impair the combustion device performance (e.g., reduce steam output) or reliability (e.g., cause premature boiler tube failure).

V. Development of standards for organic emissions

A. Development of Control Options

1. Control Option Concept

The objective of today's proposed standards is to reduce organic emissions from TSDF tanks, surface impoundments, and containers that manage hazardous wastes. The total quantity of organic emissions reduced nationwide by implementing standards for these TSDF units is a function of which hazardous wastes are selected to be regulated, which TSDF units managing these wastes use emission controls, and the degree of organic emission reduction that the emission controls achieve. To select a basis for the proposed standards, EPA identified and evaluated a variety of possible strategies for applying the emission controls selected in Section IV to TSDF tanks, surface impoundments, and containers. Each strategy considered by

EPA is referred to as a "control option." Different control options were identified by varying the types of waste management units that would need to use emission controls and the level of organic emission reduction that would be required for the emission controls.

Each control option defines a unique set of wastes (based on volatile organic concentration) and organic emission control levels that are used by EPA to perform an impact analysis using the national impacts model described in Section III. This analysis provides estimates of the nationwide human health and environmental impacts expected to occur if standards based on a particular control option were promulgated. The EPA compared the control option impacts relative to a common set of reference values called the "baseline." The baseline represents the estimated human health and environmental impacts that would occur in the absence of implementing any of the control options. For the control option impact comparison, a baseline was chosen to reflect the impacts of other RCRA and Clean Air Act regulations affecting organic emissions from TSDF tanks, surface impoundments, and containers that will have been implemented by the date when any standards being developed under this rulemaking are expected to be promulgated.

Hundreds of possible control options can be identified for the various combinations of hazardous wastes and emission control levels. However, performing an impact analysis for every possible control option regardless of the control option's potential to protect human health and the environment would be a very time-consuming task and require extensive expenditure of EPA resources. Therefore, EPA first conducted a screening evaluation to narrow the number of control options for the impact analysis. This evaluation is available in the docket. The evaluation results were used to define a subset of appropriate control options from which the basis for the proposed standards could be selected.

2. Action Levels Considered for Control Options

The need to apply emission controls to a particular TSDF tank, surface impoundment, or container can be determined by the potential emissions from a particular hazardous waste managed in the unit. Indicators of potential emissions are referred to here as "action levels." Owners and operators of TSDF units with emission levels equal to or greater than a specified action level would be required

to initiate "action" by installing and using certain emission controls. In contrast, owners and operators of TSDF units with emission levels less than this action level would not be required to use emission controls. However, these owners and operators would be required to perform periodic waste determinations to ensure the TSDF unit's emission level remains below the action level.

As is discussed in Section IV, EPA selected an emission containment and control approach to reduce organic emissions from hazardous waste tanks, surface impoundments, and containers. To implement this approach using an action level, the same action level can be applied throughout the entire waste management process or different action levels can be applied at individual stages of the waste management process. The EPA decided to use a single action level from the point of waste generation through the point where the organics in the waste are either recycled, removed, or destroyed. The reasons are discussed below.

When only a cover is applied to a tank, surface impoundment, or container, the volatilization of the organics in the waste is inhibited, but the organics are generally neither removed or destroyed. When a cover vented to a control device is applied to a tank, surface impoundment, or container, a portion of the organics in the waste are emitted from the waste stream and vented to the control device. Organics still remain in the waste and can potentially be emitted from subsequent waste management units located downstream of the controlled waste management unit. However, when a tank, surface impoundment, or container is covered and the waste in the unit is agitated or aerated, a high proportion of the organics may be emitted and vented to a control device. Nevertheless, the remaining organics can potentially be vented from downstream waste management units. Therefore, using a higher action level for downstream waste management units than is used for the upstream waste management units reduces the overall effectiveness of the organic emission containment and control approach. A higher action level would allow some portion of the organics remaining in the waste to be emitted from the uncontrolled downstream units.

Approximately two-thirds of the baseline emissions are estimated to occur from quiescent tanks and quiescent surface impoundments (i.e., the waste managed in the unit is neither aerated nor agitated). If the waste

stream is not agitated or treated upstream of these units, the application of controls on the upstream units would serve to primarily shift the point where the organic emissions occur instead of reducing organic emissions. This rationale led EPA to propose a single action level from the point of waste generation through the point where the organics in the waste are either recycled, removed, or destroyed. The EPA is requesting comment on the effect of using different action levels on certain downstream units (e.g., those used for waste fixation) versus applying the same action level through the entire waste management process.

One direct way to set an action level for a particular emission source is in terms of an emission level or rate that expresses the quantity of organics emitted over time (e.g., kilograms of organics per hour, megagrams of organics per year). This format is well-suited for those organic emission sources where the pollutant gas stream is emitted from a single point where it can be readily measured such as the exhaust stack from a boiler or the vent stack from a chemical process unit.

Unfortunately, using an emission rate format to establish the action level for many TSDF tanks, surface impoundments, and containers is not practical because of the air emission mechanism, design configuration, and operating practices used for these units. At existing TSDF, hazardous waste is often managed in tanks, surface impoundments, and containers that are not covered. Because the entire waste surface is open to the atmosphere, organic emissions occur across large areas. Consequently, to measure the actual quantity of emissions from the unit, a gas-tight enclosure would need to be erected temporarily over the entire TSDF unit's exposed waste surface to capture all organic emissions. Thus, actual measurement of the organic emissions from an uncovered TSDF unit would be an impractical and expensive means for a TSDF owner or operator to use periodically for determining if a unit's emissions are below a specific action level.

Instead of measuring the actual organic emission rate, a TSDF owner or operator could estimate the emission rate for a TSDF unit by using theoretical or empirical emission models, or simulating the unit operation using an emission flux chamber. However, using an estimation method would not provide results for a specific TSDF unit as accurate as would be achieved by actual measurement of the organic emissions from the unit. Furthermore, to use an

estimation method for implementing standards for a specific TSDF tank, surface impoundment, or container unit would require extensive and detailed knowledge about the physical and chemical properties of the waste managed in the TSDF unit, the TSDF unit operating practices and, in some cases, the meteorology at the TSDF site. Also, this approach would require extensive time and resource commitments by EPA or the designated State authority enforcement personnel to check the estimation calculations for the purpose of verifying compliance with the regulations. Therefore, because of the complexity and burden on the permitting authority of using the estimation methods currently available and, as discussed above, the impracticality and expense of using actual measurements, EPA believes that specifying an action level based on an emission rate format for nationwide standards applicable to TSDF tanks, surface impoundments, and containers would not be a practical approach.

An alternative to using an emission rate format is to use a waste parameter as an indicator of the potential organic emissions from a particular hazardous waste. Because of the need to periodically confirm that a waste parameter remains below the action level, the potential emission indicator must be in a format that is relatively simple to determine by an owner or operator and can be expeditiously checked by enforcement personnel. Considering this need, EPA evaluated possible action level formats and decided that an action level format based on the volatile organics concentration in the waste is appropriate for all TSDF tanks, surface impoundments, or containers. In addition, the EPA decided that the vapor pressure of liquid wastes should also be used as an action level for some TSDF tank operations.

Volatile organics concentration in the waste is an indicator of the total quantity of organics in the waste likely to be converted from a liquid or solid state to a gaseous state and, consequently, be emitted to the atmosphere. Vapor pressure is an indicator of the quantity of volatile organic vapors that collect inside covered tanks. When wastes are stored in a covered tank, the concentrations of volatile organics in the vapors contained in the tank headspace (i.e., space between the liquid surface and the cover) stabilize at an equilibrium concentration that is directly related to the vapor pressure of the organics in the waste. These organic vapors can

potentially be emitted to the atmosphere through the vents installed on the cover because of tank filling and emptying operations, as well as the expansion or contraction of the tank headspace resulting from daily changes in ambient temperature or barometric pressure.

The volatile organics concentrations of hazardous wastes managed in TSDF tanks, surface impoundments, and containers vary widely. For example, "off-spec" products (i.e., petroleum or chemical products that do not meet manufacturing specifications) can contain nearly 100 percent volatile organics. In contrast, aqueous wastewaters can contain less than 1 part per million by weight (ppmw) of volatile organics. The EPA investigated the sensitivity of total nationwide TSDF organic emissions to the volatile organics concentration action level value using the national impacts model and comparing the action level values ranging from 0 to 10 percent (0 to 100,000 ppmw). As the value is increased from zero, the total nationwide quantity of waste that would be managed in TSDF units required to use emission controls decreases rapidly. Preliminary evaluation of various action levels indicated that above a level of 3,000 ppmw significant organic emissions potential would not be regulated by the standards. Thus, more detailed analysis was conducted for a range of volatile organics concentration action levels from 0 to 3,000 ppmw.

The EPA has used vapor pressure action levels for previous rulemakings to control organic emissions from tanks. Under authority of the Clean Air Act, EPA promulgated new source performance standards (NSPS) for petroleum liquid storage tanks (40 CFR 60 subparts K and Ka) and volatile organic liquid (VOL) storage tanks (40 CFR 60 subpart Kb). Many hazardous wastes containing volatile organics are similar to the liquids regulated by these NSPS. To evaluate the appropriateness of using a vapor pressure action level for TSDF tanks, EPA evaluated control options with and without a vapor pressure action level applied to TSDF tanks.

3. Emission Controls Considered for Control Options

The level of organic emission reduction that would be achieved by a control option is based on the particular emission controls specified for waste management units into which is placed waste with volatile organic concentrations and vapor pressures greater than the specified action levels. As discussed in Section IV, EPA selected a volatile organic containment

and control approach for reducing organic emissions from TSDF tanks, surface impoundments, and containers. Therefore, all of the control options evaluated by the impact analysis, at a minimum, require using covers for all TSDF tanks, surface impoundments, and containers that manage wastes with volatile organic concentrations greater than the specified action level.

The need to use a control device in combination with a cover installed on a TSDF tank, surface impoundment, or container is affected by the type of waste management activity performed in the unit. For example, surface impoundments that store wastes or treat wastes without mixing, agitating, or aerating can use a floating membrane cover which contacts the waste surface. This type of surface impoundment is referred to here as a "quiescent surface impoundment" to reflect the undisturbed state of the waste in the unit. Similarly, storing wastes or treating wastes without mixing, agitating, or aerating in a tank equipped with a fixed roof (i.e., a rigid cover) limits organic emissions. This type of tank is referred to as a "quiescent tank". Control options were developed to evaluate the impacts of allowing quiescent tanks and quiescent surface impoundments to use covers only.

In contrast, waste treatment activities which increase surface turbulence in the waste such as mixing, agitating, and aerating significantly increase organic emissions because of the enhanced mass transfer between the waste medium and the air. Also, treatment activities which require the waste to be heated or generate heat in the waste can increase organic emissions. Furthermore, the nature of some hazardous waste treatment processes such as aerating a waste using floating aeration equipment or mixing a waste with a fixative material during waste fixation prevents a cover from directly contacting the waste surface. Organic emissions from waste management units which cannot use contact covers (e.g., floating roofs, floating membrane covers) can be contained by erecting a structure around the unit (e.g., air supported structure, permanent building) or, for open-top tanks, installing a fixed roof to enclose the space above the waste surface. The organic vapors from the waste are confined inside the enclosure. However, if the enclosure is vented directly to the atmosphere, organic emissions will still occur. Therefore, to be an effective organic emission control, the enclosure vents must be connected to a control device or, for some tank applications

using fixed roofs, equipped with pressure-relief valves.

Organic vapors that are vented from covered or enclosed TSDF units can be controlled using either an organic removal control device or an organic destruction control device (refer to Section IV). A variety of control devices are available that when properly designed and operated can achieve high organic emission control efficiencies. Applicability of a specific type of control device to controlling organic emissions from TSDF waste management units depends on the size of the unit and the characteristics of the organic vapor stream vented from the unit. The EPA reviewed the performance and applicability of each organic emissions control device type discussed in section IV to develop emission control levels for the control options.

As the starting point for developing emission control levels for the control options, EPA considered using an organic emission control level that would be consistent with existing organic air emission standards. As discussed in section II, the subpart AA standards for TSDF process vents require control devices to be designed and operated to reduce organic emissions by 95 percent. Many State implementation plans and other decisions on control devices made under the Clean Air Act to provide protection from the human health and environmental effects of organic emissions (in particular, ambient ozone effects) require control of organic emissions by approximately 95 percent. A requirement for a 95 percent control level would allow the TSDF owner or operator the alternative of using either organic recovery or organic destruction control devices. Preliminary analysis indicated that applying a 95 percent control level nationwide to TSDF organic emission sources would significantly reduce cancer risks relative to the baseline level. However, a 95 percent control level would not reduce the added risk to the most exposed individual of contracting cancer (i.e., maximum individual risk) to the target risk range that historically has been used for other RCRA standards (discussed in section VI).

A higher nationwide organic emission control level could be achieved by using exclusively organic destruction control devices. Thermal vapor incinerators and the other types of combustion units discussed in Section IV are capable of achieving 98 percent organic emission control efficiencies. Repeating the preliminary cancer risk analysis assuming that a 98 percent control level

nationwide is applied to TSDF organic emission sources reduced the cancer risk from the baseline level by less than 1 percent more than the reduction which would be achieved using a 95 percent control level. Furthermore, the maximum individual risk would still be greater than the target risk range which has historically been used for other RCRA standards.

Without a clear improvement in the level of cancer risk reduction that would be provided by a requirement for a 98 percent control level compared to a 95 percent control level, EPA decided that it would not be prudent public policy to require the exclusive use of organic destruction devices nationwide without regard to the content of individual organic toxic constituents in the gas streams vented to them. Instead, EPA believes that a better approach is to require a control level of 95 percent nationwide for organics as a class and to evaluate requiring control devices that reduce organic emissions beyond this level for vapor streams containing individual toxic constituents of concern as discussed in section VI. Organic destruction devices would then be applied selectively to the TSDF units that manage those wastes containing high levels of the individual toxic constituents which are creating the relatively high cancer risks to the exposed population. Thus, an organic emission control level of 95 percent was used for the control options evaluated to select the basis for the standards controlling TSDF organics as a class.

A requirement to reduce organic emissions by 95 percent provides the TSDF owner or operator with more control technology alternatives to consider in selecting the control device to use to comply with the standards. The owner or operator could use organic recovery control devices such as carbon adsorbers and condensers as well as organic destruction devices. Use of carbon adsorbers or condensers would allow recovery of the organics from gas streams with high organic contents for subsequent direct reuse at the TSDF site or sale as a solvent or fuel. Depending on the quantity of organics recovered and the value of the recovered organics, the cost of installing and operating an organic recovery device could be significantly less expensive (possibly offsetting the cost of control entirely) than an organic destruction device.

4. Control Options Selected for Impact Analysis

The control option action level and emission control screening investigations resulted in the evaluation of five control options to select the basis

for the proposed standards. All five of the control options would require that all TSDF tanks, surface impoundments, and containers managing hazardous waste with a volatile organics content greater than a specified concentration would require the use of covers as a minimum level of control. The primary differences between the control options are the value used for the volatile organics concentration action level, and whether a closed vent system and control device is used in combination with the cover for the tank and surface impoundment units requiring emission controls.

Option 1 would require all TSDF tanks, surface impoundments, and containers storing or treating a hazardous waste with any amount of detectable volatile organics (i.e., a volatile organic concentration action level of 0 ppmw) to use control equipment. The control equipment requirements are: (a) each tank uses a cover with a closed vent system and control device except for each quiescent tank managing wastes with a vapor pressure less than 10.4 kPa which uses a cover without additional controls; (b) each surface impoundment uses a cover with a closed vent system and control device; and (c) each container uses a cover at all times except during waste loading/unloading operations, and submerged fill is used to load pumpable wastes.

Option 2 would require all tanks, surface impoundments, and containers storing or treating a hazardous waste with a volatile organic concentration greater than 500 ppmw to use control equipment. The control equipment requirements are the same as described for Option 1.

Option 3 would also require all tanks, surface impoundments, and containers storing or treating a hazardous waste with a volatile organic concentration greater than 500 ppmw to use control equipment. However, Option 3 differs from Option 2 in that a cover is used without additional controls on all quiescent tanks and quiescent surface impoundments. Specifically, the control equipment requirements are: (a) each tank uses a cover with a closed vent system and control device except for each quiescent tank which uses a cover without additional controls; (b) each surface impoundment uses a cover with a closed vent system and control device except for each quiescent surface impoundment which uses a cover without additional controls; and (c) each container uses a cover at all times except during waste loading/unloading

operations, and submerged fill is used to load pumpable wastes.

Option 4 would require all tanks, surface impoundments, and containers storing or treating a hazardous waste with a volatile organic concentration greater than 1,500 ppmw to use control equipment. The control equipment requirements are the same as described for Options 1 and 2.

Option 5 would require all tanks, surface impoundments, and containers storing or treating a hazardous waste with a volatile organic concentration greater than 3,000 ppmw to use control equipment. The control equipment requirements are the same as described for Options 1, 2, and 4.

B. Health and Environmental Effects of Control Options

1. Organic Emissions

Organic emissions react photochemically with other chemical compounds in the atmosphere to form ozone. Ozone is a major air problem in most large cities in the United States. The EPA estimates that more than 100 million people live in areas where the national ambient air quality standard for ambient ozone is not attained. Ozone is a pulmonary irritant that impairs normal human respiratory functions and aggravates pre-existing respiratory diseases. Exposure to ozone also increases the susceptibility to bacterial infections. In addition, ozone can reduce the yields of citrus, cotton, potatoes, soybeans, wheat, spinach, and other crops as well as damage conifer forests and causes a reduction in the fruit and seed diets of wildlife.

Reductions in organic emissions from TSDF units would have a positive impact on human health and the environment by reducing ambient ozone formation. Baseline nationwide organic emissions from TSDF are estimated to be approximately 1.8 million megagrams per year (Mg/yr). At this emission level, TSDF organic emissions account for approximately 12 percent of the total nationwide organic emissions from stationary emission sources. The estimated nationwide TSDF organic emissions assuming implementation of the individual control options are 93 thousand Mg/yr for Option 1, 98 thousand Mg/yr for Option 2, 130 thousand Mg/yr for Option 3, 140 thousand Mg/yr for Option 4, and 180 thousand Mg/yr for Option 5.

2. Cancer Risk and Incidence

To assess the risk of contracting cancer posed by exposure to organic emissions from TSDF, EPA estimated two measures of health risk. These are

termed "annual cancer incidence" and "maximum individual risk" (MIR). Estimation of these health risk parameters requires EPA to make several critical assumptions regarding the TSDF plant configurations and operating practices, the composition of wastes managed at these TSDF, the cancer potency of the organics contained in these wastes, the emission of these organics to the atmosphere from TSDF sources, and the exposure of people living near TSDF to these air toxic emissions. The complex interrelationship of the various assumptions prevents EPA from definitively characterizing the estimated health risk parameter values as being over or underestimates.

The annual cancer incidence parameter represents an estimate of population risk and, as such, measures the aggregate risk to all people in the United States estimated to be living within the vicinity of TSDF. This risk value is based on the estimated number of excess cancers occurring in the nationwide population after a lifetime exposure (defined to be 70 years). For statistical convenience, the aggregate risk is divided by 70 and expressed as cancer incidences per year.

Annual cancer incidence was estimated for baseline and the five control options using EPA's Human Exposure Model (HEM), the composite cancer risk factor, and TSDF industry profile data bases introduced in Section III and described with more detail in Appendices D and E of the BID. Baseline nationwide annual cancer incidences from exposure to TSDF organic emissions is estimated to be 140 cases per year. The estimated nationwide TSDF cancer incidences assuming implementation of the individual control options are 6 cases per year for Option 1; 6 cases per year for Option 2; 8 cases per year for Option 3; 14 cases per year for Option 4; and 16 cases per year for Option 5.

The MIR parameter represents the maximum additional cancer risk (i.e., above background cancer risks) for any one person due to exposure for a lifetime to an emitted pollutant. The EPA estimates the MIR parameter by assuming exposure of the individual to the ambient air toxic concentrations occurs for 24 hours per day for a lifetime of 70 years. The EPA realizes that most people do not spend their entire lives at one location. However, it is completely possible for an individual to live in the same place for his or her entire life. Furthermore, other uncertainties in the analysis could lead to underestimating the risk. For example, the actual exposed subpopulations (e.g., children,

young adults) may be more sensitive to the emitted air toxics than the reference adult male for which the unit risk factor extrapolations are based.

As applied to TSDF air emissions, the MIR parameter reflects the added probability that a person would contract cancer if exposed continuously over a 70-year period to the highest annual average ambient concentration of the air toxics emitted from a TSDF representing a reasonable worst-case situation. The use of a reasonable worst-case situation is consistent with the MIR analysis used in determining the standards to control organic emissions from process vents and equipment leaks at TSDF for the first phase of EPA's program to regulate air emissions under RCRA Section 3004(n) (55 FR 25486). The MIR was estimated for the baseline and each of the five control options using EPA's Industrial Source Complex Long Term Model (ISCLT) to calculate annual average ambient organic concentrations around an actual TSDF site that was chosen to represent a reasonable worst-case situation. The MIR value was obtained by multiplying the highest annual average ambient organic concentration modeled to occur at the facility boundary times the same composite cancer risk factor used to estimate annual cancer incidence. Detailed information about the ISCLT model and the detailed TSDF modeling is provided in the Appendix J of the BID.

When evaluating the MIR estimates for TSDF, it is important to remember that these values represent a reasonable worst-case situation. Thus, EPA expects few TSDF present risks as high as the risks estimated for the reasonable worst-case situation. Baseline MIR from exposure to TSDF organic emissions is estimated to be 2×10^{-2} . The estimated MIR assuming implementation of the individual control options are: 5×10^{-4} for Option 1; 5×10^{-4} for Option 2; 5×10^{-4} for Option 3; 8×10^{-4} for Option 4; and 9×10^{-4} for Option 5. These values are greater than the target risk levels for other promulgated RCRA standards which historically have been in the range of 1×10^{-4} to 1×10^{-5} . Section VI of this preamble describes EPA's plans to reduce further the risk from TSDF air emissions.

It is important to recognize for this analysis that the MIR estimates are also sensitive to several factors including type and configuration of units at the TSDF site, number of each type of unit, composition of waste managed in each unit, organic emission rate for each unit, location of TSDF site relative to where people live, and meteorology at the TSDF site. For example, one important

factor affecting the MIR value is the magnitude and rate of organic emissions from individual waste management units at the TSDF site. At the particular TSDF used as the basis for the MIR estimates, the major source of organic emissions contributing to the maximum ambient organic concentration associated with the MIR values is two large, uncovered surface impoundments used for aerated treatment, located adjacent to one another, approximately 25 meters (82 feet) inside the facility boundary (i.e., property line). If these units were located instead near the center of the TSDF site, then the ambient organic concentrations modeled at the TSDF property line would be lower, and the MIR values would show lower risk probabilities. Many existing TSDF do not have large organic emission sources located near the facility property lines and, consequently, actual ambient organic concentrations around these facilities would be expected to be significantly lower than the modeled concentrations.

Another important factor affecting the MIR value is the distance from the TSDF units to the location where the nearest person may live. For the MIR estimates, this distance was assumed to be a person living directly on the TSDF property line. In actuality, the vast majority of the exposed population lives further from TSDF property lines. If the assumption had been used for the control option impact analysis that the nearest resident lived at a less conservative distance beyond the TSDF property line, then the MIR values would show lower risk probabilities. For example, if the distance to the nearest residence is assumed to be an additional 25 meters (82 feet) beyond the property line, the MIR value for Options 1, 2, and 3 decreases from 5×10^{-4} to 1×10^{-4} .

The composition of organics in the emissions from individual waste management units at the TSDF site also affects the MIR estimates. For example, the TSDF site used as a basis for the MIR estimates did not report managing wastes containing dioxin. As discussed in Section III of this preamble, approximately one-half of the composite unit risk factor used for the MIR estimates is contributed by dioxin. Consequently, the MIR estimated for each of the control options is approximately two times higher than the value that would be estimated if dioxin is removed from the composite unit risk factor.

As discussed earlier in this section, the TSDF site chosen as the basis for the MIR estimates has a configuration and location which results in unusually high

public exposure and health risk. This site clearly needs to be controlled. However, it could be argued that nationwide standards based on this source may result in emission controls for other TSDF sites which reduce risk at those sites well beyond the level which has traditionally been considered necessary for protection of human health. Therefore, EPA is reviewing alternative ways of ensuring that all TSDF sites do not pose significant risks to human health and the environment.

One option EPA is considering is whether to integrate its omnibus permitting authority into standard setting under RCRA section 3004(n). As discussed in section II of this preamble, omnibus permitting authority is used to address specific circumstances that are judged to warrant control beyond baseline standards. Using omnibus permitting authority, EPA could limit emissions from those TSDF sites with configurations or locations which pose unusually high risks and, thereby, establish baseline standards according to a source presenting a lower exposure scenario. This approach may lead to a lower cost standard and still protect human health and the environment. However, practical difficulties may make this approach unworkable. The EPA is concerned that the permitting process might be expensive and time consuming for both EPA and the industry. Sources suspected of posing unusually high risks would need to perform more extensive risk assessments which EPA must review. Furthermore, it is presently unclear what criteria EPA would use to decide which TSDF sites would be subject to the additional permitting requirements. If EPA were to decide to adopt this approach, questions remain regarding how to draw the dividing line between nationwide standards for TSDF developed under RCRA section 3004(n) and site-specific permit requirements implemented by the omnibus permitting authority of RCRA section 3005(c) (3); that is, the question would be which TSDF sites would be subject to omnibus permitting in addition to nationwide standards. The EPA requests comments on all of these issues.

During the course of reviewing the comments, EPA will also undertake a legal review to assess whether an approach relying in part on omnibus permitting would be within EPA's discretion in applying RCRA sections 3004(n) and 3005(c)(3), in light of the RCRA statutory language; its legislative history; past EPA practices under RCRA, see, e.g., 55 FR 25454, 25492/1 (June 21, 1990); the case law under RCRA, see,

e.g., *NRDC v. U. S. EPA*, 907 F.2d 1146, 1163-65 (D. C. Circuit 1990); and the law relating to the standards promulgated under other environmental statutes, see, e.g., *E. I. DuPont de Nemours and Company v. Train*, 430 U. S. 112 (1977) (Federal Water Pollution Control Act). The EPA invites comments on this legal question as well.

The EPA based the MIR estimates on a TSDF site representing a reasonable worst-case situation so that EPA is more confident that decisions based on the analysis results consider not only the currently known situations but also situations occurring of which EPA is unaware or situations that may occur in the future.

3. Noncancer Effects

Noncancer health effects due to TSDF organic emissions can result from direct inhalation of airborne toxic chemicals emitted from the TSDF as well as indirect pathways such as ingestion of foods contaminated by air toxics or absorption of air toxics through the skin. An evaluation of noncancer health effects resulting from direct inhalation exposure to predicted ambient air concentrations of different air toxics in areas adjacent to TSDF was performed. However, methodologies for predicting effects from indirect exposure to air toxics for application to TSDF have not been developed at this time.

A screening evaluation was performed by EPA to assess the potential adverse noncancer health effects associated with acute and chronic inhalation exposure to 179 individual toxic constituents emitted from TSDF tanks, surface impoundments, and containers. This evaluation was based on a comparison of relevant available health data for the highest short-term average and long-term average ambient concentrations of each toxic constituent estimated for the same individual TSDF used for the cancer MIR estimates. Maximum short-term ambient concentrations (i.e., averaging times of 24 hours and less) were estimated using EPA's Industrial Source Complex Short-Term (ISCST) Model, and maximum long-term ambient concentrations (i.e., annual average) were estimated using the ISCLT model. Detailed information about these models and the detailed modeling of the ambient constituent concentrations for the individual TSDF are provided in Appendix J of the BID.

The screening evaluation results show that the modeled short-term and long-term ambient constituent concentrations were in most cases at least 3 orders of magnitude below inhalation health

effect levels of concern. These results suggest that adverse noncancer health effects are unlikely to be associated with acute or chronic inhalation exposure to TSDF organic emissions on a nationwide basis. However, because of the limited health data available for many toxic constituents, additional evaluation of noncancer health effects may be needed. The EPA is specifically requesting comments from the public on methodologies and use of health data for assessing the noncancer health effects of TSDF organic emissions.

The potential for indirect exposure to air toxics is a function of whether the airborne chemicals have deposited in the soil, migrated into underground aquifers, run off into surface waters, or bioaccumulated in the food chain following long-term surface deposition. Although not as yet modified for application to TSDF, methodologies used to predict indirect exposure thus far in other contexts have shown that the cancer risks resulting from the ingestion of foods and soil contaminated by some chemicals may be significant. Therefore, as part of its continuing effort to improve risk estimates from TSDF, EPA will evaluate the need to include an indirect pathway element in the TSDF risk analysis of cancer effects.

C. Implementation Impacts of Control Options

The EPA estimated the total nationwide costs to the TSDF industry to install and operate the emission control equipment specified by each of the five control options. Nationwide cost values were estimated for two basic cost categories, capital costs and annualized costs, using the national impact model described in Section III of this preamble. These nationwide cost estimates are based on the assumption that at every TSDF location, the owner or operator would install the specified emission control equipment on all of the tanks, surface impoundments, and containers used at the TSDF to store and treat the regulated waste with treatment to comply with the LDR occurring as the last step prior to disposal of the waste. In actuality, EPA expects that at many TSDF locations, the owner or operator (after becoming aware of the rule) would treat the waste to comply with the LDR at an earlier step in the waste management sequence reducing the volatile organic concentration of the waste below the action level, and thus avoid the costs of installing and operating control equipment on the downstream tanks, surface impoundments, and containers.

Capital cost represents the investment required by TSDF owners and operators

to install the emission controls that would be required by a particular control option. The estimated nationwide capital costs to implement the individual control options are \$2,100 million for Option 1, \$1,700 million for Option 2, \$960 million for Option 3, \$690 million for Option 4, and \$520 million for Option 5. Annualized cost represents the annual cost to TSDF owners and operators to repay the capital investment for the emission controls as well as to pay for operating and maintaining the emission controls. The estimated nationwide annualized costs to implement the individual control options are \$930 million/yr for Option 1, \$710 million/yr for Option 2, \$360 million/yr for Option 3, \$290 million/yr for Option 4, and \$210 million/yr for Option 5.

Implementation of Options 1, 2, 4, or 5 would require periodic waste vapor pressure testing be performed if a TSDF owner or operator elects to not use a control device on a tank that manages a quiescent waste with a volatile organic concentration above the action level for the option. Option 3 does not have the organic vapor pressure restriction for quiescent wastes managed in tanks. The EPA's TSDF industry profile data base indicates that many existing TSDF tanks would qualify for this exception. Considering the cost to purchase, install, and operate a control device versus the cost to perform waste vapor pressure testing, owners or operators of these TSDF tanks would likely choose to perform periodic vapor pressure testing. Given the large number of tanks affected by the vapor pressure action level, the time and resources necessary for industry to determine compliance with the standards and for EPA or authorized State agencies to enforce the standards are expected to be lower for Option 3 than the other options.

D. Selection of the Basis of the Proposed Standards

The EPA selected one of the five control options as the basis for today's proposed standards using a decision framework based on EPA's historical approach of considering cost under RCRA only for those control options that provide equal protection of human health and the environment, except where the control options achieve historically acceptable levels of protection. Applying this decision framework, Option 3 was selected as the basis for today's proposed standards. The rationale for the selection of Option 3 is presented in this section.

To assess the degree of human health and environmental protection provided by each control option, EPA compared

the organic emissions, cancer MIR, and annual cancer incidence values estimated for each of the five control options relative to the estimated baseline impacts. The level of confidence in the impact analysis was an important factor in EPA's assessment of the significance of the impact estimates with respect to human health and environmental protection. As was discussed in section III, limited availability of information required that, for the national impact analysis, EPA make certain critical assumptions about some hazardous waste characteristics and TSDF operating practices. The use of these assumptions adds a level of uncertainty to the impact estimates. The complexity of the estimation methodology and number of independent input parameters to the analysis prevents EPA from quantifying this uncertainty. However, while the estimated values may not reflect the actual differences in impacts between the various control options, EPA believes the estimated values do indicate the relative differences in human health and environmental protection provided by the five control options.

All of the control options achieve substantial reductions in nationwide organic emissions from TSDF. The estimated nationwide organic emissions reduction estimated for Options 1, 2, 3, and 4 is the same magnitude, approximately 1.7 million Mg/yr. Option 5 is estimated to provide lower nationwide organic emission reductions, approximately 1.6 million Mg/yr, than estimated for the other control options.

Both Options 1 and 2 are estimated to achieve the lowest cancer MIR (5×10^{-9}) and greatest reduction in annual cancer incidence (134 cases per year) of the five options. Option 3 also is estimated to achieve an MIR of 5×10^{-9} but the estimated annual cancer incidence reduction for Option 3 (132 cases per year) is slightly lower than the estimated reduction for Options 1 and 2. Options 4 and 5 are estimated to provide less reduction in both cancer MIR and annual cancer incidence than either Options 1, 2, or 3. The estimated MIR is higher for Option 4 (8×10^{-9}) and Option 5 (9×10^{-9}) compared to Options 1, 2, and 3 (5×10^{-9}). Annual cancer incidence reductions estimated for Option 4 (126 cases per year) and Option 5 (124 cases per year) are lower than the annual cancer incidence reductions estimated for Options 1, 2, and 3.

Options 1, 2, 3, and 4 are estimated to achieve the same level of nationwide organic emission reduction (1.7 million

Mg/yr). However, none of the five control options are estimated to reduce the individual lifetime cancer MIR to the target risk levels for other promulgated RCRA standards, which have been in the range of 1×10^{-4} to 1×10^{-6} . Moreover, none of the control options attain the target risk levels EPA generally has used to develop air emission standards for hazardous air pollutants under Section 112 of the Clean Air Act. Under Section 112 as in effect prior to November 15, 1990 (and Section 112(f) as amended), this level of MIR risk does not constitute a rigid line for making a determination of acceptable risk. The EPA recognizes that the consideration of MIR must take into account its strengths and weaknesses as a measure of risk. It does not necessarily reflect the true risk, but displays a conservative risk level which is an upper bound that is unlikely to be exceeded. While levels of individual risk greater than 1×10^{-4} become presumptively less acceptable, these risk levels would be weighed with other health risk measures and information in making an overall judgement on acceptability (54 FR 51656). On the basis of available information, EPA tentatively concluded that Options 1, 2, and 3 are more protective of human health than either Option 4 or 5. Furthermore, because of the uncertainty in the impact analysis, EPA cannot confidently discern whether the differences between annual cancer incidence reductions estimated for Options 1 and 2 versus Option 3 (134 versus 132 cases per year) could actually occur. Therefore, EPA concluded that Options 1, 2, and 3 are equally protective of human health and the environment.

When no control options achieve acceptable levels of protection, EPA's approach historically has considered cost under RCRA only for equally protective control options. Following this approach, EPA compared the implementation impacts for the equally protective Options 1, 2, and 3. The Option 3 control requirements differ from the Options 1 and 2 requirements by allowing more quiescent tanks and all quiescent surface impoundments to use covers without additional controls and without the need for vapor pressure test. Option 3 would be less expensive for the TSDF industry to implement than Options 1 and 2 because fewer TSDF tank and surface impoundment units would need to install and operate control devices in addition to covers. Option 3 would be easier to implement and enforce than Option 1 or 2 because this exception would not depend on the

particular waste but rather the type of tank or surface impoundment being used.

In summary, including consideration of the estimated reductions in nationwide organic emissions and annual cancer incidence, EPA concluded that Options 1, 2, and 3 are equally protective of human health and the environment. Because Option 3 would be less expensive and easier to implement than either Option 1 or 2, EPA selected Option 3 as the basis for today's proposed standards.

E. Solicitation of Comments

Although Option 3 is selected as the basis of today's proposed standards, EPA believes that it is reasonable and prudent to continue consideration of other available alternatives to the proposed standards. Therefore, EPA is requesting comments from the public on the aspects of EPA's regulatory decisions made for today's proposed rulemaking discussed below as well as the methodology, assumptions, and data used for the current national impact analysis. In addition, EPA is planning to conduct its own study to gather more information regarding the TSDF industry. This study will include visits to selected TSDF for the purpose of obtaining firsthand information from TSDF operators regarding the waste management practices they are using to comply with other RCRA regulations (e.g., land disposal restrictions) and the practices they would anticipate using to meet the requirements of today's proposed standards.

Following a review of both the public comments on today's proposed standards submitted to EPA and the new TSDF industry data obtained by EPA, the methodology, assumptions, and data used for the national impact analysis will be reconsidered by EPA. If appropriate, EPA will modify the analysis and consider the new results in its evaluation of different control options. Consideration of comments combined with any new data provided by commenters as well as new data obtained by EPA could lead to selection of any one of the five control options described in today's proposal or possibly other control options. The EPA is especially interested in receiving comments on the following topics.

Comments are requested regarding the approach for controlling air toxic emissions from wastes containing chemicals that pose a significant human health or environmental threat but are managed by a small portion of the TSDF in the United States. Today's proposed standards would establish one set of nationwide standards applicable to all

TSDF managing wastes containing organics. For example, although wastes containing dioxin are managed at a small portion of TSDF, EPA used a composite cancer unit risk factor for its national impact analysis in which dioxin contributes approximately one-half of the risk. An alternative approach may be to establish different standards under this rulemaking for TSDF based on different waste categories. For example, EPA could establish one set of standards for those TSDF which manage wastes containing dioxin and a different set of standards for those TSDF which do not manage wastes containing dioxin. The EPA solicits comment on whether natural divisions exist in the TSDF industry which would allow standards to be established for subcategories of TSDF. A third approach may be to remove dioxin from the computation of the composite risk factor in the national impacts analysis used as the basis for this rulemaking, and consider controls for dioxin emissions from TSDF in the third phase of EPA's program to develop hazardous waste TSDF air emission standards as described in section VI of this preamble.

The EPA requests comments on the reasonableness of its determinations concerning equal protection of human health and the environment. As discussed earlier in this preamble, because of uncertainty in the impact estimates EPA cannot confidently discern significant differences in the nationwide reductions of organic emissions and annual cancer incidence attributable to certain control options. For example, Option 2 has the potential to provide additional nationwide organic emissions and annual cancer incidence reductions beyond the levels estimated to be achieved by Option 3. These additional reductions could occur because Option 2 would require the use of covers with control devices on certain quiescent tanks and on quiescent surface impoundments. However, the accuracy of EPA's current national impact analysis prevents EPA from clearly identifying the extent of the additional reductions in nationwide organic emissions and annual cancer incidence, if any, that could actually occur if Option 2 were implemented. Thus, EPA solicits information to supplement the data bases used for the national impact analysis. Comments are also requested concerning whether there are additional human health and environmental benefits which should be considered in the selection of the basis for the standards.

Finally, EPA requests comments regarding its decision to propose

standards based on using the same action level throughout the entire waste management process (i.e., from the point where the waste is generated through disposal). An alternative approach would be to use different action levels for different stages in the waste management process. For example, EPA plans to analyze the effect of using an action level of 500 ppmw for waste management units up to the point where the waste is treated by waste fixation, and an action level of 1,500 ppmw for those waste management units in which waste fixation is conducted. Based on the results of the national impact analysis performed for today's proposal, this example approach could result in reductions in nationwide organic emissions and annual cancer incidence to levels that are between those estimated for Options 3 and 4 while decreasing the nationwide annualized cost for the standards by \$240 million/yr.

VI. EPA Plans To Address Residual Risk

A. Need for Additional Risk Reduction

Today's proposed standards would result in substantial reductions in cancer risk compared to the baseline value. The MIR and annual cancer incidence are estimated to be reduced by greater than 90 percent. Although these reductions are significant, an MIR of 5×10^{-4} is estimated to occur after the application of the emission controls selected in Section V as the basis for the proposed standards. This remaining cancer risk, referred to here as "residual risk," is greater than the target cancer risk levels for other promulgated RCRA standards which historically have been in the range of 1×10^{-4} to 1×10^{-6} . The EPA is planning to investigate additional cancer risk reduction approaches beyond those considered in selecting the basis for today's standards as part of the third phase of EPA's program to develop hazardous waste TSDF air emission standards. These plans may be reconsidered if, based on its review of public comments received regarding today's proposal, EPA develops new cancer risk estimates for the second phase rulemaking and the estimated values are substantially lower.

The third phase will involve analyzing the cancer risk associated with exposure to individual toxic constituents remaining in the organic emissions from TSDF assuming the implementation of standards developed in the first two phases. If these analyses confirm the need for additional risk reduction, EPA may decide to provide additional human health and environmental protection by developing nationwide standards that

will reduce the emissions of the specific toxic constituents of concern. During the interim while these analyses are being completed, EPA's omnibus permitting authority under 40 CFR 270.32(b)(2) will be used where EPA is aware of a site-specific need for additional controls.

Separate EPA projects are in progress to obtain more data about the management of hazardous waste at TSDF. The results from a nationwide survey of hazardous waste generators and TSDF are being compiled. These survey data contain more detailed information about TSDF hazardous waste characteristics and management operations than has been previously available to EPA. Because EPA is still in the process of reviewing, verifying, cataloguing, and analyzing the survey data, the full set of data could not be used for developing today's proposed standards. Limited use of selected subsets of the survey data was possible to improve EPA's understanding of waste fixation practices in tanks, surface impoundments, and containers, and to estimate the impacts of applying emission controls to 90-day tanks and containers. Once the survey is complete, improved data bases may allow risk estimates to be conducted to better assess the impacts from implementing today's proposed standards and to determine which facilities may have higher residual risk.

One of three possible outcomes could result from analyzing the risk associated with exposure to individual toxic constituent emissions from TSDF. First, revised risk estimates may show that the residual risk is lower than 5×10^{-4} and is within the historical range of other RCRA standards. Thus, no additional action may be required. Second, revised estimates may show that the residual risk is a problem at only a few specific facilities. Thus, additional risk reduction could be achieved under the RCRA omnibus permitting authority whereby site-specific risk reduction would be implemented on the basis of guidance developed by EPA for permit writers. Finally, the revised estimates may show that residual risk is a problem at many facilities. Thus, additional risk reductions would be pursued through the development of nationwide standards under RCRA section 3004(n).

The EPA is planning to assess residual risk for individual toxic constituents that meet two criteria: (1) The constituent is contained in wastes managed at existing TSDF; and (2) health effects data are available for the constituent (e.g., unit risk factors for carcinogens). Based on a preliminary

evaluation of individual toxic constituents, EPA currently estimates that assuming implementation of today's proposed standards, approximately 15 to 30 individual toxic constituents may require additional controls.

B. Potential Residual Risk Reduction Approaches

The EPA has not yet selected an approach to reduce residual risk. Several potential approaches have been identified that could be used to achieve additional risk reduction by either implementing EPA's omnibus permitting authority on a site-by-site basis or promulgating a nationwide standard. Two potential approaches are described below in order to solicit comments about them and to provide owners and operators of TSDF that may install control technology to meet today's proposed standards with additional information to use in selecting methods of controlling organic emissions. If EPA decides to implement one of these strategies by nationwide standards then EPA will publish a proposed rule to that effect.

One approach would involve the application of additional emission controls beyond the level required by today's proposed standards for the management of hazardous wastes that contain specific toxic constituents. For each constituent of concern, a concentration would be specified for each constituent representing the level at which the constituent could be managed without exceeding a selected-target risk at a model-sized facility representing a reasonable worst-case situation. The target risk has not been decided but will likely be between 1×10^{-4} and 1×10^{-6} . This concentration level would be the action level for the application of additional emission controls. Wastes with constituent concentrations above the specified action limits would be managed in units that are controlled to a greater degree than would be required by today's proposed standards. For example, additional levels of control could be achieved by applying a cover on a tank managing a quiescent waste with a volatile organic concentration below 500 ppmw or by adding a closed vent system and control device to a tank managing a quiescent waste with a volatile organic content above 500 ppmw.

Higher levels of control could be achieved by requiring a waste management unit using a closed vent system and control device to reduce organic emissions to a level greater than the 95 percent level required by the proposed standards. For example,

organic emission reductions of at least 98 percent could be achieved by using organic destruction control devices such as vapor incineration. As discussed in section V, EPA believes that a control device organic emission reduction efficiency of 95 percent is appropriate for nationwide standards that would reduce organic emissions as a class. However, organic destruction may be an appropriate emission control method when applied selectively to wastes with high concentrations of individual toxic constituents. For these situations, the reduction in toxic emissions and, consequently, risk may outweigh any additional secondary impacts from increased NO_x and CO emissions or increased energy consumption.

An alternative approach would be to limit the quantities of specific toxic constituents in the hazardous waste that could be managed at a particular TSDF. The total amount of each toxic constituent that could be managed at a TSDF over a period of time would be limited. For example, a TSDF would be allowed to manage hazardous wastes containing a particular constituent until the accumulated quantity of the constituent that was processed during a specified period (e.g., one month, one year) attained a specified mass limit. If the mass limit is attained, wastes containing the constituent could no longer be managed at the TSDF for the remainder of the period. The mass limit would be determined from calculations based on the maximum ambient concentration that could occur without exceeding a target risk. Managing constituent quantities above the mass limits would be expected to result in risks above the target risk, while managing constituent quantities equal to or below the mass limits would likely result in risks equivalent to, or below, the target risk.

This approach would probably specify two mass limits for each constituent. One mass limit would apply to the management of wastes in uncontrolled TSDF units such as open tanks. A second mass limit would apply to the management of wastes in controlled TSDF units such as tanks with covers vented to a control device. The mass limit applicable to a TSDF that manages wastes in uncontrolled units would be more stringent than the one for controlled units because the emission rate would be higher for uncontrolled units.

The two approaches described here are being considered as ways to reduce the residual risk remaining after implementation of the proposed standards. The additional emission

control approach offers the advantage of easy implementation because a concentration action level, which is relatively easy to measure, is used as the means by which additional controls are triggered. However, because this only requires that emission controls be applied to wastes having toxic constituent concentrations above a certain action level, the approach would not control other factors that contribute to emissions (e.g., waste quantities managed). Consequently, applying controls to the wastes containing concentrations of constituents that exceed the action levels would not necessarily achieve a target risk level, which is a potential disadvantage of this approach. However, if the target risk is not achieved, EPA's omnibus permitting authority could be used to achieve further risk reduction. The mass-limit approach has the advantage that it would achieve the target risk. It also has a potential disadvantage in that it would be difficult to administer and enforce, and might reduce the nationwide waste management capacity below the levels that are needed to handle the wastes from all waste generators.

To take into account site-specific factors that affect the MIR, both approaches would provide a procedure for obtaining a variance from the control requirements. A variance procedure is needed for sites where the concentration of a particular constituent in the waste being managed at a TSDF could be higher than the selected action level while the actual health impact could be lower than the risk calculated by EPA due to factors unique to the specific site. An example would be managing a waste with constituent concentrations well above the action levels but in such a small quantity that the emissions, without additional controls, would not exceed the target risk. Under the variance procedure, the owner or operator would provide EPA with information demonstrating that emissions from the particular site would not exceed EPA's target risk. Upon review of the information (in essence, a site-specific risk assessment), EPA could exempt such a facility from the control requirements.

Just as it is possible to place waste with constituent concentrations above the action levels in a particular TSDF unit and not exceed the target risk, it is also possible to place waste with constituent concentrations below the specific constituent action levels in a particular TSDF unit and still exceed the target risk. The total quantity of the constituent in a waste may be large enough to result in a high cancer risk

even though the wastes contain relatively low concentrations of constituents. To address this situation, EPA would prepare a guidance document to allow the permitting authority to assess site-specific risks. If the risk assessment indicated that emissions would result in exposures above the target risk, the permitting agency could require additional emissions control under its omnibus authority.

The EPA considered proposing additional requirements for individual constituents as part of today's proposed standards; however, the exact nature and extent of the constituent problem is unknown at the present time. While the total quantity of toxic constituents in the wastes placed in TSDF units nationwide is known to be large, current data are not sufficiently detailed to describe the distribution of those toxic constituents among the individual TSDF. In addition, the available site-specific data for individual TSDF do not provide adequate site descriptions needed for detailed facility risk modeling. Both types of data are necessary to accurately determine site-specific MIR. The national survey data now being compiled by EPA should significantly improve the hazardous waste characterization and TSDF industry profile data files used in the analyses and thereby provide a more accurate estimate of risk distribution. A preliminary analysis of those data indicate that simply applying additional technology-based controls on a nationwide basis will not necessarily reduce maximum risk to target levels. Therefore, a more detailed analysis of constituent emissions and control options that include nontechnology-based approaches is being conducted.

VII. Requirements of Proposed Standards

A. Applicability

Today's proposal would add air emission standards for TSDF tanks, surface impoundments, and containers to 40 CFR parts 264 and 265 in a new subpart (subpart CC). These proposed standards would be applicable to owners and operators of permitted and interim status TSDF under subtitle C of RCRA. The proposed 40 CFR 264 subpart CC standards would also be applicable to certain miscellaneous units by an amendment to 40 CFR 264.601 that would require the permit terms and provisions for a miscellaneous unit being permitted under 40 CFR 264 subpart X to include the relevant emission control

requirements specified by 40 CFR 264 subpart CC. The rationale for this amendment is discussed at the end of this section of the preamble.

In addition, amendments to 40 CFR 265 subparts I and J would add the relevant emission control requirements specified by the standards proposed today as 40 CFR 265 subpart CC to the requirements that a hazardous waste generator must comply with pursuant to 40 CFR 262.34(a) in order to exempt tanks and containers accumulating waste on-site for no more than 90 days from the RCRA subtitle C permitting requirements. The 40 CFR 265 subpart CC requirements would not apply to accumulation of up to 55 gallons of hazardous waste or one quart of acutely hazardous waste listed in 40 CFR 261.33(e) in containers at or near the point of generation pursuant to 40 CFR 262.34(c). Also, the proposed standards would not apply to generators of between 100 and 1,000 kilograms of hazardous waste in a calendar month who accumulate the waste in tanks and containers pursuant to § 262.34 (d) or (e). The rationale for including certain generator accumulation tanks and containers in today's proposal is presented in section VIII.

B. Exceptions

The proposed standards would require that organic emission controls be installed and operated on tanks, surface impoundments, and containers used to manage hazardous waste. An exception from the control requirements would be allowed for a unit provided that all waste placed in the unit after the effective date of the standards has a volatile organic concentration less than 500 ppmw. In other words, a waste determined to contain less than 500 ppmw volatile organics could be placed in a tank, surface impoundment, or container that is not controlled for organic emissions. The volatile organic concentration of the waste would be determined before the waste is exposed to the atmosphere or mixed with other waste at a point as near as possible to the site where the waste is generated. Therefore, under the proposed standards, if a waste stream is not determined to have a volatile organic concentration less than 500 ppmw, then the specified organic emission controls would need to be used on every tank, surface impoundment, and container into which that waste stream is subsequently placed at the affected facility. However, if during the course of treating a waste (using a means other than by dilution or evaporation into the atmosphere) the organic concentration of the waste decreases below 500 ppmw,

emission controls would not be required on the subsequent downstream tanks, surface impoundments, and containers that manage this waste.

It is EPA's intention that this exception apply only to those units for which the owner or operator is reasonably certain that the volatile organic content of the waste will consistently remain below 500 ppmw. If an owner or operator cannot determine confidently that the volatile organic content of the waste placed in a unit will remain below 500 ppmw, then the owner or operator should install the required emission controls. Determination that the volatile organic concentration of the waste is less than 500 ppmw would be performed by direct measurement or by knowledge of the waste as described later in this section.

The EPA recognizes that there are treatment processes that can be used to remove or destroy organic constituents in a waste. Therefore, to encourage the efficient use of treatment processes for reducing TSDF organic emissions, the proposed standards have been drafted so that a TSDF owner or operator who treats a waste stream to reduce the volatile organic concentration below 500 ppmw by a means other than by dilution (or evaporation into the atmosphere) would not be required to apply emission controls (i.e., covers and, in certain cases, control devices) to the subsequent downstream tanks, surface impoundments, or containers managing that waste stream. Although the tanks, surface impoundments, and containers into which the treated wastes are subsequently placed would not need to use the proposed emission controls, the treatment process used to reduce the waste volatile organic content below 500 ppmw (and the conveyors to it) would still need to comply with the air emission control requirements specified in 40 CFR 264 or 265. The waste determination for treated wastes would require documentation that organics have actually been removed or destroyed and that the reduction in volatile organic concentration is not a result of dilution or evaporation into the atmosphere.

An exception from the control requirements would also be allowed if the owner or operator documents that at all times the waste placed in the unit complies with the treatment standards for organics specified by the land disposal restrictions (LDR) in 40 CFR 268, subpart D (discussed in section II). Because the LDR treatment standards are developed on the basis of using BDAT, treatment of wastes using BDAT is presumed to reduce the volatile

organic concentration of a waste to below 500 ppmw. Thus, EPA concludes that documentation certifying that wastes meet these constituent concentration standards provides adequate assurance that the waste would have little or no organic emissions. The public is specifically requested to comment on the appropriateness of allowing this exception from the proposed standards.

C. Waste Determinations

1. Waste Volatile Organic Concentration Determination

a. Implementation. Waste determinations would not be required for waste placed in units that use the required organic emission controls. A waste determination would only be required when an owner or operator chooses to place the waste in a tank, surface impoundment, container, or miscellaneous unit that does not use the required emission controls because the waste consistently contains less than 500 ppmw volatile organics. In this case, the owner or operator would be required to periodically perform a waste determination to verify that only waste having a volatile organic concentration less than 500 ppmw is placed in units not controlled for organic emissions.

The types of waste for which an owner or operator may choose to perform a waste determination include a waste that is recurring or continuously generated with a volatile organic concentration consistently below 500 ppmw or a waste that results from a one-time occurrence (e.g., a product batch that does not meet customer specifications) that is believed to have a volatile organic concentration below 500 ppmw. At TSDF locations where the volatile organic content of the waste managed is highly variable and is not consistently below 500 ppmw (e.g., a commercial TSDF receiving wastes from many customers), EPA expects that the owners or operators would install and operate the emission controls required by the standards and avoid the need to perform waste determinations to segregate the wastes for management in controlled versus uncontrolled units.

b. Concentration Determination Methods. To determine whether a particular waste may be placed in a unit not controlled for organic emissions, the owner or operator would be required to conduct initial and periodic waste determinations. The proposed standards would allow the owner or operator to use one of two methods for determining that the volatile organic concentration of a waste is below 500 ppmw. The first

method would be by direct measurement of the waste volatile organic concentration. The second method would be by knowledge of the waste.

Direct measurement waste determination would require that at least four waste samples be collected and analyzed for volatile organic concentration. The samples would need to be collected as close together in time as is practical, so that any variation in results can be attributed to sampling and analytical variability rather than process variability. Sampling and analysis would be performed using a new test method, "Determination of Volatile Organic Concentration in Waste Samples," being proposed today for addition to "Standards of Performance for New Stationary Sources Reference Methods" (40 CFR part 60, appendix A) as Reference Method 25D and to "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (EPA Publication No. SW-846) as Test Method 5100. This method is described in Section IX. The results of the sample analysis would then be used to calculate a mean and standard deviation for the logarithms of the measured values of volatile organic concentration. The mean and standard deviation of the logarithms would then be used as input values for a statistical t-test. The statistical t-test involves adding the average of the logarithms of the measured volatile organic concentrations to an estimate of the measurement standard error (sampling and analytical error), and then comparing the appropriate value (exponential of the sum) to the 500 ppmw action level. If the waste volatile organic concentration result for the statistical t-test is equal to or greater than 500 ppmw, then the owner or operator would be required to place the waste in tanks, surface impoundments, and containers that comply with the control requirements proposed today. If the waste volatile organic concentration result for the statistical t-test is less than 500 ppmw, then the owner or operator would be allowed to place the waste in tanks, surface impoundments, and containers that are not controlled for organic emissions. A detailed description of this statistical calculation procedure is presented in appendix 1 to this preamble.

As an alternative to using direct measurement, an owner or operator would be allowed to use knowledge of the waste as a means of determining that the volatile organic concentration of the waste is less than 500 ppmw. Examples of information that could

constitute acceptable knowledge include: (a) Documentation that no organics are involved in the process generating the waste; (b) documentation that the waste is generated by a process that is substantially similar to a process at the same or another facility which has previously been determined by direct measurement to have a volatile organic content less than 500 ppmw; or (c) previous speciation analysis results from which the total concentration of organics in the waste can be computed.

Under the proposed standards, owners and operators choosing to comply with the standards by determining that a waste has a volatile organic content less than 500 ppmw would be subject to the provision that the EPA could require at any time that the owner or operator verify compliance with the standards by performing a direct measurement waste determination (i.e., collecting a representative number of samples, analyzing the samples using Reference Method 25D or Test Method 5100, and applying the statistical calculation procedure). Thus, if EPA requires the owner or operator to perform this waste determination for a waste which has been placed in an affected tank, surface impoundment, container, or miscellaneous unit not using the required emission controls and the results of that determination indicate the waste volatile organic concentration is equal to or greater than 500 ppmw, then the owner or operator would be in noncompliance with the requirements of the proposed rule.

c. Concentration Determination Location. The location where the waste volatile organic content is determined can greatly affect the results of the determination. This occurs because the concentration level can decrease significantly after generation as the waste is transferred to, and managed, in various waste management units. Even when managed in a unit equipped with emission controls, a portion of the organics in the waste will be emitted since the controls are not 100 percent effective.

If the waste is directly or indirectly exposed to ambient air at any point in its management sequence, a portion of the organics in the waste will be emitted to the atmosphere, and the concentration of organics remaining in the waste will decrease. For high volatility organic compounds such as butadiene, all of the compound would evaporate within a few seconds of exposure to air. Similarly, emissions of organics from open waste transfer systems (e.g., sewers, channels, flumes)

are expected to be very significant. To ensure that the determination of volatile organic concentration is an accurate representation of the emission potential of a waste upon generation, it is essential that the waste determination be performed at a point as near as possible to where the waste is generated, before any exposure to the atmosphere can occur.

For the reasons stated above, the waste determination must be based on the waste composition before the waste is exposed, either directly or indirectly, to the ambient air. Direct exposure of the waste to the ambient air means the waste surface interfaces with the ambient air. Indirect exposure of the waste to the ambient air means the waste surface interfaces with a gas stream that subsequently is emitted to the ambient air. If the waste determination is performed using direct measurement, the standards would require that waste samples be collected from an enclosed pipe or other closed system which is used to transfer the waste after generation to the first hazardous waste management unit. If the waste determination is performed using knowledge of the waste, the standards would require that the owner or operator have documentation attesting to the volatile organic concentration of the waste before any exposure to the ambient air.

When a waste generator is also the TSDF owner or operator (e.g., the TSDF is located at the waste generation site), performing a waste determination before the waste is exposed to the ambient air can be readily accomplished since the TSDF owner or operator has custody of the waste from the point of generation. However, for the situations where the waste generator is not the TSDF owner or operator (e.g., the waste is generated at one site and shipped to a commercial TSDF), the TSDF owner or operator would not have custody of the waste until it is delivered to the TSDF. In this case, the TSDF owner or operator may not have access to the waste before it is exposed to the ambient air. Consequently, it would be necessary for the hazardous waste generator to perform the waste determination if waste is to be placed in TSDF units not equipped with the specified emission controls.

The EPA considered whether the requirement to perform the volatile organic concentration waste determinations should be added to the standards applicable to generators of hazardous waste in 40 CFR part 262. A waste determination would only be required when a TSDF owner or

operator chooses to place the waste in unit that does not use the specified emission controls. Furthermore, EPA expects that owners and operators of commercial TSDF receiving waste from a variety of waste generators will likely install the required emission controls on all units in order to have the flexibility to handle varying quantities of waste regardless of the waste volatile concentration being above or below 500 ppmw. Therefore, adding a requirement to 40 CFR part 262 that waste generators perform the volatile organic concentration waste determination before shipping the waste to a TSDF may result in many waste generators having to incur the expense of performing unnecessary waste determinations. Instead, EPA decided that a better approach for situations where the waste is generated then shipped off-site to a TSDF for management in units not controlled for organic emissions would be to allow the TSDF owner or operator the option of either: (1) Accepting only waste which is accompanied by waste determination documentation certifying that the waste volatile organic concentration is below 500 ppmw; or (2) performing the waste determination once the waste is received at the inlet to the first waste management unit at TSDF provided the waste has been collected and then transferred to the TSDF in a closed system such as a tank truck, and the waste is not diluted or mixed with other waste containing less than 500 ppmw of volatile organics. The EPA is requesting comment on the need to add to part 262 a requirement that waste generators perform the volatile organic concentration waste determination.

The location where the waste determination would be made for any one facility will depend on several factors. One factor is whether the waste is generated and managed at the same site, or the waste is generated at one site and transferred to a commercial TSDF for management. Another important factor is the mechanism used to transfer the waste from the location where the waste is generated to the location of the first waste management unit (e.g., pipeline, sewer, tank truck). For example, if a waste is first accumulated in a tank using a direct, enclosed pipeline to transfer the waste from its generation process, then the waste determination could be made based on waste samples collected at the inlet to the tank. In contrast, if the waste is first accumulated in a tank using an open sewer system to transfer the waste from its generation process, then the waste determination would need to be made

based on waste samples collected at the point where the waste enters the sewer before the waste is exposed to the ambient air.

If a waste determination indicates that the volatile organic concentration is equal to or greater than 500 ppmw, then the owner or operator would be required to place the waste in units complying with the control requirements being proposed today, and transferred from one unit to another in a closed system (i.e., pipe or other transfer mechanism that is neither open nor vented to the atmosphere) until the waste is treated to remove or destroy organics so that the volatile organic content is below 500 ppmw.

d. Concentration Determination Frequency. Variations or changes in the process producing a waste may cause the volatile organic concentration of the waste to change. Therefore, EPA is proposing to require repetition of the waste determination by either direct measurement or knowledge as a condition for continued placement of the waste in units not controlled for organic emissions. The EPA considered three alternatives for the concentration determination frequency. All of the alternatives would require a waste determination be performed when there is a change in the waste being managed or a change in the operation that generates or treats the waste such that the regulatory status of the waste may be affected. The alternatives differ in the frequency of repetition in the absence of any waste or process changes, and would require either: (1) No periodic repeat determinations; (2) periodic repeat waste determinations at a specified frequency; or (3) periodic repeat waste determinations at a frequency established on a site-by-site basis by negotiation between the owner or operator and the permit writer.

Under the first alternative, once the initial determination was made that the volatile organic concentration of a waste is below 500 ppmw, no additional waste determinations would be made unless there is a change in the waste being managed or a change in the operation that generates the waste that may affect the regulatory status of the waste. From EPA's perspective of regulatory enforcement, this alternative is not a reasonable choice because it increases the likelihood of inconsistent implementation of the proposed standards by owners and operators. The alternative would not provide EPA with information to evaluate how effective each owner or operator is in checking the volatile organic content of the waste being placed in waste management units

not using the specified organic emission controls and, thus, ensuring that the waste volatile organic concentration has not increased above 500 ppmw because of unintentional changes in the waste generating process or in the raw materials. The EPA believes these variations could be substantial and would be of special significance for wastes that have a measured volatile organic concentration near 500 ppmw because of the likelihood that there could be excursions above the action level. Any such excursions would be inconsistent with EPA's objective of allowing waste to be placed in units not controlled for organic emissions only if the volatile organic concentration of the waste does not exceed the 500 ppmw limit. Because of the increased possibility of not meeting the proposed emission control requirements, this alternative could be less protective of human health and the environment than the other alternatives considered.

Under the second alternative, waste determinations would be made when known changes occur in the waste or waste generating activity and, in addition, waste determinations would be made at a fixed, uniform frequency for all facilities. The periodic waste determinations would be more likely to detect unintentional or unperceived changes in the waste volatile organic concentration provided the determination frequency was set sufficiently high. Thus, periodic waste determinations would overcome the disadvantage of the first alternative associated with unintentional or unperceived changes in waste volatile organic concentration.

Under the third alternative, waste determinations would be made on a periodic basis at a frequency determined by negotiation between the permit writer and the owner or operator. While this alternative has the advantage of establishing the waste determination frequency based on unique characteristics of the waste or waste generating activity, it has the disadvantage of requiring negotiations between the owner or operator and the permitting authority (i.e., EPA or authorized State agency). This approach is currently used by EPA for several other RCRA regulations; however, because most TSDF will initially be subject to the interim status rules in 40 CFR part 265, which do not require prior review and approval before operation, EPA is hesitant to include provisions that would require negotiations with the permitting authority. Also, in some cases, the waste determinations would be performed by generators, and

because generators are not required to obtain RCRA permits there would be no permit negotiations.

Considering the advantages and disadvantages of the different alternatives, EPA concluded that requiring waste determinations on a fixed, uniform frequency is the most appropriate approach. Regular, periodic waste determinations are desirable because of the potential variability in waste makeup and because, once a waste is mismanaged and organics are released to the air, the damage to the environment may be done; i.e., the released organics cannot be removed from the ambient air except slowly by long-term, natural events.

Given the decision to use a specific, periodic waste determination frequency, the question remains as to what frequency should be required. Frequent waste determinations would shorten the period of time during which waste organic concentrations unknowingly changed and were not detected. However, frequent waste determinations may be unnecessary for some wastes. For wastes that have highly variable volatile organic concentrations, the interval between determinations would need to be shorter than for wastes with less variable volatile organic concentrations if the results are to be informative. The EPA considered two alternatives for periodic waste determination frequencies for situations when there is no change in the waste being managed or the operation that generates the waste: (1) A monthly frequency with a statistical procedure for using less frequent intervals; and (2) an annual frequency.

The first alternative would require waste determinations to be performed on a monthly basis with a procedure for establishing a less frequent interval based on the variability of the waste determination results for the initial 6-month period. After 6 months (the initial determination plus five subsequent, consecutive monthly determinations), a statistical calculation procedure would be used to determine if the waste determination frequency could be less frequent (e.g., semiannual or annual). This procedure would be separate from the statistical calculation procedure described earlier for the direct measurement waste determination. A standard statistical t-test would be used to determine the variability of the volatile organic concentrations measured for the samples collected during the preceding 6 months. The average of the logarithms of the measured volatile organic concentrations would be added to an

estimate of the sampling and analytical error and, then, the resulting value would be compared to the 500 ppmw limit. If the value were less than 500 ppmw, the owner or operator would be allowed to extend the waste frequency interval to a longer period. If the value were equal to or greater than 500 ppmw, then the owner or operator would be required to continue performing the waste determinations on a monthly interval. A more detailed description of this statistical calculation procedure is provided in appendix 1 to this preamble.

The second alternative would require for situations when there is no change in the waste being managed or the operation generating the waste, that a waste determination be performed once per year. This alternative would apply the same waste determination interval to all facilities and would not require use of the statistical calculation procedure needed for the first alternative to establish a site-specific interval. Consequently, an annual waste determination interval would be simpler to implement by the TSD owner or operator. Also, the annual interval would be easier to enforce by EPA or authorized State agencies because enforcement personnel would not need to conduct a site-specific calculation check before being able to verify that the waste determinations at a particular facility are being performed in compliance with the required waste determination interval. The EPA concluded that an annual waste determination interval would provide a reasonable balance between minimizing organic emissions and the ease of implementing and enforcing the standards. Therefore, today's proposal would require that an owner or operator be required to repeat the waste determination at least annually and, additionally, every time there is a change in the waste being managed or in the operation that generates or treats the waste that may affect the regulatory status of the waste. However, EPA is requesting comment on the appropriateness of both the requirement for periodic waste determinations and the selection of an annual waste determination frequency.

e. Waste Sampling Requirements. Owners or operators that choose to use direct measurement must consider the variability of the waste when collecting representative samples to be analyzed. Waste variability can be categorized as spatial or temporal. Both types of variability can interact and influence waste analysis results.

Spatial variability refers to vertical or horizontal concentration gradients that

are often exhibited by a waste contained in a tank, surface impoundment, or container. To minimize spatial variation, the proposed Reference Test Method 25D would require that waste samples be collected whenever possible from an enclosed pipe discharging the waste from the waste management unit, and that a static mixer be used in the pipe to reduce stratification.

Temporal variability refers to changes in the volatile organic concentration of the waste generated by a process over time because of process variations, changes in raw materials, or other factors. To ensure that the waste determination is based on the expected maximum volatile organics concentration, EPA is proposing that four or more waste samples be collected at a point in time when the volatile organic concentration in the waste is as high as reasonably expected for the particular process. In setting the minimum number of samples at four, EPA is seeking a balance between obtaining sufficient data to statistically characterize the volatile organic concentration of a waste and the burden imposed on the owner or operator to collect the samples. Four measurements were judged by EPA to be the minimum required to estimate the measurement variability of volatile organic concentration samples from a waste.

f. Alternative Procedures for Treated Waste. The proposed standards would allow a special provision for a situation when the waste exiting a treatment unit has volatile organic concentrations less than 500 ppmw, and the quantity of waste leaving the treatment unit is less than or equal to the total quantity of waste entering the unit. For this situation, the treated waste would be allowed to be placed in subsequent waste management units that are not controlled for organic emissions. When one or more of the wastes entering the treatment unit has a volatile organic concentration less than 500 ppmw, an owner or operator would need to document that organics have been removed from the waste and that the reduced concentration is not the result of dilution due to mixing of wastes having volatile organic concentrations above 500 ppmw with wastes having volatile organic concentrations below 500 ppmw.

One method for determining that organics have been removed from the treated waste involves calculating a weighted average volatile organic concentration for the waste entering the treatment unit. The average volatile organic concentration of the waste

exiting the treatment unit must be less than the computed weighted average concentration in the waste entering the treatment unit to confirm that no dilution of the waste has occurred. The equation that is used to calculate this level is as follows:

$$C = \frac{\sum_{j=1}^m (Q_{a_j} \times 500 \text{ ppmw}) + \sum_{i=1}^n (Q_{b_i} \times C_{b_i})}{\sum_{j=1}^m Q_{a_j} + \sum_{i=1}^n Q_{b_i}}$$

Where:

C = volatile organic concentration action level for the waste after treatment (ppm by weight)

Q_{a_j} = quantity of each waste stream (j) to be treated that has a volatile organic concentration at the tity of each waste stream (i) to be treated that has a volatile organic concentration less than 500 ppmw (Mg)

C_{b_i} = volatile organic concentration of waste stream Q_{b_i}

m = the number of waste streams greater than or equal to 500 ppmw

n = the number of waste streams less than 500 ppmw.

The effect of using this equation to calculate a weighted average concentration is to ensure that the waste streams with a volatile organics content in excess of 500 ppmw entering the treatment unit actually have been removed, and not just diluted.

In lieu of calculating the weighted average concentration in situations where a treatment unit has multiple input wastes with some having volatile organic concentrations above and some below the 500 ppmw action level, an owner or operator may choose to document that the volatile organic concentration of the output waste is no greater than the concentration in the input waste that has the lowest concentration. This procedure ensures that no dilution of the waste to lower the volatile organic concentration has occurred. The proposed standards would allow the volatile organic concentration of waste to be determined using either direct measurement or knowledge of the waste or treatment process.

These alternatives for determining that a treated waste has a volatile organic concentration below the 500 ppmw action level and that no dilution has occurred were identified by EPA as reasonable means for determining that the treated wastes do not need to be placed in units using the emission control requirements of today's proposal. However, because there are

other approaches to making this determination, EPA requests the public to comment on the appropriateness of the method presented.

2. Waste Organic Vapor Pressure Determination

For wastes having a volatile organic concentration of 500 ppmw or more that are placed in tanks, today's proposal would require that the tanks be equipped with certain organic emission controls depending on the tank capacity and the waste organic vapor pressure as described later in this section.

Therefore, compliance with the standards for some tanks would depend on the ability of the owner or operator to measure the organic vapor pressure of the waste placed in the tank and determine that the vapor pressure is below the applicable limit.

Measurements of vapor pressure could be made using the proposed Reference Method 25E or Test Method 5110 or other acceptable methods as described in section IX. To make a vapor pressure determination, a waste sample would be required to be collected prior to the point where the waste enters the tank. Because the organic vapor pressure varies as a function of temperature, measurements would be required to be taken at the maximum temperature that is reasonably expected to occur.

D. Control Requirements

The basis for the control requirements being proposed today are the control technologies specified for Option 3 as discussed in section V. These control technologies are described in detail in chapter 4 of the BID which discusses the basis for the estimates of emission reductions that each type of control would be expected to achieve. These controls have been successfully applied to emission sources that are the same as, or similar to, those that occur at hazardous waste TSDF, and are judged to be appropriate controls for the sources regulated by today's proposed standards.

In preparing specific provisions of today's proposal, existing EPA regulations that address the same or similar emission sources were consulted for guidance in developing the detailed regulatory language and in some cases were adopted directly for use in the standards proposed today. For example, requirements for certain tank control equipment were taken directly from existing relevant Clean Air Act rules for storage of volatile liquids in 40 CFR 60 subpart Kb, and the inspection frequencies for containers and surface impoundments were taken directly from

existing RCRA regulations in 40 CFR part 264 subparts I and K, respectively.

1. Tanks

Today's proposed standards would require that organic emission controls be used on a tank into which is placed hazardous waste containing 500 ppmw or more of volatile organics. Because several equivalent emission controls for tanks are available (as discussed in Section IV), an owner or operator would have the flexibility to use any one of several emission controls in order to comply with the standards. In addition, only a fixed roof cover would be required on those tanks that meet all of the following conditions: (1) The waste placed in the tank remains in a quiescent state (i.e., not mixed, agitated, or aerated), (2) the tank capacity and waste organic vapor pressure are not within the categories regulated by 40 CFR 60 subpart Kb, (3) no waste fixation occurs in the tank, and (4) no heat is added to or generated by processes occurring in the tank.

To ensure that organic emissions are effectively controlled, the proposed standards would require the fixed roof cover to completely enclose the tank so as to form a closed system which is vented only through the control device during normal operating conditions. The closed vent system and control device would be required to meet the design specifications described later in this section under the heading "Closed Vent Systems and Control Devices". For tanks required to use only a fixed roof cover, the vents in the cover would need to be equipped with a pressure-relief valve, a pilot-operated relief valve, a pressure-vacuum (PV) valve, or an equivalent pressure-relief device. These devices would be required to remain closed except when tank venting is required to prevent physical damage or permanent deformation of the tank or cover. For all tanks using fixed roof covers, the cover and all openings in the cover would be required to be designed and operated with no detectable emissions as determined by the procedures specified in Reference Method 21 in 40 CFR 60 Appendix A. All openings in tank covers such as hatches would be required to be sealed (e.g., gasketed, latched) and kept closed at all times when wastes are in the tank except during inspection and maintenance.

Pressurized tanks are designed to operate at internal pressures above atmospheric and thus operate as closed systems that do not emit organic emissions during normal storage conditions. An owner or operator would

be allowed to comply with the proposed regulation by the use of a pressurized tank. This tank would be required to be designed to operate in excess of 204.9 kPa. This pressure has been determined to be adequate to prevent release of emissions when wastes with the highest reasonably expected vapor pressures are stored at the highest reasonably expected temperatures. Pressurized tanks would be required to operate with no detectable emissions as determined by the procedures specified in Reference Method 21.

Under the authority of the Clean Air Act, EPA has promulgated new source performance standards (NSPS) for storage tanks constructed or modified after July 23, 1984 that contain volatile organic liquids (40 CFR 60 subpart Kb). These standards require that tanks with a capacity equal to or greater than 75 m³ (approximately 20,000 gallons) but less than 151 m³ (approximately 40,000 gallons) containing organic liquids with a vapor pressure greater than 27.6 kPa (approximately 4.0 pounds per square inch) and tanks with a capacity equal to or greater than 151 m³ containing organic liquids with a vapor pressure greater than 5.2 kPa (approximately 0.75 pounds per square inch) be equipped with one of the following air pollution controls: (1) A fixed roof and an internal floating roof, (2) an external floating roof, (3) a closed vent system and control device, or (4) emission controls that are equivalent to one of the first three. All tanks with a capacity greater than 75 m³ containing organic liquids with a vapor pressure greater than 76.6 kPa are required to use a closed vent system and control device to control organic emissions.

The EPA views the controls required by the NSPS for volatile organic liquids as the minimum control for any large tank containing organic hazardous waste, regardless of the date of construction of the tank. Accordingly, the tank control requirements specified in 40 CFR part 60 subpart Kb are incorporated as minimum control requirements for tanks in the standards proposed today for hazardous waste TSDF. An exception to this is the subpart Kb requirement that requires each tank with a capacity greater than 75 m³ and containing an organic liquid with a vapor pressure greater than 76.6 kPa to use only a closed vent system and a control device. This requirement is not included in the standards proposed today because EPA does not expect wastes managed at TSDF to have vapor pressures near or above 76.6 kPa. The EPA requests comments on this decision.

The EPA believes that most existing tanks at TSDF are smaller than the sizes regulated by subpart Kb. Consequently, including the subpart Kb requirements in today's proposal should have little or no additional impacts. However, making the subpart Kb control requirements the minimum requirements for today's proposed standards would ensure that any existing large tanks used for the management of hazardous waste at TSDF are controlled at least as effectively as new, modified, or reconstructed tanks storing volatile organic liquids.

2. Surface Impoundments

Today's proposed standards would require that a cover and closed vent system that routes the gas stream to a control device that reduces organic emissions by at least 95 percent be used on a surface impoundment into which is placed a hazardous waste containing 500 ppmw or more of volatile organics. In addition, a floating synthetic membrane cover that contacts the waste surface can be used alone provided all of the following conditions are met: (1) The waste placed in the surface impoundment remains in a quiescent state (i.e., not mixed, agitated, or aerated), (2) no waste fixation occurs in the surface impoundment, and (3) no heat is added to or generated by processes occurring in the surface impoundment.

To comply with the proposed standards for surface impoundments, a nonquiescent surface impoundment would need to be equipped with an air supported structure or rigid structure that vents the gas stream from the enclosure to a control device. Contact covers (i.e., floating membrane covers) would only be allowable for quiescent surface impoundments because application of such a cover to a nonquiescent surface impoundment may not be physically possible, and would, at best, be impractical. Also, as discussed in Section IV, use of an air-supported structure without a control device would not provide effective organic emission control. Consequently, the standards would require that where an air-supported structure is used, a control device for both quiescent and nonquiescent surface impoundments be used also.

The use of floating membrane covers would be allowed only for quiescent units that are not used for waste fixation or other heat generating treatment processes (e.g., some neutralization processes are exothermic). The restrictions on the use of this control technique were included because of the potential for increased emissions from

waste management units when the temperature is elevated. Under conditions of elevated temperature, volatilization of organics increases, thereby resulting in higher organic emissions. Consequently, all units used for heat generating treatment processes would be required to use covers in conjunction with control devices.

To ensure that organic emissions are effectively controlled, the proposed standards would require the surface impoundment cover (i.e. floating membrane cover, air-supported structure, or any other types selected by the owner or operator) and all openings on the cover to be designed and operated with no detectable emissions as determined by the procedure in Reference Method 21. All openings in the surface impoundment covers such as hatches and access doors would need to be sealed (e.g., gasketed, latched) and kept closed at all times when wastes are in the surface impoundment except during inspection and maintenance. Vents in the surface impoundment would be required to be operated with no detectable emissions except when venting is required to prevent physical damage or permanent deformation of the cover or surface impoundment. The closed vent system and control device would be required to meet the design specifications described later in this section under the heading "Closed Vent Systems and Control Devices".

For quiescent surface impoundments that use floating membrane covers, the covers would be required to cover the entire surface area of the impoundment when the impoundment is filled to capacity, and to be designed and installed to minimize volatile organic emissions. The standards would require that the cover be fabricated using high-density polyethylene (HDPE) having a thickness of at least 2.5 millimeters (100 mils) as the membrane material, or a material with equivalent permeability properties and other appropriate physical and chemical properties. Selection of the cover material was made on the basis of existing applications of HDPE covers on landfills and surface impoundments which have demonstrated that the material is compatible with hazardous waste and that airtight HDPE covers can be designed and installed on surface impoundments. The 2.5 millimeters thickness was selected because it is the thickest HDPE commercially available and was included as a requirement based on theoretical mass transport calculations presented in Appendix H of the BID which indicate that increasing membrane thickness significantly

lowers the volatile organic permeation rate. The proposed standards would require that surface impoundment covers be in place at all times that any waste is contained in the impoundment except during inspection, maintenance, or removal of residues through one of the cover openings, or during closure of the impoundment.

Although there is no theoretical size limit on floating synthetic membranes, as discussed in Chapter 4 of the BID, at very large sizes they become difficult to handle because of their weight. One consequence of this difficulty is that owners and operators of large impoundments may choose to convert from the use of impoundments to the use of tanks rather than installing covers.

3. Containers

Containers are defined in 40 CFR 260.10 as any portable device in which a material is stored, transported, treated, disposed of, or otherwise handled. Containers include (but are not limited to) drums, barrels, dumpsters, tank trucks, rail cars, dump trucks, ships, and barges. Owners and operators who store, handle, or prepare hazardous waste for management in containers are required under 40 CFR 264.173 and 40 CFR 265.173 to keep hazardous waste containers closed during waste storage except when waste is added or removed and are required not to open, handle, or store hazardous waste containers in a manner which may rupture the container or cause it to leak. Today's proposal would not change these requirements but would clarify that the intent of the existing rules is to have container covers form a tight seal. In addition, today's proposal would require that the cover be in place at all times during preparation, handling, and storage of hazardous waste except when waste is being added or removed. Today's proposal is also adding provisions that would require the following: (1) that container storage be carried out with no detectable emissions; (2) that submerged fill methods be used for placing pumpable waste in containers; and (3) that enclosures equipped with a closed vent system and control device be used to control emissions from waste fixation and heat generating processes that are carried out in containers.

The EPA determined that significant emissions may be released to the atmosphere when pumpable waste (i.e., liquid, slurry, or sludge waste that can be conveyed using a pump and associated piping) is being loaded into containers. It was further determined that if container loading is conducted by introducing waste into a container above the waste surface, i.e., by splash

loading, emissions from the process are substantially increased. Consequently, today's proposal would control emissions from container loading or filling operations by requiring the use of submerged fill techniques for all pumpable wastes. In submerged fill, waste is introduced into a container through a pipe that extends beneath the surface of the waste in the container. This filling method minimizes emissions caused by agitation and splashing during filling.

Piping used for submerged filling of containers would be required to extend to within a distance no greater than two diameters of the fill pipe of the bottom of the container while the container is being filled. This provision would ensure that if a waste contains solids, the solid particles would be able to clear the end of the fill pipe rather than accumulate at the end of the pipe and possibly restrict the flow of material. Requiring the end of the pipe to extend to a point near the bottom of the container is necessary to ensure that the end of the pipe is beneath the surface of the waste during most of the filling process. When a container is being filled, only the area required for the loading inlet and appropriate vent area would be allowed to be open to the atmosphere.

4. Closed Vent Systems and Control Devices

For units required to use closed vent systems and control devices, EPA is proposing that the control device be operated whenever any waste is in the unit. The closed vent system would be required to be operated with no detectable emissions. The vent system consists of the piping, connections, and (if used) the flow inducing device that transport organic vapors from the unit to the control device. To achieve the maximum organic emission reduction, the vent system must be closed and not allow any organic vapors to escape directly to the atmosphere prior to the vapor stream entering the control device. Therefore, it is necessary to design and operate the vent system to ensure no detectable organic emissions from the vent system components.

The proposed standards would require that control devices be designed and operated to either achieve a total organic compound emission reduction efficiency of at least 95 percent, or meet specific performance requirements promulgated under 40 CFR 264 Subpart AA (specifically § 264.1033(c)-(d)) for control devices used to reduce organic emissions from TSDF process vents. Therefore, control devices that may be used to comply with today's proposed standards include organic destruction

control devices such as thermal vapor incinerators, catalytic vapor incinerators, boilers, process heaters, and flares as well as organic recovery control devices such as carbon adsorbers and condensers. Applicability of the various control device types to a particular emission source will depend on the characteristics of the organic vapor stream that would be vented to the control device. As discussed in Section IV and Chapter 4 of the BID, these control devices when properly designed and operated have been demonstrated to achieve a total organic compound emission reduction efficiency of at least 95 percent as would be required by today's proposal.

If an enclosed combustion device (i.e., thermal vapor incinerator, boiler, or process heater) is used, it would need to be designed and operated to achieve either a total organic compound emission reduction efficiency of at least 95 percent or achieve a total organic concentration of 20 ppm by volume (ppmv) corrected to 3 percent oxygen on a dry basis. In lieu of an owner or operator having to develop a site-specific design to achieve the 95 percent or 20 ppmv level, the proposed standards would allow an enclosed combustion device to be used to comply with the standards that operates at a minimum residence time of 0.5 seconds and a minimum temperature of 760 °C. These are general design criteria that have been established for other EPA rulemakings under the Clean Air Act as the minimum conditions necessary to achieve the required 95 percent control efficiency. The lower limit of 20 ppmv would be provided for enclosed combustion devices to allow for the decline in achievable destruction efficiency that occurs with decreasing inlet organic concentration below approximately 2,000 ppmv. This limit is based on an analysis performed for EPA rulemakings under the Clean Air Act for the synthetic organic chemical manufacturing industry (48 FR 57547).

If a flare (an open combustion device) is used, the proposed standards require specific design and operating criteria to be met for steam-assisted, air-assisted, and nonassisted flares. A vapor stream being combusted in a steam-assisted or air-assisted flare would need a net heating value of 11.2 megajoules per standard cubic meter (MJ/scm) (300 Btu/scf). A vapor stream being combusted in a nonassisted flare would need a net heating value of 7.45 MJ/scm (200 Btu/scf). These restrictions on the use of flares to vapor streams with a net heating value above certain limits were included to ensure that flares will

achieve an emission reduction of at least 95 percent. All flares would need to be designed and operated with no visible emissions as determined by the procedures of EPA Reference Method 22 except for no more than a total of 5 minutes during any 2-hour period. The flare would need to be in operation at all times that emissions could be vented to it, and a pilot flame would need to be present whenever the flare is in operation. The calculation procedures for determining the net heating value of the gas being combusted and other design specifications (e.g., exit velocity) are included in the standards.

While the general design criteria necessary to achieve at least 95 percent organic control efficiency can reliably be established for enclosed combustion devices and flares, general design criteria for carbon adsorbers, condenser, or other organic recovery control devices cannot be specified on an industry-wide basis. Therefore if a carbon adsorber, condenser, or other type of organic recovery control device is used, the owner or operator would need to develop a site-specific design for the control device to achieve an organic control efficiency of at least 95 percent.

Owners or operators who use control devices to comply with today's proposed regulation would be required to document that each control device is designed to achieve the requirements specified by the standards for the particular type of control device. This documentation would consist of control device design plans (e.g., specifications, diagrams). The EPA believes that the engineering design practices for control devices are sufficiently established that the design documentation alone provides the necessary evidence that the desired level of performance is achieved and, when supplemented by control device monitoring data, adequately ensures continued compliance with the control requirements of the regulation. However, as an alternative to design documentation, an owner or operator would be allowed to document control device performance by source test results to show that the control device reduces organic emissions by the required percentage.

When carbon adsorption is used to remove organics from a gas stream, the carbon must periodically be replaced or regenerated when the capacity of the carbon to adsorb organics is reached. When either regeneration or removal of carbon takes place, there is an opportunity for organics to be released to the atmosphere unless the carbon disposal or regeneration is carried out under controlled conditions. There

would be no environmental benefit in removing organics from an exhaust gas stream using adsorption onto activated carbon if the organics are subsequently released to the atmosphere during desorption or during carbon disposal. To avoid such an occurrence, today's proposal would require owners or operators using carbon adsorption systems for organic emissions control to take steps to ensure that proper emission controls are used during carbon regeneration or disposal.

For carbon adsorption systems using on-site carbon regeneration, the proposed standards would require that the determination of the carbon adsorption system organic reduction efficiency include not only organic emissions vented from the carbon bed but also the organic emissions vented from the carbon regeneration equipment. Regenerable carbon adsorption involves two separate steps. The first is the adsorption step during which the organic (adsorbate) is adsorbed on to the surface of the activated carbon (adsorbent). During the second step, the adsorbate is removed from the carbon (desorption) and recovered for reuse. Both of these steps are equally important in the overall process, and any organics released to the atmosphere in either step must be accounted for in the control device efficiency determination. For example, regeneration or desorption is usually accomplished by passing steam through the bed countercurrent to the vent steam flow. The steam carries the desorbed organics from the bed and is then condensed and decanted. Any organics that pass through the condenser (i.e., not condensed) and are vented to the atmosphere would need to be added to the quantity of organics vented from the carbon bed during the adsorption step to obtain the carbon adsorption system outlet organic emission rate for computing the control device organic removal efficiency. Similarly, if there are organics in the aqueous phase of the steam condensate that are not treated and eventually escape to the atmosphere, these must be added to the carbon adsorption system outlet organic emission rate.

For carbon adsorption systems that do not use on-site regeneration or require replacement of spent carbon, the proposed standards would require that the owner or operator certify that carbon removed from the system is either: (1) Regenerated or reactivated by a process that minimizes the release of organics to the atmosphere by using effective control devices such as those required in today's proposed rule, or (2)

incinerated in a thermal treatment device that complies with the requirements of 40 CFR 264 subpart O.

E. Monitoring and Inspections

Monitoring and inspection requirements are included in the proposed standards to help ensure that emission controls are properly operated and maintained. Information provided by regular monitoring and inspections will enable owners and operators, as well as enforcement agencies, to determine whether emission controls are being operated properly and can be used as an indicator of compliance with the emission reduction efficiency requirements. In selecting monitoring and inspection requirements for today's proposed standards, EPA referred to approaches that are used in other EPA regulations that require the same or similar emission controls to those proposed today for TSDF tanks, surface impoundments, or containers. The frequency of the monitoring and inspection requirements in today's proposal have been selected to be consistent with existing requirements in 40 CFR parts 60, 61, and 264 to the extent that they are appropriate for TSDF units.

Monitoring is used here to refer to the measuring of specific control equipment operating parameters that have been selected as indicative of proper operation of the equipment. Inspections are visual observations of the overall control equipment condition to determine if there are any improper operating practices or equipment defects that could cause reduced control efficiency or allow the escape of organic vapors from the controlled unit.

1. Waste Management Units

Connections and seals on covers used to control organic emissions from waste management unit connections should not leak any organic emissions to the atmosphere provided they are properly installed and operated. Thus, the proposed standards require that cover connections and seals operate with "no detectable emissions". Control equipment is considered by EPA to be operating with no detectable emissions if there are no visible defects in the control equipment and the local volatile organic compound concentration is less than 500 ppm by volume (ppmv) at the surface of each seal or connection as determined by the procedure specified in Reference Method 21 "Determination of Volatile Organic Compound Leaks" in 40 CFR 60 appendix A. The Reference Method 21 was developed for the specific purpose of detecting organic

emissions from leaks. The 500 ppmv level used to define no detectable emission is separate and distinct from the waste volatile organic concentration level of 500 ppmw that is proposed for determining which waste management units would not be required to use organic emission controls. It is only a coincidence that the numerical value used for the two levels is the same.

The proposed standards would require the owner or operator to visually inspect covers used on affected tank, surface impoundment, and container units each week to check for evidence of visible defects. These inspections would serve to help ensure that the equipment is being used properly (e.g., hatches are closed and latched except when workers require access to a tank or container) and the equipment is being maintained in good condition (e.g., no holes or gaps have developed in covers). The inspection interval of once per week was selected so that the proposed inspection requirements could be included as part of the weekly inspections the owner or operator is already conducting to comply with existing RCRA standards (e.g., 40 CFR 264.195 for tanks, 40 CFR 264.254 for surface impoundments, 40 CFR 264.174 for containers).

To detect leaks around cover seals and fittings from openings too small to be detected by eye, initial and semiannual monitoring by Reference Method 21 would be required at all connections and seals on each cover. The monitoring would be required to be performed during loading of waste into the unit or, for nonquiescent waste management processes, while the unit is generating emissions.

If the inspection or monitoring of a component inspection indicates that the emission control equipment requires repair, the proposed regulation would require that an initial attempt at repair of the equipment be performed as soon as possible but no later than 5 calendar days after detection of the leak and that the repair work be completed within 15 calendar days. It is EPA's intention that the owner or operator promptly repair emission control equipment components. The EPA also recognizes that under some circumstances a repair of emission control equipment cannot always be made upon leak detection because facility maintenance personnel are not immediately available, the replacement part necessary to repair the equipment is not stocked in the facility's on-site spare parts inventory, or special contractors must be hired to perform the repair work. However, regardless of the circumstances, EPA expects the owner

or operator within the first 5 calendar days following detection of the leak to, at a minimum, take initial actions to complete the repair (e.g., tighten cover gasket fittings, replace cover seals, patch cover membrane material), schedule facility maintenance personnel or control equipment vendor service personnel (if special repair work is needed), and order replacement parts (if needed). If repairs cannot be completed within the 15 calendar day period, the owner or operator would not be allowed to add waste to that unit until the repairs were completed.

One exception to the 15 calendar day repair period is being proposed today. An extended repair period beyond 15 calendar days would be allowed for surface impoundment covers under certain conditions. It is EPA's understanding that a surface impoundment may occasionally be a critical component of a company's manufacturing process (e.g., there is no backup or alternative waste management unit available for placing the hazardous waste generated by the manufacturing process). Also, performing some types of repairs on the surface impoundment cover may require the surface impoundment first be drained so that the entire manufacturing process would need to be shut down until the repairs were completed. Shutdown of an entire manufacturing process could possibly create a substantial hardship and significant economic losses for a company. To avoid this situation without diminishing the protection of human health and the environment provided by the standards, EPA concluded that if delaying the repair of the surface impoundment cover would not cause the emission controls to be significantly less protective, then it would be appropriate to allow continued use of the surface impoundment but delay the repair of the surface impoundment cover until the next time the manufacturing process is shut down either for scheduled maintenance or because of a process breakdown or upset. Therefore, EPA is proposing that the repair period for a surface impoundment cover may be extended beyond 15 calendar days until the next time the process that generates the waste which is placed in the surface impoundment is shut down, provided the owner or operator documents that the repair cannot be completed without a process shutdown and that delaying the repair would not cause the emission controls to be significantly less protective. The EPA requests comment on the need to provide this extended

repair period for certain surface impoundment cover applications.

2. Closed Vent Systems and Control Devices

Closed vent systems and control devices used to control emissions from waste management units would be required to be periodically inspected and monitored to insure that they are operated and maintained in accordance with their design. The proposed standards would require that closed vent systems and control devices be visually inspected at least once per week. Each closed vent system would need to be monitored for detectable emissions using Reference Method 21 at least once per year. Monitoring of a closed vent system could be required at other times requested by the Regional Administrator. If an instrument reading indicated detectable emissions, then the owner or operator would be required to initiate repair of the system within 5 calendar days after detection and to complete the repair no later than 15 calendar days after detection.

The proposed standards would require the owner or operator to install, calibrate, maintain, and operate monitors that continuously measure and record specific control device operating parameters. The monitoring would be required to be performed in accordance with the requirements that have been promulgated by EPA under 40 CFR 264 subpart AA (specifically § 264.1033(f)-(h)) for monitoring the performance of control devices used to reduce organic emissions from TSDF process vents. The parameters to be monitored vary depending on the type of control device used. For thermal vapor incinerators, continuous monitoring of combustion zone temperature would be required. For boilers and process heaters having a design heat input capacity less than 44 MW, continuous monitoring of combustion zone temperature would be required. For boilers and process heaters having a design heat input capacity equal to or greater than 44 MW, continuous monitoring of a parameter that indicates good combustion operating practices are being used would be required. For catalytic vapor incinerators, continuous monitoring of temperature upstream and downstream of the catalyst bed would be required. For flares, continuous monitoring of visible emissions and pilot flame ignition would be required. For carbon adsorption systems that regenerate the carbon bed directly in the control device such as a fixed-bed carbon adsorber, continuous monitoring of exhaust gas organic concentration or

a parameter that indicates that the carbon bed is regenerated or replaced at regular, predetermined intervals would be required. For condensers, continuous monitoring of coolant fluid exit temperature and exhaust gas temperature would be required. These monitoring parameters were selected on the basis of previous analyses performed for EPA rulemakings under the Clean Air Act for the synthetic organic chemical manufacturing industry that showed that these parameters are indicative of control device performance. For control devices not otherwise specified, monitoring parameters would be specified in the design plan and the limits would be established during a performance test. The standards would also require that control device monitoring data be reviewed by the owner or operator at least once each day the control device is in operation to ensure that the device is operating properly (i.e., operating at design specifications).

Continuous monitoring of a carbon adsorption system that does not regenerate the carbon directly on-site in the control device such as a carbon canister would not be required by today's proposed standards. Carbon canisters are simple, low-cost control devices that would likely be applied to individual tanks or other sources venting low volume and flow rate vapor streams. Application of continuous monitors to these types of carbon adsorption systems would not be reasonable because the cost of using continuous organic monitors would be expensive relative to the cost of the control device. A less expensive approach which achieves the same purpose is for the owner or operator to replace the carbon in the control device with fresh carbon on a regular basis before carbon breakthrough occurs. Therefore, the proposed standards would require that the replacement interval be determined in accordance with § 264.1033(h) by either periodic monitoring of the organic concentration level in the exhaust vent stream from the control device or by design calculations.

F. Recordkeeping Requirements

The proposed standards would require that certain data and records be routinely reviewed and be entered into the facility operating record required by 40 CFR 264.73 and 40 CFR 265.73. Because these sections do not apply to hazardous waste generators, hazardous waste generators affected by the proposed standards (i.e., large quantity generators using 90-day accumulation tanks or containers) would be required

to maintain the specified data and records in a file located on-site that would be readily available to EPA or authorized State personnel. The information to be maintained on-site includes the following items: the results of all waste analyses for volatile organic concentration and organic vapor pressure; information pertaining to closed vent system and control device design as described in 40 CFR 264 subpart BB; design and monitoring data for covers and enclosures; all control device exceedances and the actions taken to remedy them; and all inspection records. Consistent with §§ 264.73 and 265.73, the proposed standards would require that all records be maintained in the facility operating record until facility closure except records and results of inspections and monitoring, which would need to be kept for 3 years from the date of entry.

In selecting the recordkeeping requirements, EPA wanted to ensure that adequate information is available to owners and operators as well as to enforcement agencies to verify that control systems are being properly operated and maintained. The EPA was also seeking to avoid placing undue burden on owners and operators with unnecessary monitoring and recordkeeping requirements. The EPA believes that the selected procedures are adequate and that the monitoring and recordkeeping burden is reasonable. Required records must be furnished to EPA upon request and must be readily available for inspection by EPA or authorized State representatives at all reasonable times.

G. Reporting Requirements

The proposed standards would require an owner or operator of a permitted TSDF (i.e., a facility subject to 40 CFR part 264) to submit reports to EPA only when events occur at the TSDF that result or may result in the facility being in noncompliance with certain requirements of the proposed standards. No reporting requirements are proposed for interim status TSDF (i.e., a facility subject to 40 CFR part 265).

An exception from certain proposed control requirements would be allowed for a tank, surface impoundment, or containers subject to the standards, provided the volatile organic concentration of the waste placed in the unit is below 500 ppmw. The EPA intends that this exception apply only to those units for which the owner or operator can be reasonably certain that the volatile organic concentration of the waste consistently remains below 500 ppmw. Failure to use the required

organic emission controls on units into which waste with volatile organic concentrations of 500 ppmw or more are placed would be noncompliance with the standards. Therefore, in the event that a waste exceeding the 500 ppmw volatile organic concentration limit is placed in a unit without the specified emission controls, the owner or operator would be required to submit a report to EPA explaining the reasons why the waste could not be managed in compliance with the requirements of the standards. The owner or operator would be allowed up to 30 calendar days after a waste determination is performed to prepare and submit the report to EPA.

Under the proposed standards, the owner or operator would be required to properly operate and maintain each control device used to comply with the standards. Also, as previously described, the proposed standards would require continuous monitoring of specific control device operating parameters. A control device monitor reading outside the operating range allowed by the standards indicates that the control device is not operating normally or is malfunctioning (i.e., not operating at the design setting necessary to achieve at least 95 percent organic emission control efficiency), and action must be taken by the owner or operator to return the control device to operation at the design setting. When a control device malfunction cannot be corrected within 24 hours of detection (referred to in this preamble as a "control device exceedance"), the proposed standards would require the owner or operator to record additional information about the control device exceedance. This information would then be reported to EPA on a semiannual basis. The report would need to describe the nature and period of each control device exceedance and to explain the reason why the control device could not be returned to normal operation within 24 hours. A report would need to be submitted to EPA only if control device exceedances have occurred during the past 6-month period. These reports aid EPA in determining the owner's or operator's ability to properly operate and maintain the control device. The EPA recognizes that a control device malfunction may occur due to circumstances beyond the control of the owner or operator (e.g., defective equipment supplied by the manufacturer). Therefore, a single control device exceedance may not necessarily be indicative of improper control device operation or maintenance.

H. Alternative Standards for Tanks

To provide some owners or operators of TSDF tanks with additional flexibility in complying with today's proposed standards, owners and operators would be allowed to use as an alternative to a cover vented to a control device either: (1) A fixed roof with an internal floating roof, (2) an external floating roof, or (3) an emission control for which a Federal Register notice has been published in accordance with 40 CFR 60.114(b). The alternative emission control would not be suitable for all TSDF tanks for several reasons. First, floating roofs are only suitable for vertical, smooth wall tanks with sufficiently large diameters. Also, floating roofs cannot be used for TSDF tanks where the presence of the floating roof would interfere with a treatment process (e.g., tanks equipped with surface mixing or aeration equipment). Finally, because the floating roof deck and seals are in direct contact with the hazardous waste, the materials used to fabricate these components must be compatible with the waste composition to obtain a reasonable equipment service life. Thus, EPA expects that the alternative standards for tanks will primarily be used for some but not all large TSDF tanks storing liquids with a volatile organic content greater than 500 ppmw.

Special inspection, monitoring, recordkeeping, and reporting requirements for internal and external floating roofs would be required by today's proposal because TSDF workers and EPA enforcement personnel cannot see inside a tank equipped with these types of control equipment unless the tank is empty. These requirements are selected to be consistent with the inspection, monitoring, recordkeeping, and reporting requirements now being implemented by EPA under the Clean Air Act for New Source Performance Standards (NSPS) for volatile organic liquid storage (40 CFR 60 subpart Kb). The EPA believes that the tanks affected by the NSPS (i.e., liquid storage tanks containing varying amounts of organics) are sufficiently similar to the TSDF tanks expected to use floating roofs to justify the same inspection, monitoring, recordkeeping, and reporting requirements.

1. Standards

The alternative standards proposed today for internal and external floating roofs are identical to the requirements specified in the existing NSPS for volatile organic liquid storage (40 CFR 60 subpart Kb). For internal floating roofs, the closure devices must be a foam- or liquid-filled seal, two

continuous seals, one above the other, or a mechanical shoe seal. For external floating roofs, the closure device must consist of two continuous seals, a primary seal and a secondary seal, one above the other.

Today's proposal does not contain the provision in the NSPS for volatile organic liquid storage that allows a tank owner or operator to petition the EPA for a determination of equivalency of an emission control not specifically identified in the regulations. However, if an emission control is determined to be equivalent by EPA for tanks subject to the NSPS under the provisions of 40 CFR 60.114(b), then that type of emission control would be acceptable for use on a TSDF tank in order to comply with the standards proposed today.

2. Special Inspection Requirements

The special inspection and monitoring requirements for internal and external floating roofs would require an initial inspection of the primary and secondary seals at the time the roof is installed. Subsequent inspections would be required to be performed at intervals ranging from 1 to 5 years depending on the type of seal mechanism used. Inspection of internal floating roofs would be by visual inspections to ensure that no holes, tears, or gaps develop in the seals. Inspections of external floating roofs would require measurement of gap widths between the primary seal and the wall, and between the secondary seal and the wall to ensure that these gaps are maintained within specified limits.

3. Special Recordkeeping Requirements

The special recordkeeping requirements for internal and external floating roofs would require the owner or operator to maintain certain records in the facility operating records. Documentation would be required that describes the internal floating roof or external floating roof design and certifies that the control equipment meets the specifications listed in the regulation. If the inspection of an internal floating roof identifies any defects, a description of the nature of the defects, and the date and means by which repair was made would need to be placed in the operating records. For external floating roofs, the records for the seal gap monitoring would need to include the date of the measurements, the raw data from the measurements, and the calculations of gap area as specified in the standards. If the measurements identify gaps exceeding specified limits, the records would also need to describe the gap area calculations and the date and means of

repair. Consistent with § 264.73 and § 265.73, the proposed standards would require that all records be maintained in the facility operating record until facility closure except records and results of inspections, which would need to be kept for 3 years from the date of entry.

4. Special Reporting Requirements

The special reporting requirements for internal and external floating roofs would require the owner or operator subject to the standards in 40 CFR part 264 to notify EPA in writing at least 30 days prior to the filling or refilling of a tank to provide EPA the opportunity to inspect the roof and seals for compliance with the standards. This requirement is necessary because the roof seals can only be inspected when the tank is empty.

I. Standards for Miscellaneous Units

The EPA has promulgated standards in 40 CFR part 264 for specific types of waste management units. These standards serve not only to regulate the operation of these units at TSDF but also to provide a basis for evaluating the issuance of permits to operate these units. So that owners and operators can obtain permits to operate hazardous waste management technologies that are not covered elsewhere under part 264, EPA promulgated standards under 40 CFR 264 subpart X which apply to "miscellaneous units" (52 FR 46946). A "miscellaneous unit" is defined in 40 CFR 260.10 as a hazardous waste management unit where waste is treated, stored, or disposed of that is not a container, tank, surface impoundment, waste pile, land treatment unit, landfill, incinerator, boiler, industrial furnace, underground injection well with appropriate technical standards under 40 CFR part 146, or a unit eligible for a research, development, and demonstration permit under 40 CFR 270.85.

Miscellaneous units are permitted on a case-by-case basis with terms and provisions as needed to protect public health and the environment through generic performance standards specified in 40 CFR 264.601. Section 264.601 requires that appropriate portions of the existing requirements be incorporated into the permit (subparts I through O at the time subpart X was promulgated). For example, in regulating air emissions from a pyrolysis unit (a type of unit not covered by specific standards in part 264), the permit for the unit would incorporate the applicable requirements of the subpart O incinerator standards. Because it is EPA's intention that all existing air and water environmental

standards be considered for issuance of a permit for a miscellaneous unit, it is appropriate to amend subpart X at this time to include the air emission standards that have been developed since subpart X was promulgated. Therefore, today's proposed standards would amend 40 CFR 264.601 to require that permit terms and provisions for a miscellaneous unit being permitted under 40 CFR part 264 subpart X include the appropriate air emission control requirements promulgated in subparts AA and BB of 40 CFR part 264, and proposed today as subpart CC of 40 CFR part 264.

Application of the subpart CC standards to miscellaneous units would require determining which one of the waste management unit categories (i.e., tank, surface impoundment, or container), if any, is most similar to the miscellaneous unit. For example, waste is sometimes stored or treated in units consisting of a flexible, synthetic liner supported by an above-ground metal frame (instead of a depression formed of earthen materials as is the case for a surface impoundment). Similar to a surface impoundment, the placement of wastes containing more than 500 ppmw volatile organics in this unit would result in significant organic emissions from the exposed waste surface. Likewise, using the same type of emission controls applicable to surface impoundments (e.g. floating membrane cover) would reduce organic emissions. Therefore, in this case where the miscellaneous unit is determined to resemble a surface impoundment, a subpart X permit may be issued that would include relevant provisions of the subpart CC surface impoundment standards being proposed today.

VIII. Generator Accumulation Tanks and Containers Emission Controls

Hazardous waste generators who accumulate waste on-site in containers or tanks for short periods of time are specifically exempted from the RCRA subtitle C permitting requirements provided the generators comply with the provisions specified in 40 CFR 262.34. Both large quantity generators (i.e., generators who generate more than 1,000 kilograms per calendar month) and small quantity generators (i.e., generators who generate more than 100 kilograms but less than 1,000 kilograms per calendar month) can be exempted. A large quantity generator is exempted if hazardous waste is accumulated on-site in tanks and containers for 90 days or less and certain requirements are met as specified in § 262.34(a) including compliance with 40 CFR part 265 subpart I (if the waste is accumulated in

a container) or subpart J (if the waste is accumulated in a tank). The generator accumulation tanks and containers that meet these requirements are referred to in this preamble as "90-day tanks and containers." A small quantity generator is exempted if hazardous waste is accumulated on-site in containers and tanks for up to 180 (or 270 days in some cases) and certain requirements are met as specified in 40 CFR 262.34 (d) and (e) including compliance with container requirements in 40 CFR 265 subpart I and with special tank requirements in 40 CFR 265 subpart J (specifically § 265.201). All generators are exempted for containers used at or near the point of generation to accumulate up to 55 gallons of hazardous waste or one quart of acutely hazardous waste listed in 40 CFR 261.33(e) provided certain requirements are met as specified in 40 CFR 262.34(c).

In most cases, 90-day tanks and containers are used by large quantity generators to accumulate waste upon generation, and may handle waste before it is managed in on-site waste management units that require RCRA permits or before it is shipped off-site for management at a commercial TSDF. As a result, if these 90-day tanks or containers are open to the atmosphere, a significant fraction and possibly all of the volatile organics contained in the waste may be volatilized and lost to the atmosphere before the waste is managed in a waste management unit that is controlled for air emissions. If this were to occur, a substantial portion of the organic emission and cancer risk reductions that could potentially be achieved by implementation of the proposed standards would remain unrealized.

In view of the organic emissions potential of 90-day tanks and containers, EPA evaluated the health and environmental impacts of emissions from these accumulation units. Data from a 1986 survey of hazardous waste treatment, storage, disposal, and recycling facilities, a 1981 survey of hazardous waste generators, and a 1985 survey of small quantity generators were used as the basis for the analysis. The most recent 1986 survey data only accounted for 90-day tanks and containers located at a TSDF site. Therefore, these data were supplemented by the results of the 1981 generator survey to estimate nationwide numbers of 90-day tanks and containers. The results of the 1985 survey of small quantity generators were used to estimate nationwide numbers of accumulator units at small quantity generators.

The survey data were used as the basis for estimating the environmental and health impacts of organic emissions from 90-day tanks and containers and the costs associated with controlling these emissions. The estimates were made using the same analytical approach used to estimate organic emissions, health impacts, and control costs for TSDF tanks, surface impoundments, and containers described in section III. A detailed description of the 90-day tank and container impacts estimate procedure is provided in Appendix L of the BID.

The analysis results estimate that nationwide emissions of organics from 90-day tanks and containers are approximately 259 thousand Mg/yr under baseline conditions. Annual cancer incidence as a result of exposure to these emissions is estimated to be approximately 21 cases per year. It was further estimated that if the air emission control requirements being proposed for tanks and containers at TSDF were also applied to 90-day tanks and containers, nationwide annual emissions of organics from 90-day tanks and containers would be reduced to approximately 4 thousand Mg/yr and the annual cancer incidence would be reduced to less than 1 case per year. The capital costs of adding emission controls to 90-day tanks and containers are estimated to be approximately \$41 million. Total annual costs are estimated to be approximately \$8.6 million for 90-day tanks and containers.

The estimated health and environmental impacts of 90-day tank and container emissions can be interpreted in two ways. If the waste analyses used as a basis for estimating emissions and incidence from permitted units are assumed to represent the waste at the time it enters the permitted unit, then the impacts estimated for 90-day tanks and containers are separate from, and in addition to, the impacts estimated for permitted units. On the other hand, if the waste analyses used to estimate emissions from permitted units represents the waste near the point where it is generated, and if the 90-day tanks and containers are one of a series of waste management activities through which the waste passes between the point of generation and the point of final disposition, then the impacts estimated for 90-day tanks and containers do not represent separate impacts in addition to those estimated for permitted units. Instead, emissions estimated from 90-day tanks and containers would double count the emissions estimated from permitted units and, to the extent that this situation exists, the emissions and

emission reductions estimated for permitted units would be overstated.

Waste data used in the analysis of permitted units, which served as the basis for the above analysis, were based on analyses of waste samples taken both at the point of generation and at the waste management unit. Because the data used in the analysis represent the waste at different points in the waste management sequence, the actual impacts of 90-day tanks and containers are probably somewhere between the two situations cited. Although EPA currently does not have sufficient information to make accurate estimates of the relationship between emissions from permitted units and 90-day tanks and containers, the survey data indicate that approximately 70 percent of the waste managed in 90-day tanks and containers is subsequently managed in permitted units. Thus, it can be stated with relative assurance that at least 30 percent of the estimated health and environmental impacts for 90-day tanks and containers are in addition to the impacts for permitted units. Regardless of the exact magnitude of emissions from 90-day tanks and containers, EPA is convinced that if these units are allowed to operate without air emission controls, the health and environmental impacts would be substantial and may undermine the predicted benefits of today's proposed regulation as applied to permitted units.

Impact estimates were also performed for small quantity generators. At small quantity generators, baseline annual emissions of organics are estimated to be approximately 2,000 Mg/yr, and annual cancer incidence is estimated to be approximately 0.16 case per year. With the use of the proposed organic emission controls, estimated emissions would be reduced to approximately 100 Mg/yr, and cancer incidence would be reduced to less than 0.01 case per year. Control cost estimates for small quantity generators were based on the small quantity generator survey data which indicated that most affected units at these sites would be quiescent and thus would require only covers to control emissions. A small fraction of units are nonquiescent and would be required to install covers and control devices to comply with the proposed standards. The capital costs of controlling small quantity generators are estimated to be about \$13 million. Total annual costs are estimated to be approximately \$4.9 million for small quantity generators.

Because of the large emission potential of the 90-day tanks and containers located at TSDF and large quantity generators, EPA is proposing

that 90-day tanks and containers located at TSDF and large quantity generators be included in the air emission sources regulated by today's proposed standards. The EPA has decided not to include accumulation tanks and containers at small quantity generators in today's proposed regulation because of the relatively small organic emission potential for an estimated large number of facilities (approximately 54,000) that would be affected. The EPA may decide to regulate accumulation tanks and containers used by small quantity generators at some future date if new information becomes available that suggests different impacts from those estimated by the current evaluation.

Another group of accumulation containers, referred to as "satellite accumulation units," is not included in today's proposed rule. The provisions of § 262.34 describing satellite accumulation allows generators to accumulate up to 55 gallons of hazardous waste in a container without complying with subpart I of 40 CFR 265 if the containers are at or near the point where waste initially accumulates, and if the accumulation is performed under the responsibility of the operator of the waste generating process. Satellite accumulation may occur over any length of time without having to comply with the other provisions of § 262.34 related to 90-day tanks and containers. The provisions related to satellite accumulation were added as an amendment to § 262.34 because of the small quantities of waste involved and the large number of sites at which satellite accumulation may occur at industrial facilities. The EPA believes that the rationale for excluding satellite accumulation from the regulations covering 90-day tanks and containers is equally valid for excluding them from the requirements of today's proposal. Thus, satellite accumulation units are not included in the sources regulated by today's proposed standard.

Today's proposal would amend subparts I and J of 40 CFR 265 to add a requirement that 90-day tanks and containers covered by these subparts would also have to comply with air emission control requirements in subparts AA, BB, and CC. The permit-exempt status of units complying with 40 CFR 262.34 would be maintained. The decision to apply air emission regulations to 90-day tanks and containers was made after the standards for process vents (subpart AA) and equipment leaks (subpart BB) were proposed. However, the rationale that served as the basis for regulating process vents and equipment leaks at

TSDF is also applicable to process vents and equipment leaks associated with 90-day tanks and containers. That is, the emission mechanisms and control technologies are the same for process vents and equipment leaks at TSDF as they are for process vents and equipment leaks associated with 90-day tanks and containers. Consequently, today's rulemaking also proposes that 90-day tanks and containers must also comply with the air emission standards in subparts AA and BB in addition to subpart CC.

IX. Test Methods

This section discusses the two test methods being proposed today: (1) Reference Method 25D' "Determination of the Volatile Organic Concentration of Waste Samples," used to determine the waste volatile organic concentration; and (2) Reference Method 25E, "Determination of Vapor-Phase Organic Concentration in Waste Samples," used to determine which wastes may be placed in tanks with covers only rather than tanks with covers and vented to a control device. The purposes of each of these methods and their intended uses are described in more detail in the following paragraphs.

A. Waste Volatile Organic Concentration Test Method

1. Background

The proposed organic emission controls are not required to be used on an affected waste management unit if an owner or operator determines that the waste being managed in the unit has a volatile organic concentration less than 500 ppmw. This determination may involve testing of wastes to determine volatile organic concentration. A new test method designated as Reference Method 25D, "Determination of the Volatile Organic Concentration of Waste Samples," is being proposed for this purpose in 40 CFR part 60, Appendix A. The identical test method would also be added to "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (EPA Publication No. SW-846) as Test Method 5100.

In seeking to identify a method for determining the volatile organic concentration of a waste, the EPA evaluated several candidate test methods. Objectives of the evaluation were to identify a test method whose results determine the volatilization potential of the waste, including retention of the volatiles in the waste whose results are reproducible, and that is relatively simple and easy to use. The method also needed sufficient

sensitivity to detect organic concentrations as low as 100 ppmw in the waste.

Methods based on separation of the volatile fraction from the waste matrix by equilibrium headspace analyses, steam distillation, and nitrogen purging were evaluated in a laboratory program. Reports on method development work were distributed for review by the public on February 4, 1987, and April 5, 1988. Initially, it appeared that a method using steam distillation would be the most appropriate. However, based on review of public comments received on the test method development reports and additional analyses, EPA selected a heat and nitrogen purge method for proposal. The proposed test method is based on procedures judged to yield good retention of volatiles during sample preparation. It is also judged to separate fewer relatively nonvolatile compounds from the waste samples than the steam distillation process, therefore yielding a better determination of volatilization potential. The proposed test method is also easier to use than the steam distillation process. The waste volatile organic content test method discussion is broken into the following sections: (1) Sampling, (2) liquid matrix for sample analyses, (3) purge conditions, (4) analytical detectors, and (5) method application.

In summary, the proposed test method requires representative samples to be taken before the waste is exposed to the atmosphere where volatiles can be lost. Each sample is transferred to a container holding polyethylene glycol (PEG) to prevent loss of volatiles. The samples are cooled and sent to the laboratory for analysis. In the laboratory, water is added to the PEG/sample mixture and that mixture is heated and purged with a stream of nitrogen (6 liters per minute at 75 °C). The purged gas stream is sent through detectors that measure the quantity of organic carbon and halogens removed from the waste. The mass of the total organic carbon, calculated as methane, and halogens, calculated as chloride, are converted by calculation to a concentration by weight of volatile organics.

The proposed test method would require the analysis of an audit sample obtained through the appropriate regulatory agency. An audit material has been developed in order to identify and quantify laboratory bias in the analysis portion of the method. The audit sample is formulated to resemble an actual waste sample, and would be analyzed according to the test procedure.

The rationale for the test method is described below.

2. Sampling

In the proposed test method, the sampling procedure is designed to assure that the sample is representative of the waste stream and to minimize the loss of volatiles during sample preparation. Representative samples are obtained by using appropriate sample collection procedures, which include sampling as close as possible to the point of generation (before the waste is exposed to the atmosphere where volatiles can be lost), and sampling, whenever possible, from an enclosed pipe.

The proposed method requires a static mixer to be used in the sampling line to reduce stratification and provide a well mixed stream for sampling. However, the EPA recognizes static mixers may not be appropriate for some streams, and that they may not be the best way to deal with stratification in some streams being sampled. The EPA requests comments in the use of and need for static mixers or alternate procedures to achieve a representative sample.

Loss of volatiles is minimized by cooling the sample, collecting it directly into PEG, and minimizing sample transfers. Grab samples are collected using pre-cooled sample containers that have been completely filled with PEG except for a volume equivalent to the 10 milliliter sample size. When a sample is collected, a sample container is opened, and the sample is injected into the sample container beneath the surface of the PEG to minimize exposure to the atmosphere. After the sample is transferred into the container, the container is immediately capped and cooled for transfer to the laboratory for analysis. In the laboratory, the sample is transferred to the purge container, and water is added to the purge container.

3. Liquid Matrix for Sample Collection and Analyses

The PEG and water medium was selected as the liquid matrix from which the volatile organics are purged after considering water, dioctylphthalate (DOP), DOP/water PEG, and PEG/water matrices during development of the test method. Use of an organic in the matrix was concluded to be essential in order to reduce the loss of volatiles after the sample collection. Therefore, water alone would not be a suitable medium. Comments received from industry identified several problems with the use of DOP, including the potential for source organics to react with DOP and the overestimate of emission potential of organics such as phenol (relatively nonvolatile) when mixed with DOP.

Therefore, DOP was eliminated as a suitable medium. The PEG and water matrix was selected over PEG alone to better estimate emission potential of certain compounds having relatively high Henry's Law constants, but medium to low vapor pressures such as dichlorobenzene, naphthalene, and tetrachloroethylene.

4. Purge Conditions

For the proposed method, the sample/PEG/water mixture is heated to 75°C and purged with nitrogen (6 liters per minute) for 30 minutes. Ranges of purge rates and purge temperatures were investigated during method development. A purge gas temperature of 75°C and a purge gas rate of 6 l/min were selected to provide the best measure of emission potential because it is a compromise between the goal of purging and measuring those compounds that tend to volatilize over the longer term, and the goal of not purging and therefore not measuring the relatively non-volatile compounds.

5. Analytical Detectors

The proposed method produces a generic volatile organic concentration measurement without identifying the specific organic compounds present in the waste. Carbon and halogens have been selected as the elements measured by analytical detectors to determine the organic concentration by weight. The measurement of carbon is essential as it is the best indicator of the presence of organics. However, the measurement of the mass of carbon in the sample only provides a portion of the mass for many organic compounds. Therefore, selection of other elements for measurement was considered as well to provide a basis to estimate the true weight of the organics present in the waste sample. Halogens were selected because of their relatively high molecular weight as compared to carbon and because of their prevalence (especially chlorine) in organic compounds widely managed in hazardous waste TSDF. Other elements, such as oxygen, nitrogen, and sulfur, are also candidates for measurement because of their presence in organic compounds. They have not been selected at this time because to do so would greatly increase the complexity of the test method without greatly improving the accuracy of the test method.

6. Method Application

Two bleed streams are split from the heated purge gas stream as it leaves the purge chamber. One bleed stream is directed to a flame ionization detector

(FID), where the organic carbon is measured, while the other is directed to an electrolytic conductivity detector (ELCD), where halogens are measured. Both the FID and the ELCD results are integrated over the purge period and, coupled with the measured flow rates, provide a measure of the amount of total organic carbon and the total halogens, respectively, removed from the waste sample. The quantity of organic carbon, calculated as methane, and the quantity of halogens, calculated as chloride, removed with the purge gas are used to determine the concentration of volatile organics in the original waste sample. Methane is used as the basis for reporting carbon in the concentration calculation to account for the weight of hydrogen and other elements typically present in organic compounds, but not detected by either the FID or ELCD. Chloride was selected as the basis for reporting halogens in the concentration calculation because it is the prevalent halogen present in wastes.

B. Waste Vapor-Phase Organic Concentration Test Method

Today's proposal allows certain tanks used for quiescent waste management processes to use only a cover provided that the tank volume is less than a specified size, or, if the volume is larger than the specified size, the owner or operator determines that the wastes managed in the tank have an organic vapor pressure less than a specified pressure. The determination of waste organic vapor pressure requires testing of the waste to be managed in the tank to measure the waste vapor-phase organic concentration. A test method for this purpose, designated as Reference Method 25E, "Determination of Vapor-Phase Organic Concentration in Waste Samples," is being proposed today for addition to 40 CFR part 60 appendix A. An identical test method would also be added to "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (EPA Publication No. SW-846) as Test Method 5110. Several alternative methods would also be acceptable including methods described in American Petroleum Institute Bulletin 2517, "Evaporation Loss From External Floating Roof Tanks: ASTM Method D2879-83" as modified for use with this proposed rule.

The EPA considered several candidate methods to measure the vapor-phase organic concentration of the waste or waste organic vapor pressure. The objectives of the selection process were to identify a test method that is related to the volatilization potential of the waste, that gives results that are reproducible, that is relatively

simple, and is easy to use. In this case, i.e., the matter of exception from the requirement for a control device on a covered tank, the volatilization potential and hence the emission potential of the waste in the covered tank is related to the vapor-phase organic concentration or waste organic vapor pressure.

Several candidate organic vapor pressure methods considered are used for other tanks storing volatile organic and petroleum liquids in the synthetic organic chemical manufacturing industry (SOCMI) and the petroleum refining industry. Those other tanks are presently regulated under the Clean Air Act (40 CFR 60 Subparts Ka and Kb). These methods are: (1) A method described in American Petroleum Institute Bulletin 2517, "Evaporation Loss From External Floating Roof Tanks," and (2) ASTM Method D2879-83 (modified for use with this proposed rule). Many of the wastes that would be regulated by today's proposed rule have significant aqueous fractions, and water vapor from the aqueous fraction interferes with (adds to) the direct measurement of waste vapor pressure. The direct vapor pressure measurement methods would, therefore, tend to produce higher vapor pressure results than only measuring the vapor pressure of the waste's organic fraction. The direct pressure measurement methods could be satisfactorily applied to those wastes that are predominantly non-aqueous, however.

In considering the ASTM Method D2879-83 direct vapor pressure measurement method for use with today's proposed rule, the EPA believes that it is necessary to modify the method to eliminate the procedure that allows the sample to be degassed by reducing the system pressure and heating the liquid prior to the vapor pressure measurement. The concern is that the degassing step may drive off the compounds whose vapor pressure the method is intended to measure, especially for wastes with relatively low concentrations of volatile organics. The EPA is interested in receiving comments from the public on this matter. The above candidate vapor pressure measurement methods may be used by the owner or operator at their discretion, but are not recommended for determining aqueous waste organic vapor pressure because of positive bias introduced by water vapor.

The approach used in the proposed test method is to collect a waste sample at the tank inlet in a headspace sample vial and transfer the vial to a balanced pressure headspace sampler, which pressurizes the sample vial and injects a

vapor sample into the FID for analysis of organic carbon. In the proposed test method, the sampling procedure to obtain representative samples and prevent loss of volatiles is much the same as described above for Reference Method 25D.

Helium is used to pressurize the sample vial, and the pressure is released to transfer a headspace sample directly into the FID's gas sample loop. The headspace sample is injected directly into the FID from the sample loop, and the FID response is used to measure the concentration of organic carbon in the vapor sample as propane. This vapor-phase organic concentration (expressed as propane) is then converted, by a calculation given in the method, to waste organic vapor pressure.

To calculate organic waste vapor pressure from the measurement of carbon, it is necessary to assume the number of carbon atoms associated with each mole of gas in the vapor-phase. The selection of propane as the compound for the basis of the vapor pressure calculation was made after studying a list of 53 organic compounds with vapor pressures in excess of 1.3 kPa that are found in waste. A study of the compound list showed that the arithmetic average number of carbon atoms in the compounds was 2.8. Thus, propane with three carbon atoms was designated as the compound basis for the conversion calculation. The effect of using propane as the basis is to overestimate the organic vapor pressure if the compounds in the vapor-phase are mostly C₄ or higher compounds, and to underestimate the organic vapor pressure if the vapor-phase compounds are predominantly C₂ or C₁ compounds. Of the 53 compounds studied, 39 had three or fewer carbon atoms. The EPA is interested in receiving comments from the public on the proposed method, and particularly the selection of propane as the basis for the vapor pressure calculation.

X. Implementation

A. Implementation of Rules at Permitted TSDF

1. Background

New RCRA standards (such as today's proposal) typically apply to interim status facilities on the effective date of the standards. In the case of permitted facilities, however, new standards generally do not apply until the facilities' permits are modified or renewed. This practice is often referred to as the "permit-as-a-shield." Under the current RCRA permitting system, a facility that has received a final permit

must comply with all of the following requirements as specified in 40 CFR 270.4: (1) The specific conditions written into the permit (including conditions that demonstrate compliance with Part 264 regulations); (2) self-implementing statutory requirements; and (3) regulations promulgated under 40 CFR Part 268 restricting the placement of hazardous waste in or on the land. When new regulations are promulgated after the issuance of a permit, EPA may reopen the permit to incorporate the new requirements as stated in § 270.41. Otherwise, the new regulatory requirements are incorporated into a facility's permit at the time of permit reissuance, or at the five year review for land disposal facilities.

Although EPA has the authority to reopen permits to incorporate the requirements of new standards, EPA is concerned about the resource burdens of this approach. To reopen permits for each new regulation at the time it is promulgated would impose a large administrative burden on both EPA and the regulated community as each permit modification would generally require the same administrative procedures as are required for initial permits (e.g., development of a draft permit, public notice, and opportunity for public hearing). As a consequence, the requirements of new standards are usually incorporated into a permit when it is renewed.

In today's rule, EPA is proposing to remove the permit-as-a-shield provision as it applies to control of air emissions under RCRA Section 3004(n). Thus, the proposal to remove the permit-as-a-shield provision would affect the implementation of the standards proposed today for organic emissions from tanks, surface impoundments, and containers, and the air emission standards recently promulgated for vent and equipment leak emissions (55 FR 25454). This is the first major group of air emission standards to be developed under RCRA (excluding incinerator standards). Accordingly, with the development of these standards EPA evaluated the need to implement the TSDF air standards at permitted facilities more quickly than would be done under the current regulatory policy. In this evaluation, a variety of factors was considered, including the extent of the environmental and health impacts of TSDF emissions, Congressional intent, and ease of implementation. These factors are discussed below.

2. Extent of Health and Environmental Impacts

As discussed in Section V, baseline excess cancer incidences resulting from nationwide TSDF organic emissions are estimated to be 140 cases per year and the maximum individual risk (MIR) is approximately 2×10^{-2} . In addition, organic emissions from TSDF account for more than 10 percent of total nationwide organic emissions from stationary sources and thus contribute significantly to the formation of atmospheric ozone. These health and environmental impacts are very high relative to the impacts of releases from other sources regulated under RCRA and the Clean Air Act.

If the TSDF air emission standards were not applied to permitted facilities until their permits were renewed (i.e., delay application of new regulations), a substantial portion of the emission and impacts reduction of the standards could be delayed. It is estimated that about 800 of the approximately 5,700 existing facilities would have obtained final permits prior to the promulgation of the rule covering process vents and equipment leaks. It is also estimated that a considerable number of the remaining facilities are likely to be permitted prior to promulgation of today's proposed standards for tanks, surface impoundments, and containers. Once issued, a permit has a term of 5 to 10 years. Therefore, to implement the air emission standards under current regulatory policy may cause a significant delay in achieving the benefits of the air emission standards.

3. Congressional Intent

The air emission standards being proposed today and the air emission standards promulgated for TSDF process vents and equipment leaks are authorized by section 3004(n) of RCRA. This section is part of the Hazardous and Solid Waste Amendments (HSWA) which were signed into law on November 8, 1984. Congress intended for requirements under HSWA to be implemented promptly. This is indicated by the fact that it was specified that requirements contained in the amendments were immediately applicable in all States, whether or not the State was authorized to administer its own hazardous waste program. In addition, Congress established minimum technology requirements in the amendments for major sources of potential environmental releases at facilities. These requirements, such as the requirement that surface impoundments be retrofitted with double liners and leachate collection

systems, and the banning of land disposal of certain wastes, were applied independent of the permitting system. These provisions provide further evidence that Congress intended that important HSWA provisions should go into effect immediately.

4. Ease of Implementation

The requirements of the standards proposed today for tanks, surface impoundments, and containers are straightforward; that is, the rule is specific as to who must apply controls and what those controls must be. The same is true for the standards promulgated for process vents and equipment leaks. For both rules, the owner or operator can make a direct measurement or calculation and compare the results against an action level in the standards to determine if controls are required on an emission source. If controls are required, the standards include specifications for equipment applied to suppress emissions (e.g., covers), performance criteria for control devices, and in the case of equipment leaks, the details of the leak detection and repair program that must be implemented. The standards for TSDF air emissions can therefore be described as "self-implementing" in that they can be directly implemented by TSDF without interpretation or intervention by the permitting authority. Also, EPA has previously been successful in applying the controls required by the TSDF air standards to similar emission sources in the chemical and petroleum industries under the Clean Air Act. This experience confirms that air standards of the type being proposed today can be applied directly by facilities without prior permitting review.

In summary, the results of EPA's impact analysis establish TSDF as a major source of organic emissions and health risk. Further, because the standards proposed and promulgated by EPA under RCRA Section 3004(n) are the first major group of standards to address air emissions from TSDF under the HSWA provisions, it would be consistent with Congressional intent to make the rules effective as soon as possible. Finally, because the rules are self implementing, they can be implemented by facilities without prior intervention by the permitting authority. Based on these considerations, EPA has concluded that the substantive control requirements of the air emission standards should apply and be enforced at all TSDF as soon as possible and, consequently, that the standards should

not be implemented under the permit-as-a-shield policy.

One option for expediting implementation of the air emission standards at permitted facilities would be for EPA to exercise its authority to reopen permits specifically to include the requirements of these standards. As noted earlier, however, this would involve a lengthy administrative process and impose a potentially large burden on permitting agencies and the regulated community. (Many permits may have just been issued.) Furthermore, even with a significant commitment to make the necessary permit modifications, this process would likely take years to complete. Thus, the EPA is not proposing to pursue this option.

An alternative option would be to apply the air emission control requirements for interim status facilities directly to permitted facilities. Under this option, facilities with permits as of the effective date of the standards would be required to comply with the air emission standards promulgated for interim status facilities until their permits are renewed, at which time the air standards would be incorporated into the permits. Because it would accomplish the objective of requiring air emission controls at permitted facilities on the effective date of the standards without the administrative burden associated with reopening permits, EPA selected this option for proposal.

The EPA is proposing the following regulatory actions that would make the air emission standards applicable to all facilities (including those that have submitted part A or part B permit applications and those that have received permits) on the effective date:

(1) Standards for tanks, surface impoundments, and containers be added as subpart CC to 40 CFR part 265. These standards would be immediately applicable to interim status facilities

upon the effective date (6 months after the promulgation date).

(2) Standards for tanks, surface impoundments, and containers be added as Subpart CC for 40 CFR part 264. Each RCRA permit issued after the effective date must include permit conditions necessary to achieve compliance with these standards.

(3) Section 270.4 of the RCRA permitting regulations be amended to require that facilities that have obtained final permits prior to the effective date (6 months after promulgation) comply with the tank, surface impoundment, and container standards for interim status facilities (i.e., 40 CFR 265 subpart CC) until the facility's permit is reviewed or reissued. Furthermore, this amendment would require the promulgated standards for TSDF process vents (40 CFR 265 subpart AA) and equipment leaks (40 CFR 265 subpart BB) apply to these facilities. This amendment would eliminate the permit-as-a-shield for the air emission standards, but would not require that permits be reopened.

These actions, if adopted, would mean that the air rules promulgated under RCRA section 3004(n) would be applicable to all facilities as of the effective date of the standards finally promulgated. More details on the implementation schedule for the standards proposed today and the standards promulgated for vents and equipment leaks are presented later in this section.

5. Proposed Standards for TSDF Tanks, Surface Impoundments, and Containers

Under the approach discussed above, the standards proposed today for tanks, surface impoundments, and containers would be implemented on the following schedule for existing TSDF's including permitted facilities:

(1) 180 days following promulgation, the standards become effective; all

facilities become subject to the new standards;

(2) On the effective date of the standards, each facility that does not have the controls required by the standards in place must have one of the following in the facility's operating record: an implementation schedule indicating when the controls will be installed, or their waste determination that indicates that controls are not required.

(3) No later than 18 months following the effective date (2 years following promulgation), the controls required by the standards must be installed at all facilities where they apply.

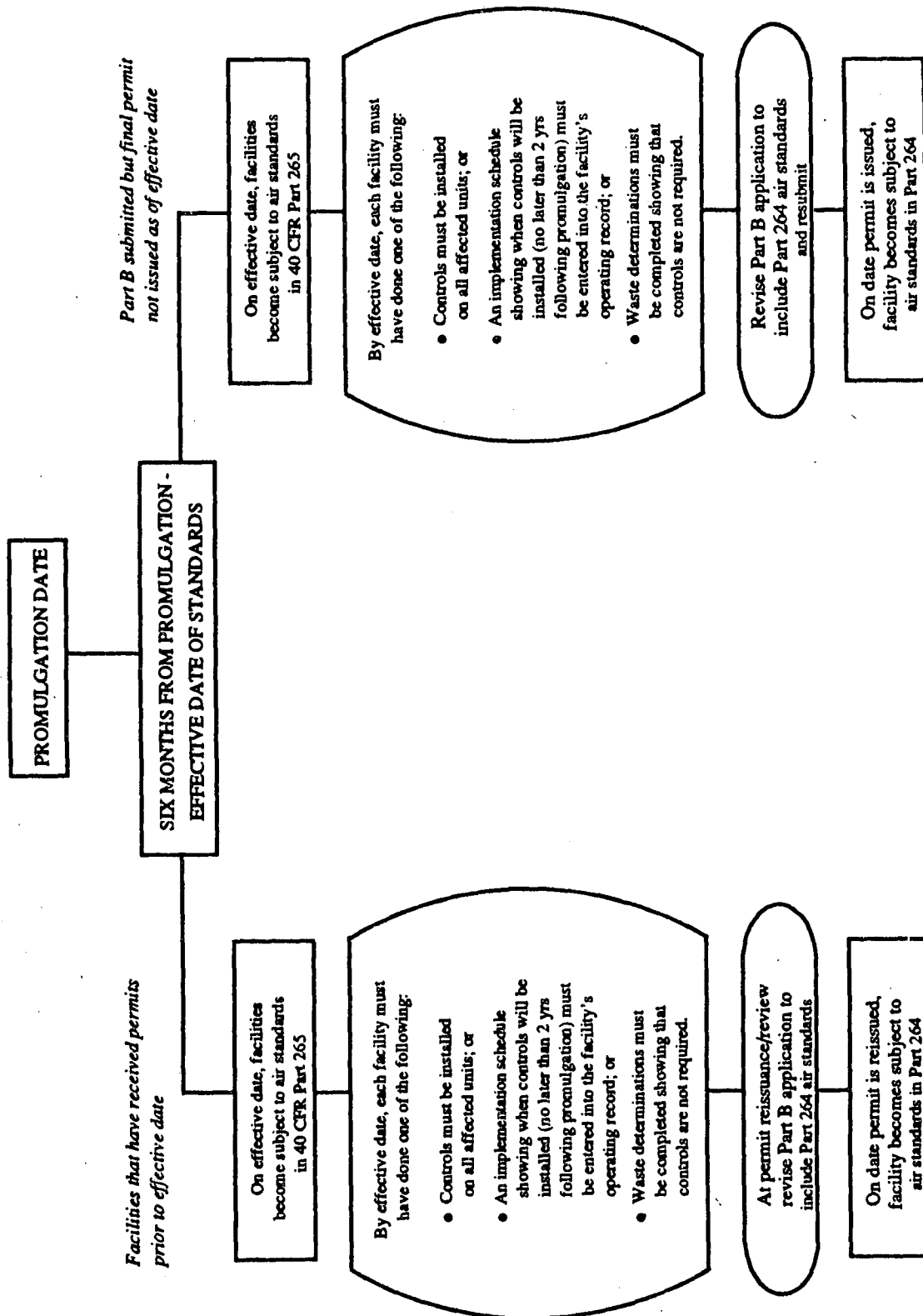
All permits issued after the effective date must incorporate the appropriate standards.

Interim status facility owners and operators who have submitted their part B permit applications who have not received their final permit as of the effective date of the standards would be required to modify their part B permit applications to incorporate the requirements of the final rule in 40 CFR parts 264 and 270.

The implementation schedule for permitted and interim status facilities is shown in Figure 1. Interim status facility owners and operators who have submitted part B applications but have not received their final permits as of the effective date of the standards would be required to modify their part B applications to incorporate the part 264 and 270 requirements of the final rule. No specific time period for submittal of the revised part B has been selected yet. However, four possible time period options are being considered by EPA as described below. The EPA requests comments on these options for when part B application information should be submitted.

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Figure 1. Air Standards for Tanks, Surface Impoundments and Containers: Implementation Schedule for Existing TSDFs With Permits or in Interim Status



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The first option would establish no specific deadline for modification of part B. Under this option, EPA would request the information under § 270.10(e)(4) of the regulations on a case-by-case basis. Once EPA requests it, the owner or operator would then have 6 months to submit the information or the permit could be denied.

The second option would be to establish a nationwide deadline in the rule requiring submittal of a revised part B within 3 months after publication of the notice of final rulemaking. Under this option, owners and operators whose permits were then issued before the effective date of the rule would have unnecessarily submitted their information since their permit would not be required to contain air emission standards (according to the permitting scheme being permitted today).

The third option would require submittal of part B by the effective date of the rule, that is, within 6 months after publication of the notice of final rulemaking. While this option would create some uncertainty for persons who were anticipating permit issuance in the period before the effective date as to whether they had to submit their part B, it would allow for prompt issuance of permits after the effective date. Historically, facility owners and operators are allowed up to 6 months to develop part B information when a facility or unit becomes subject to new requirements.

The fourth option would establish a national deadline 3 months after the effective date for submittal of part B. Although this option would eliminate the uncertainty inherent in the second and third options as to which permits will need to contain permit conditions for the air emission standards, it could delay by 3 months permit issuance in some cases.

Newly constructed TSDF are required to submit part A and part B permit applications, and to receive a final permit prior to construction as required by § 270.10. Following the effective date of the standards proposed today, a part B application for a new facility must be in compliance with the standards as contained in 40 CFR part 264, if applicable. Therefore, all controls required by the standards would have to be in place and operating upon startup.

Similarly, new waste management units added to existing facilities would have to be equipped with the required controls prior to startup. For a new unit added to an existing permitted facility, a permit modification would be necessary. Where a new unit is added to a facility in interim status, the owner or operator must submit a revised part A application

(§ 270.72(c)) including an explanation of the need for the new unit, and then receive approval from the permitting authority.

The EPA considered allowing up to 18 months past the effective date of the standards for new facilities to complete the installation of air emission controls (as is allowed in the proposal for existing facilities). This was rejected, however, for two reasons. First, with today's proposal, owners or operators considering the construction of new facilities are put on notice that controls for air emissions will be required in the future, and therefore have ample time to include air emission controls in the design of new facilities. Secondly, with the opportunity to include air emission controls in the design of new facilities, design and construction should be easier than for existing facilities that have to be retrofitted with controls.

An existing solid waste management unit (or facility) may become a hazardous waste management unit (or facility) requiring a RCRA permit when a waste becomes newly listed or identified as hazardous. Owners and operators of facilities not previously requiring a RCRA permit who have existing units handling newly listed or identified hazardous waste can submit a part A application and gain interim status. Under the proposed implementation approach, the air emission standards proposed today would be implemented at these facilities on the following schedule:

(1) 180 days following the date the managed waste is listed or identified as hazardous, the standards become effective; facilities become subject to the standards.

(2) On the effective date of the standards, each facility that does not have the controls required by the standards in place must have one of the following in the facility's operating record: (1) an implementation schedule indicating when the controls will be installed, or (2) their waste determination that indicates that controls are not required.

(3) No later than 18 months following the effective date the controls required by the standards must be installed at all facilities.

6. Omnibus Permitting Authority

The permitting authority cited by section 3005 of RCRA and codified in § 270.32 states that permits issued under this section ". . . shall contain such terms and conditions as the Administrator or State Director determines necessary to protect human health and the environment." This section, in effect, allows permit writers

to require, on a case-by-case basis, emission controls that are more stringent than those specified by a standard. This omnibus authority could be used in situations where, in the permit writer's judgment, there is an unacceptably high residual risk after application of controls required by an air emission standard.

As previously stated in Section II, the approach that EPA is using for today's proposed regulatory action is based on first controlling TSDF organic emissions as a class and to follow this, if necessary, with another phase of regulations to further reduce the risk from air emissions. During the interim, permit writers could use their omnibus permitting authority to require air emission controls similar to those proposed today or more stringent controls at TSDF where a high residual risk remains after implementation of today's proposed air emission standards.

The EPA is currently preparing a guidance document to be used by permit writers to help identify facilities that would potentially have high residual risk. The guidance document will include step by step procedures to be used to identify potentially high risk facilities and will include detailed guidance for making a formal, site-specific risk assessment. Methods for providing additional emissions control at facilities identified as having high residual risk after implementation of the standards for organic air emissions would also be included and will cover both work practice controls and technological controls. Detailed examples of both risk assessments and the provision of additional emissions control will be included in the guidance. Checklists will be included to assist permit writers to assure that all appropriate actions are taken.

7. Final Standards for TSDF Process Vents and Equipment Leaks

The only impact of today's proposal to eliminate the permit-as-a-shield as applied to the promulgated standards for vents and equipment leaks is on facilities that will have obtained permits by the effective date of these standards. Under the § 270.4 requirements, these facilities would not be subject to the standards until their permits were modified or reissued. Under today's proposal, the implementation schedule for these facilities would be as follows:

(1) 180 days following promulgation of the standards proposed today, these facilities become subject to the standards for vents and equipment leaks; compliance with the standards for

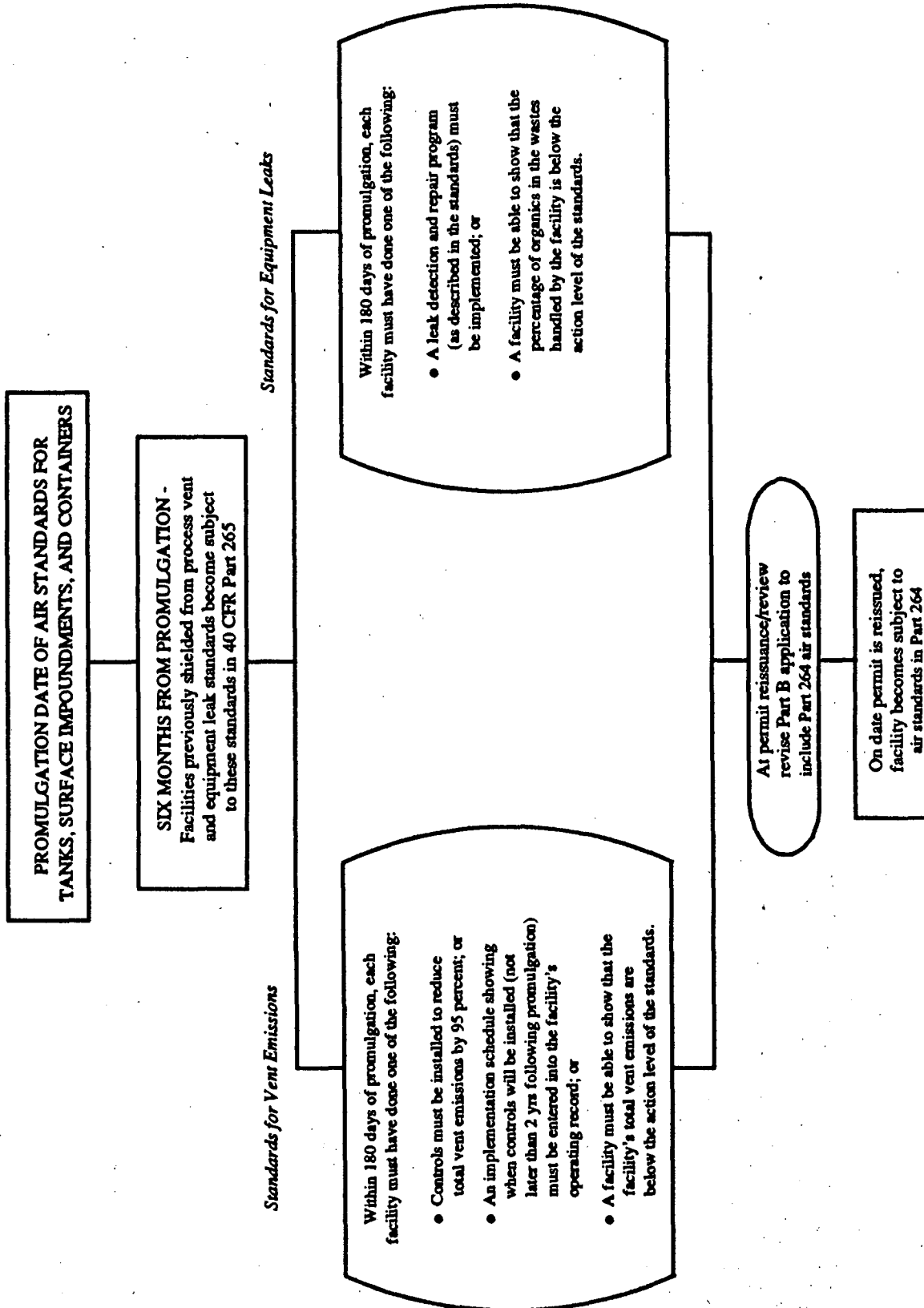
equipment leaks is required by this date. Each facility that does not have control devices required by the standards in place must have an implementation schedule in the facility's operating record indicating when the controls will be installed.

(2) No later than 18 months following the effective date of the standards proposed today (2 years following promulgation), any control devices required by the standards for vents and equipment leaks must be installed at these facilities.

The implementation schedule for the TSDF process vent and equipment leak standards at these facilities is shown in Figure 2.

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**Figure 2. Air Standards for Process Vents and Equipment Leaks:
 Implementation Schedule for Existing Facilities with Permits as of (date)**



BILLING CODE 6560-50-C

B. Applicability of Rules in Authorized States

Under section 3006 of RCRA, EPA may authorize qualified States to administer and enforce the RCRA program within the State (see 40 CFR part 271 for the standards and requirements for authorization). Following authorization, EPA retains enforcement authority under sections 3008, 7003, and 3013 of RCRA, as well as inspection authority under Section 3007, although authorized States have primary enforcement responsibility.

Prior to the HSWA, a State with final authority administered its hazardous waste program entirely in lieu of EPA administering the Federal program in that State. The Federal requirements no longer applied in the authorized State, and EPA could not issue permits for facilities in that State. When new, more stringent Federal requirements were promulgated or enacted, the State was obligated to enact equivalent requirements within specified time frames. New Federal requirements did not take effect as Federal law in an authorized State until the State adopted the requirements as State law and was authorized for the requirements.

In contrast, under section 3006(g)(1) of RCRA, 42 U.S.C. 6928(g), new requirements and prohibitions imposed by the HSWA take effect in authorized States at the same time they take effect in nonauthorized States. The EPA is directed to carry out those requirements and prohibitions in authorized States, including the issuance of permits, until the State is granted authority to do so. While States must still adopt HSWA-related provisions as State law to retain final authorization, the HSWA requirements apply in authorized States in the interim.

Today's rule is proposed pursuant to section 3004(n) of RCRA, a provision added by HSWA. Therefore, the Agency is proposing to add the requirements to Table 1 in § 271.1(j), which identifies the Federal program requirements that are promulgated pursuant to the HSWA and that take effect in all States, regardless of their authorization status. In particular, EPA is considering including the portion of today's proposal related to 90-day tanks and containers as part of the HSWA rules. The HSWA added section 3004(n), which provides that EPA must "promulgate such regulations for monitoring and control of air emissions at hazardous waste treatment, storage, and disposal facilities. . . . as may be necessary to protect human health and the environment." Based on EPA's analysis of the possibility for release of organics before waste reaches

a TSDF, EPA believes that controls on tanks and containers at generator facilities should be considered as necessary regulations for effective control of air emissions at TSDF. Therefore, EPA seeks comment on the concept of including the controls at generator sites in the provisions that EPA will implement directly in authorized States. The EPA may select this approach in the final rule.

C. Effect on State Authorizations

The EPA will implement today's rule when finalized in authorized States until either: (1) They modify their programs to adopt these rules and receive final authorization for the modification, or (2) they receive interim authorization as described below. Because the standards are proposed pursuant to the HSWA, a State submitting a program modification may apply to receive either interim or final authorization under section 3006(g)(2) or 3006(b), respectively, on the basis of requirements that are substantially equivalent or equivalent to EPA's. The procedures and schedule for State program modifications for either interim or final authorization are described in 40 CFR 271.21. It should be noted that all HSWA interim authorizations will expire automatically on January 1, 1993 (see 40 CFR 271.24(c)). The EPA invites comment on whether EPA should, in the final rule, modify § 271.24(c) to extend this deadline.

Specifications in 40 CFR 271.21(e)(2) require that States having final authorization must modify their programs to reflect Federal program changes, and subsequently must submit the modifications to EPA for approval. The deadline by which States must modify their programs to adopt this proposed regulation will be determined by the date of promulgation of the final rule, in accordance with 40 CFR 271.21(e)(2). This deadline can be extended in certain cases (40 CFR 271.21(e)(3)). Once EPA approves the modification, the State requirements become subtitle C RCRA requirements.

A State that submits its official application for final authorization less than 12 months after the effective date of these standards is not required to include standards equivalent to these standards in its application. However, the State must modify its program by the deadlines set forth in 40 CFR 271.21(e). States that submit official applications for final authorization 12 months after the effective date of these standards must include standards equivalent to these standards in their applications. The 40 CFR 271.3 sets forth the requirements a State must meet when

submitting its final authorization application.

States with authorized RCRA programs may already have requirements similar to those in today's proposed rule. Such State regulations have not been assessed against the Federal regulations being proposed today to determine whether they meet the tests for authorization. Thus, a State is not authorized to implement these requirements as RCRA requirements until the State program modification is assessed against Federal requirements and approved. Of course, States with existing standards may continue to administer and enforce their standards as a matter of State law. In implementing the Federal program, EPA will work with States under cooperative agreements to minimize duplication of efforts. In many cases, EPA will be able to defer to the States in their efforts to implement their programs, rather than take separate actions under Federal authority.

XI. Administrative Requirements

A. Public Hearing

If requested, EPA will hold a public hearing on August 20, 1991 (Julia Stevens, FTS 629-5578). The hearing will be held at EPA's Office of Administration Auditorium, Research Triangle Park, North Carolina, beginning at 10:00 a.m. Anyone wishing to make a statement at the hearing should notify Julia Stevens, Standards Development Branch (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, NC, 27711, telephone (919) 541-5578, by August 9, 1991.

Oral and written statements may be submitted at the public hearing. Persons who wish to make oral presentations must restrict them to 15 minutes and are encouraged to have written copies of their complete comments for inclusion in the public record.

B. Docket

The docket for this rulemaking is available for public inspection at the RCRA Docket Office (OS-305) in room 2427 of the U.S. Environmental Protection Agency, 401 M Street SW., Washington, DC 20460. The docket room is open from 9 a.m. to 4 p.m., Monday through Friday, except for Federal holidays. The public must make an appointment to review docket materials and should call the docket at (202) 475-9327 for appointments. The public may copy a maximum of 100 pages of material from any one regulatory docket at no cost. Additional copies cost \$0.15/page. The docket number is F-91-CESP-

FFFFF. The docket contains a copy of all references cited in the Background Information Document for the proposed rules, as well as other relevant reports and correspondence. A docket index is available for review at the docket office.

C. External Participation

Development of the basic background information for these proposed standards included consultation with appropriate advisory committees, independent experts, and Federal departments and agencies. The EPA will welcome comments on all aspects of the proposed regulation, including economic and technological issues.

D. Office of Management and Budget Reviews

1. Paperwork Reduction Act

The information collection requirements in this proposed rule have been submitted for approval to the Office of Management and Budget (OMB) under the Paperwork Reduction Act, 44 U.S.C. 3501 et seq. An Information Collection Request document has been prepared by EPA (ICR No. 1593.01), and a copy may be obtained from Ms. Sandy Farmer, Information Policy Branch (PM-223), U.S. EPA, 401 M Street, SW., Washington, DC 20460 or by calling (202) 382-2740.

Public reporting burden for this collection of information is estimated to average 56 hours per respondent per year, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Chief, Information Policy Branch, 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."

The final rule will respond to any OMB or public comments on the information collection requirements contained in this proposal.

2. Executive Order 12291 Review

Executive Order No. 12291 requires each Federal agency to determine if a regulation is a "major" rule as defined by the order and "to the extent permitted by law," to prepare and consider a Regulatory Impact Analysis (RIA) in connection with every major

rule. Major rules are defined as those likely to result in:

1. An annual cost to the economy of \$100 million or more; or
2. A major increase in costs or prices for consumers or individual industries; or
3. Significant adverse effects on competition, employment, investment, productivity, innovation, or international trade.

The EPA has judged the proposed Hazardous Wastes TSDF air emission standards for organics control to be a major rule based on estimated national control costs (i.e., annualized costs in excess of \$100 million). The EPA has prepared a draft RIA that includes estimates of costs, benefits, and net benefits associated with five alternative control options. The draft analysis, titled Hazardous Waste TSDF—Regulatory Impact Analysis for Proposed RCRA Air Emission Standards, is available in the docket.

The RIA results indicate that all control options examined would increase the unit cost of hazardous waste management services by less than 1 percent. The results also indicate a decrease in the number of jobs at TSDF but the decrease is so small that employment dislocations would probably be few, if any. Efforts undertaken by waste generators to minimize the quantity of hazardous waste in response to the waste management service price increase, could, in the aggregate, imply facility closures; however, it appears likely that the reductions will be distributed across all facilities and that the number of closures, if any, will be nominal.

Unit cost increases for storage-only facilities are substantial for several industry sectors and options when viewed as a share of hazardous waste management costs. However, storage facility closures also appear unlikely.

At generator sites that operate 90-day tanks and containers, the economic analysis indicated that the prices of goods and services could rise slightly because of the costs to the generators to comply with the proposed standards. The impact of the proposed standards on the volume of wastes stored and the number of jobs are estimated to be negligible, and employment dislocations and plant closures are unlikely.

The draft RIA has been submitted to OMB for review under Executive Order 12291. Written comments from OMB and any written EPA response to these comments are available for public inspection at the docket office cited above. A final RIA will be issued at the

time of promulgation of the final rulemaking.

3. Regulatory Flexibility Act

Under the Regulatory Flexibility Act, whenever an Agency publishes any proposed or final rule in the Federal Register, it must prepare a Regulatory Flexibility Analysis (RFA) that describes the impact of the rule on small entities (i.e., small businesses, organizations, and governmental jurisdictions). That analysis is not necessary, however, if an agency's administrator certifies that the rule will not have a significant economic impact on a substantial number of small entities.

The EPA has established guidelines for determining whether an RFA is required to accompany a rulemaking package. The guidelines state the criteria for determining when the number of affected small entities is "substantial" (i.e., at least 20 percent of the small entities) and when an impact is "significant." The determination of significance essentially depends upon compliance costs, production costs, and predicted closures. The draft RIA, cited in the preceding paragraph, describes the criteria in detail and the economic impact model employed to estimate the effects of a regulation on small entities (refer to Chapter 6 of the RIA for additional details).

The results of the economic impact model in the RIA indicate that the effects of regulation on small entities are minimal. The number of affected small entities is insubstantial, and the impacts are insignificant.

Accordingly, I hereby certify that the regulation will not have a significant impact on a substantial number of small entities. Therefore, this regulation does not require an RFA.

List of Subjects in 40 CFR Parts 60, 260, 264, 265, 270, and 271

40 CFR Part 60

Air pollution control, Test method, Vapor-phase organic concentration, Volatile organic concentration, Waste, Waste testing.

40 CFR Part 260

Definitions, Hazardous waste.

40 CFR Parts 264 and 265

Air pollution control, Container, Control device, Hazardous waste, Hazardous waste management unit, Inspection, Miscellaneous unit, Monitoring, Recordkeeping, Reporting, Standards, Surface impoundment, Tank, TSDF, Waste determination.

40 CFR Part 270

Administrative practice and procedure, Air pollution control, Confidential business information, Hazardous waste, Permit, Permit modification, Reporting and recordkeeping requirements.

40 CFR Part 271

Administrative practice and procedure, Air pollution control, Confidential business information, Hazardous waste, Reporting and recordkeeping requirements.

Dated: July 1, 1991.

William K. Reilly,
Administrator.

Appendix 1. Waste Determination Statistical Procedures

Today's proposed standards would require waste determinations be performed if an owner or operator chooses to place waste with a volatile organic concentration less than 500 ppmw in a tank, surface impoundment, or container not equipped with the specified organic emission controls. The first section of this appendix describes the statistical procedure that is proposed today as 40 CFR 264 appendix X and 40 CFR 265 appendix VI to compute the waste volatile organic concentration value for comparison to the 500 ppmw limit.

Under the proposed standards, the waste determination would need to be performed initially by the effective date of the standards and repeated at least annually and, additionally, every time there is a change in the waste being managed or in the operation that generates or treats the waste that may affect the regulatory status of the waste. Section VII of this preamble discusses the alternatives considered by EPA for the selection of the interval for periodic waste determinations. As an alternative to the annual frequency waste determination requirement included in the proposed standards, EPA considered requiring a monthly frequency with a less frequent interval being allowed for certain waste conditions. The second section of this appendix describes the statistical procedure EPA developed to establish for which wastes the less frequent interval could be used based on the variability of monthly waste determination results for a 6-month period.

A. Statistical Procedure To Determine if Waste Volatile Organic Concentration is Less Than 500 ppmw

The direct measurement waste determination as described in section VII of this preamble would require that

at least four waste samples be collected and analyzed for volatile organic concentration. The samples would need to be collected as close together in time as is practical, so that any variation in results can be attributed to sampling and analytical variability rather than process variability. The samples would be analyzed using Reference Method 25D/Test Method 5100 as described in section XI of this preamble. To compare these multiple test results to the 500 ppmw limit, a single concentration value from the four or more measured concentration values must be obtained. A statistical t-test would be used to obtain a single concentration value.

The statistical t-test involves adding the average of the logarithms of the measured volatile organic concentrations to an estimate of the measurement standard error (sampling and analytical error), and then comparing the appropriate value (exponential of the sum) to 500 ppmw. The t-test relies on the assumption that the quantities being compared are normally distributed. Since the logarithms of concentrations are approximately normally distributed, they are used in lieu of the concentration values directly obtained from Reference Method 25D or Test Method 5100. To perform the statistical t-test, some measure of variability among sample results taken at a given point in time is needed. This measurement variability (or standard deviation) can be estimated directly if multiple samples are taken at each of two or more points in time, and then the standard deviations estimated from each of those times are pooled.

To pool the results from multiple sampling periods, it is necessary to know or assume how the standard deviation of the measurements changes when the waste concentration increases or decreases. If the standard deviation is a constant at all measured concentration values, then the pooling of results from different time periods can be done directly using the measured concentration values. If the standard deviation varies in proportion to the magnitude of the measurements, then the natural logarithms of the measured values should be used when calculating the mean and standard deviation. It is EPA's judgment that standard deviations of waste test results will tend to be proportional to the waste concentration. For example, in absolute units (ppmw), EPA believes that a process that yields a waste having a volatile organic concentration of about 400 ppmw would tend to have a larger sampling and analytical variability (say, a standard deviation of 40 ppmw) than

would a process that yields a waste having a volatile organic concentration of about 100 ppmw (say, a standard deviation of 10 ppmw). In other words, if the process level changed, then the standard deviation would tend to change in a proportionate fashion. Under the conditions of this example, the (natural) logarithms of the concentration measurements are more appropriate than the concentration measurements themselves for use in pooling measurement results from several sampling times. Therefore, EPA chose to use the natural logarithms of the measured values for these statistical calculations.

At any time, *i*, the mean of the logarithms of the measured values of volatile organic concentration, \bar{X}_i , is obtained by averaging the logarithms of the measured values:

$$\bar{X}_i = \frac{\sum X_{ij}}{n_i} \quad (\text{Eq. 1})$$

Where:

- n_i = the number of waste samples at time *i*.
- X_{ij} = the natural logarithm (ln) of the volatile organic concentration of sample *j* taken at time *i*.

The standard deviation, S_i , is obtained as follows:

$$S_i = \sqrt{\frac{1}{n_i} \sum_{k=0} (n_k - 1) s_k^2 / K_i} \quad (\text{Eq. 2})$$

Where:

$$K_i = \sum_{k=0} (n_k - 1) \quad (\text{Eq. 3})$$

$$s_k = \sqrt{\frac{\sum_j X_{kj}^2 - (\sum_j X_{kj})^2 / n_k}{n_k - 1}} \quad (\text{Eq. 4})$$

- X_{kj} = Natural logarithm (ln) of the measured volatile organic concentration of sample *j* taken at time *k*.
- n_k = number of waste samples selected at time *k*.

For the initial determination (i=0 and k=0), the standard deviation, S_0 , is equal to s_0 . If an owner or operator conducts the minimum amount of testing during subsequent sampling periods, which consists of collecting and analyzing a single sample each month (or a single sample each 6 months if a reduced sampling frequency is being used), then the standard deviation calculated for the initial set of sampling results, S_0 , is assumed to apply to the results of each subsequent determination and is used in making comparisons of the logarithms of measured values with the 500 ppmw limit.

To determine if the volatile organic concentration of a waste is below 500 ppmw, the mean of the logarithms of the measurements at time i, X_i , would be added to the product of the standard deviation, S_i , and a multiplier; the exponential of this sum would then be compared with 500 ppmw to determine if the waste can be managed in units that are not controlled for air emissions. The value of the multiplier depends on the number of samples taken and can be obtained from Column 2 in Table 2 by selecting the value corresponding to the value of K_i in Column 1. The following condition must be true in order for the waste to qualify for management in units that are not controlled for organic emissions:

$$\exp(\bar{X}_i + (t_i \times S_i) / \sqrt{n_i}) < 500 \text{ (or an alternate level for treated waste) (Eq. 5)}$$

Where:

X_i = The mean of the natural logarithms of the measured values obtained from samples at the current time, i, as defined by Eq. 1.

t_i = A value obtained from Column 2 of Table 2 corresponding to the value of K_i in Column 1.

S_i = The standard deviation as defined by Eq. 2.

n_i = The number of samples collected at the current time, i.

TABLE 2.—MULTIPLIERS FOR USE IN t-TEST

K_i (from Eq. 3)	Multiplier (t_i) (for Eq. 5)	Multier (t'_i) (for Eq. 6)
1.....	3.078	6.314
2.....	1.886	2.920
3.....	1.638	2.353
4.....	1.533	2.132
5.....	1.476	2.015
6.....	1.440	1.943
7.....	1.415	1.895
8.....	1.397	1.860
9.....	1.383	1.833
10.....	1.372	1.812
11.....	1.363	1.796
12.....	1.356	1.782
13.....	1.350	1.771
14.....	1.345	1.761
15.....	1.341	1.753

TABLE 2.—MULTIPLIERS FOR USE IN t-TEST—Continued

K_i (from Eq. 3)	Multiplier (t_i) (for Eq. 5)	Multier (t'_i) (for Eq. 6)
16.....	1.337	1.746
17.....	1.333	1.740
18.....	1.330	1.734
19.....	1.328	1.729
20.....	1.325	1.725
21.....	1.323	1.721
22.....	1.321	1.717
23.....	1.319	1.714
24.....	1.318	1.711
25.....	1.316	1.708
26.....	1.315	1.706
27.....	1.314	1.703
28.....	1.313	1.701

In some situations, an owner or operator may benefit from taking multiple samples during one or more of the sampling periods following the initial determination. For example, if the estimate of the standard deviation calculated for the initial set of sample results is large and the mean value of the initial test or a value measured during a follow-up test is near the 500 ppmw limit, a reduction in the standard deviation or the multiplier may be needed in order for the measured values to meet the conditions of the t-test. Multiple sampling at any sampling time will always reduce the value of the multiplier, and may reduce the value of the estimated standard deviation as well.

B. Statistical Procedure To Determine Waste Determination Interval

The statistical procedure developed by EPA for determining the waste conditions for which the less frequent waste determination interval would be appropriate is also based on using a statistical t-test. In deriving the multipliers for the statistical t-test described in the first section of this appendix, the objective set by EPA was to ensure that the chance of a waste sample being incorrectly determined to be below 500 ppmw would be no more than 1 in 10. The EPA concluded that if a waste consistently meets the condition of Eq. 5 for some minimum time period, and if the waste could meet a more stringent t-test where the chance of an incorrect determination is less than 1 in 10, thus providing increased assurance that no incorrect determinations would be made, then a reduced sampling frequency would be appropriate. After examining several options, EPA concluded that a time period of 6 months would provide sufficient evidence that a waste will consistently meet the condition of Eq. 5 and further concluded that a more stringent test where the chance of an incorrect

determination is no more than 1 in 20 would provide adequate assurance that a reduced sampling frequency could be employed. Whereas the test associated with Eq. 5 is based on the mean of all observations taken at time i, the test for assessing sampling frequency considers all individual observations taken at time i plus all observations from the five most recent sampling periods.

In the procedure derived to test for the appropriateness of a reduced sampling frequency, an owner or operator would be allowed to reduce his sampling frequency from one or more samples per month to one or more samples at a less frequent interval (e.g., semiannually, annually) provided that every sample taken over the previous six sampling periods meets the following condition:

$$\exp(X_{kj} + (t'_i \times S_{ij})) < 500 \text{ (or an alternate level for treated waste) (Eq. 6)}$$

Where:

X_{kj} = The logarithm of the measurement of sample j taken at time k, where k=i, i-1, i-2, i-3, i-4, and i-5.

t'_i = A value taken from Column 3 of Table 2 corresponding to a Column 1 value equal to K_i .

S_{ij} = The standard deviation as previously defined (Eq. 2).

If the condition in Eq. 6 is true for each test result for the previous six sampling periods, the owner or operator would be allowed to switch from monthly to less frequent testing and would be allowed to continue to use the reduced frequency as long as the condition in Eq. 6 is met. If at any time the condition in Eq. 6 is not met, then the owner or operator would be required to switch back to or continue using monthly testing. At any time that the condition of Eq. 6 is not met, an owner or operator would have the option of collecting and analyzing more than the minimum number of samples to potentially reduce the estimated variability of the samples and thus show that the conditions are met.

Note that the condition in Eq. 6 differs from the condition in Eq. 5 in that it uses a larger multiplier (i.e., for each row of Table 2, the Column 3 value is larger than the Column 2 value) and it does not contain the quantity n_i . As a result of these differences, the t-test for switching from monthly to less frequent testing is more stringent than the t-test for determining if the volatile organic concentration is below the 500 ppmw limit.

Because of the complexity of the statistical procedure presented here, EPA developed an example form, shown in Figure 3, that simplifies the calculation procedure to determine

whether or not a reduced sampling frequency can be used.

Figure 3.—Waste Analysis Form—Sample Worksheet

- A. Sample Period (sample collection date)
 B. Measured concentration value for each sample collected during period (minimum of four samples)
 C. Logarithms of values in Row B
 D. Number of values in Row C
 E. Average of values in Row C
 F. Variance of values in Row C
 G. [Row D] - 1
 H. [Row D prior period] + [Row G]
 I. [Row D prior period] × [Row L prior period]
 J. [Row F] × [Row G]
 K. [Row I] + [Row J]
 L. [Row K] / [Row H]
 M. [Row L]^{0.5}
 N. Multiplier (Table 2, column 2; $K_1 = \text{Row H}$)
 O. [Row M] × [Row N] / [Row D]^{0.5}
 P. [Row E] + [Row O]
 Q. exp [Row P]
 R. Is Row Q < 500?
 If "yes" ► go to Row S; If "no" ► stop
 S. Is Row Q < 500 for last 6 periods?
 If "yes" ► go to Row T; If "no" ► stop
 T. Multiplier (Table 2, column 3; $K_1 = \text{Row H}$)
 U. exp [(Row M) × (Row T)]
 V. 500 / [Row U]
 W. Is Row V > all Row B for last 6 periods?
 If "yes" ► semi-annual sampling allowed
 If "no" ► monthly sampling required

The form includes instructions to determine if the conditions of Eq. 5 and Eq. 6 are met. On the form, Row B pertains to measured concentration values from the waste sample analyses, Row C pertains to the logarithms of the measured concentration values, Rows D through M involve some preliminary

calculations, Rows N through S constitute the test to determine if the volatile organic concentration of the sampled waste is below 500 ppmw, and Rows T through W contain the test for determining if a reduced sampling frequency can be used.

For the reasons set out in the preamble, title 40, chapter I, parts 60, 260, 264, 265, 270, and 271 of the Code of Federal Regulations are proposed to be amended as follows:

PART 60—STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

1. The authority citation for part 60 continues to read as follows:

Authority: Sections 111, 301(a) of the Clean Air Act as amended (42 U.S.C. 7411, 7601(a)), unless otherwise noted.

2. Appendix A is amended by adding test methods 25D and 25E:

METHOD 25D—Determination of the Volatile Organic Concentration of Waste Samples
 Introduction

Performance of this method should not be attempted by persons unfamiliar with the operation of a flame ionization detector (FID) or an electrolytic conductivity detector (ELCD) because knowledge beyond the scope of this presentation is required.

1. Applicability and Principle

1.1 Applicability. This method is applicable to the determination of the volatile organic concentration of wastes.

1.2 Principle. A sample of waste is collected from a source as close to the point of generation as practical. The sample is then purged with nitrogen to separate certain organic compounds. Part of the sample is analyzed for carbon concentration, as methane, with an FID, and part of the sample is analyzed for chlorine concentration, as chloride, with an ELCD. The volatile organic concentration is the sum of the carbon and chlorine content of the sample.

2. Apparatus

2.1 Sampling. The following equipment is required:

2.1.1 Static Mixer. Installed in-line or as a by-pass loop, sized so that the drop size of the dispersed phase is no greater than 1000 μm . If the installation of the mixer is in a by-pass loop, then the entire waste stream shall be diverted through the mixer.

2.1.2 Tap. Installed no further than two pipe diameters downstream of the static mixer outlet.

2.1.3 Sampling Tube. Flexible Teflon, 0.25 in. ID. Note: Mention of names or specific products does not constitute endorsement by the Environmental Protection Agency.

2.1.4 Sample Container. Borosilicate glass or polytetrafluoroethylene (PTFE), 15 to 50 ml, and a Teflon lined screw cap capable of forming an air-tight seal.

2.1.5 Cooling Coil. Fabricated from 0.25 in. ID 304 stainless steel tubing with a thermocouple at the coil outlet.

2.2 Analysis. The following equipment is required:

2.2.1 Purging Apparatus. For separating the organic compounds from the waste sample. A schematic of the system is shown in Figure 1. The purging apparatus consists of the following major components.

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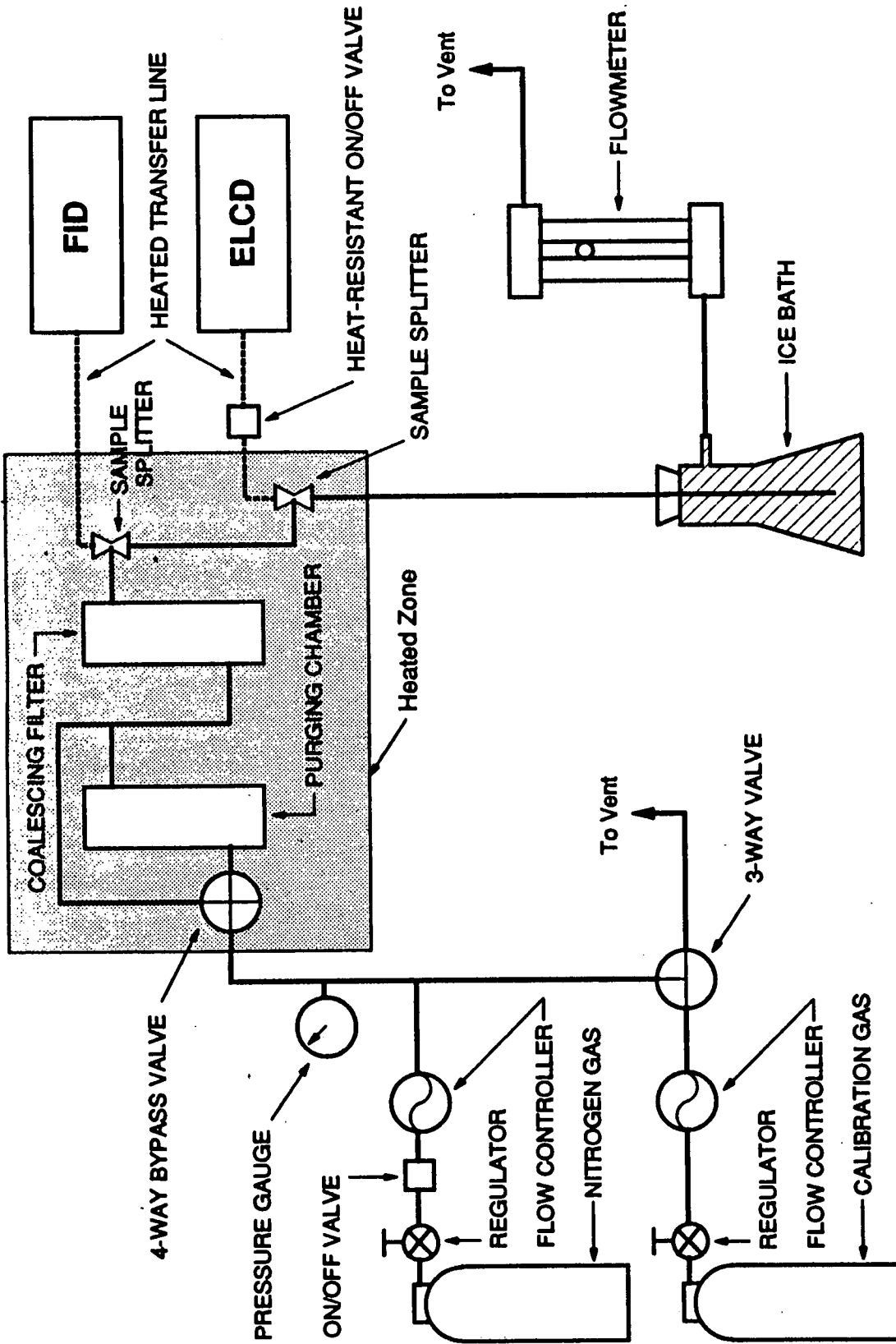


Figure 1. Schematic of Analytical System

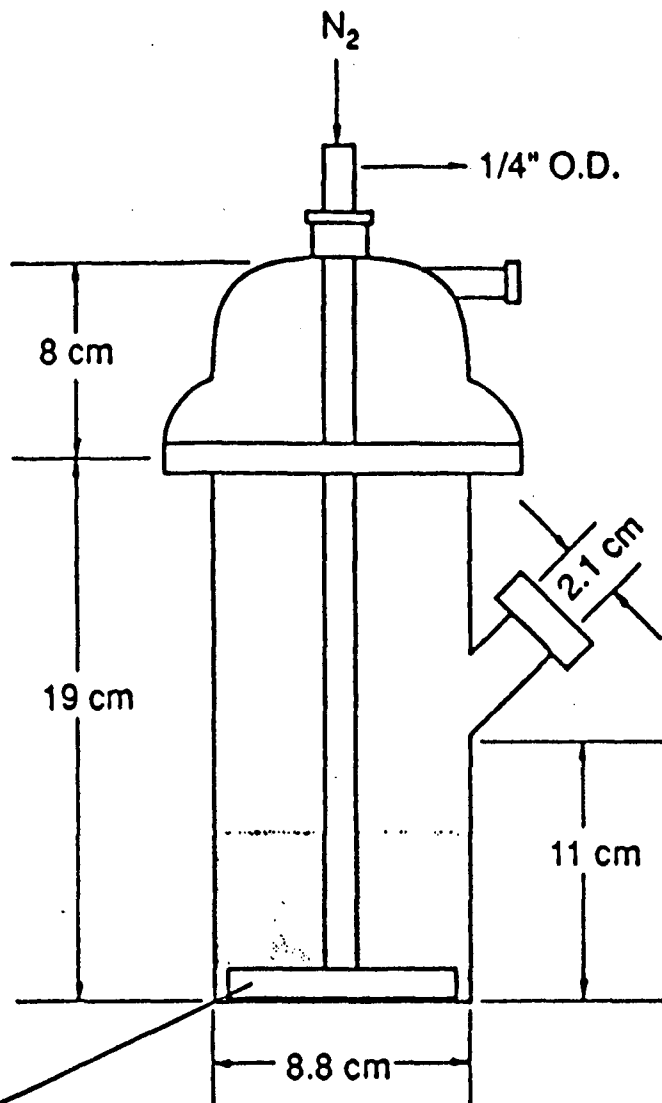
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2.2.1.1 Purging Chamber. A glass container to hold the sample while it is heated and purged with dry nitrogen. The cap of the purging chamber is equipped with three fittings: one for a purging lance (fitting with

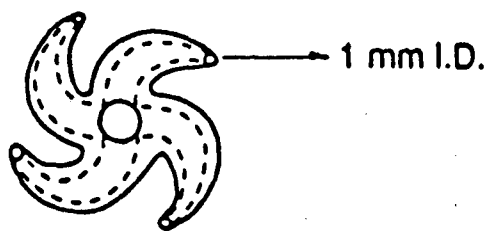
the #7 Ace-thread), one for the Teflon exit tubing (side fitting, also a #7 Ace-thread), and a third (a 50-mm Ace-thread) to attach the base of the purging chamber as shown in Figure 2. The base of the purging chamber is a

50-mm inside diameter (ID) cylindrical glass tube. One end of the tube is open while the other end is sealed. Exact dimensions are shown in Figure 2.

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Purging Lance



End View of FDD

Figure 2. Schematic of Purging Chamber.

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2.2.1.2 Purging Lance. Glass tube, 6-mm OD by 30 cm long. The purging end of the tube is fitted with a four arm bubbler with each tip drawn to an opening 1 mm in

diameter. Details and exact dimensions are shown in Figure 2.

2.2.1.3 Coalescing Filter. Porous fritted disc incorporated into a container with the

same dimensions as the purging chamber. The details of the design are shown in Figure 3.

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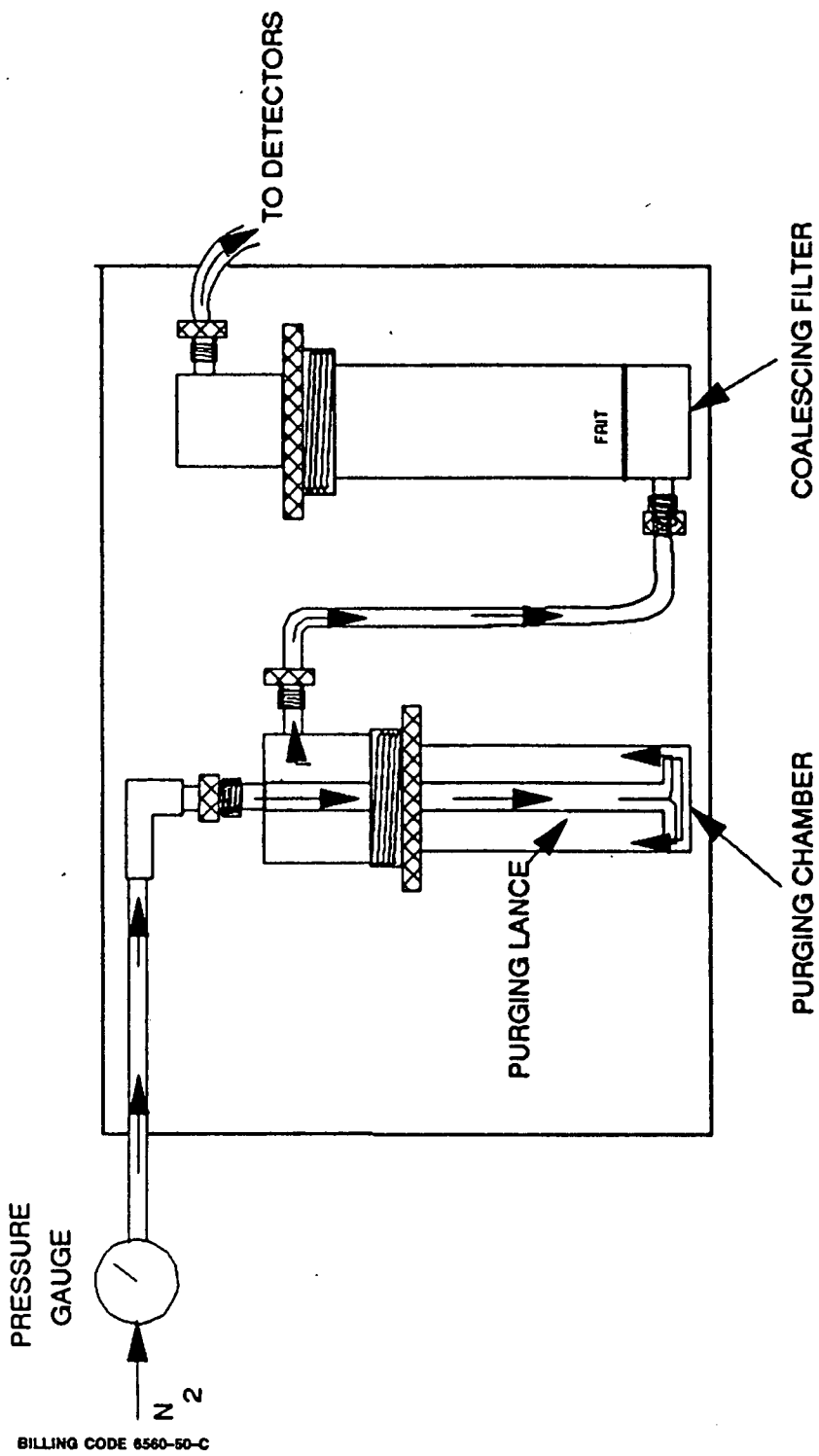


Figure 3. Orientation of Purging Chamber and Coalescing Filter.

2.2.1.4 Constant Temperature Chamber. An oven capable of maintaining a temperature around the purging chamber and coalescing filter of 75 ± 5 °C.

2.2.1.5 Three-way valve. Manually operated, stainless steel. To introduce calibration gas into system.

2.2.1.6 Flow Controllers. Two adjustable. One capable of maintaining a purge gas flow rate of $0.4-0.8$ l/min. The other capable of maintaining a calibration gas flow rate of 1-100 ml/min.

2.2.1.7 Rotameter. For monitoring the air flow through the purging system (0-10 l/min).

2.2.1.8 Sample Splitters. Two heated flow restrictors. At a purge rate of up to 6 l/min, one will supply a constant flow to the ELCD. The second will split the analytical flow between the FID and the vent. The approximate flow to the FID will be 40 ml/min and to the ELCD will be 15 ml/min, but the exact flow shall be adjusted to be compatible with the individual detector and to meet its linearity requirement.

2.2.1.9 Filter Flask. With one-hole stopper. Used to hold ice bath. Excess purge gas is vented through the flask to prevent condensation in the flowmeter and to trap volatile organic compounds.

2.2.1.10 Four-way Valve. Manually operated, stainless steel. Placed inside oven, used to bypass purging chamber.

2.2.1.11 On/Off Valves. Two, stainless steel. One heat resistant up to 130 °C and placed between oven and ELCD. The other a toggle valve used to control purge gas flow.

2.2.1.12 Pressure Gauge. Range 0-40 psi. To monitor pressure in purging chamber and coalescing filter.

2.2.2 Volatile Organic Measurement System. Consisting of an FID to measure the carbon concentration, as methane, of the sample and an ELCD to measure the chlorine concentration.

2.2.2.1 FID. An FID meeting the following specifications is required:

2.2.2.1.1 Linearity. A linear response (± 5 percent) over the operating range as demonstrated by the procedures established in Section 5.1.1.

2.2.2.1.2 Range. A full scale range of 50 pg carbon/sec to 50 μ g carbon/sec. Signal attenuators shall be available to produce a minimum signal response of 10 percent of full scale.

2.2.2.1.3 Data Recording System. Analog strip chart recorder or digital integration system compatible with the FID for permanently recording the output of the detector. The recorder must have the capability to start and stop integration at points selected by the operator.

2.2.2.2 ELCD. An ELCD meeting the following specifications is required. Note: A $\frac{1}{4}$ -in. ID quartz reactor tube is recommended to reduce carbon buildup and the resulting detector maintenance.

2.2.2.2.1 Linearity. A linear response (± 10 percent) over the response range as demonstrated by the procedures in Section 5.1.2.

2.2.2.2.2 Range. A full scale range of 5.0 pg/sec to 500 ng/sec chloride. Signal attenuators shall be available to produce a minimum signal response of 10 percent of full scale.

2.2.2.2.3 Data Recording System. Analog strip chart recorder or digital integration system compatible with the output voltage range of the ELCD. The recorder must have the capability to start and stop integration at points selected by the operator.

3. Reagents

3.1 Sampling.

3.1.1 Polyethylene Glycol (PEG). Ninety-eight percent pure with an average molecular weight of 400. Before using the PEG, remove any organic compounds that might be detected as volatile organics by heating it to 200 °C and purging it with nitrogen at a flow rate of 1 to 2 l/min for 2 hours.

3.2 Analysis.

3.2.1 Sample Separation. The following are required for the sample purging step:

3.2.1.1 PEG. Same as Section 3.1.1.

3.2.1.2 Purging Gas. Zero grade nitrogen (N_2), containing less than 1 ppm carbon.

3.2.2 Volatile Organic Measurement. The following are required for measuring the volatile organic concentration:

3.2.2.1 Hydrogen (H_2). Zero grade H_2 , 99.999 percent pure.

3.2.2.2 Combustion Gas. Zero grade air or oxygen as required by the FID.

3.2.2.3 FID Calibration Gas. Pressurized gas cylinder containing 25 percent propane and 1 percent 1,1-dichloroethylene by volume in nitrogen.

3.2.2.4 Water. Deionized distilled water that conforms to American Society for Testing and Materials Specification D 1193-74, Type 3, is required for analysis. At the option of the analyst the $KMnO_4$ test for oxidizable organic matter may be omitted when high concentrations are not expected to be present.

3.2.2.5 N-Propanol. ACS grade or better. Electrolyte Solution. For use in the conductivity detector.

4.0 Procedure

4.1 Sampling.

4.1.1 Sampling Plan Design and Development. Use the procedures in chapter nine of the Office of Solid Waste's publication, Test Methods for Evaluating Solid Waste, third edition (SW-846), as guidance in developing a sampling plan.

4.1.2 Waste in Enclosed Pipes.

4.1.2.1 Sample as close as practical to the point of waste generation in order to minimize the loss of organics. Assemble the sampling apparatus as shown in Figure 4. Install the static mixer in the process line or in a by-pass line. Locate the tap within two pipe diameters of the static mixer outlet.

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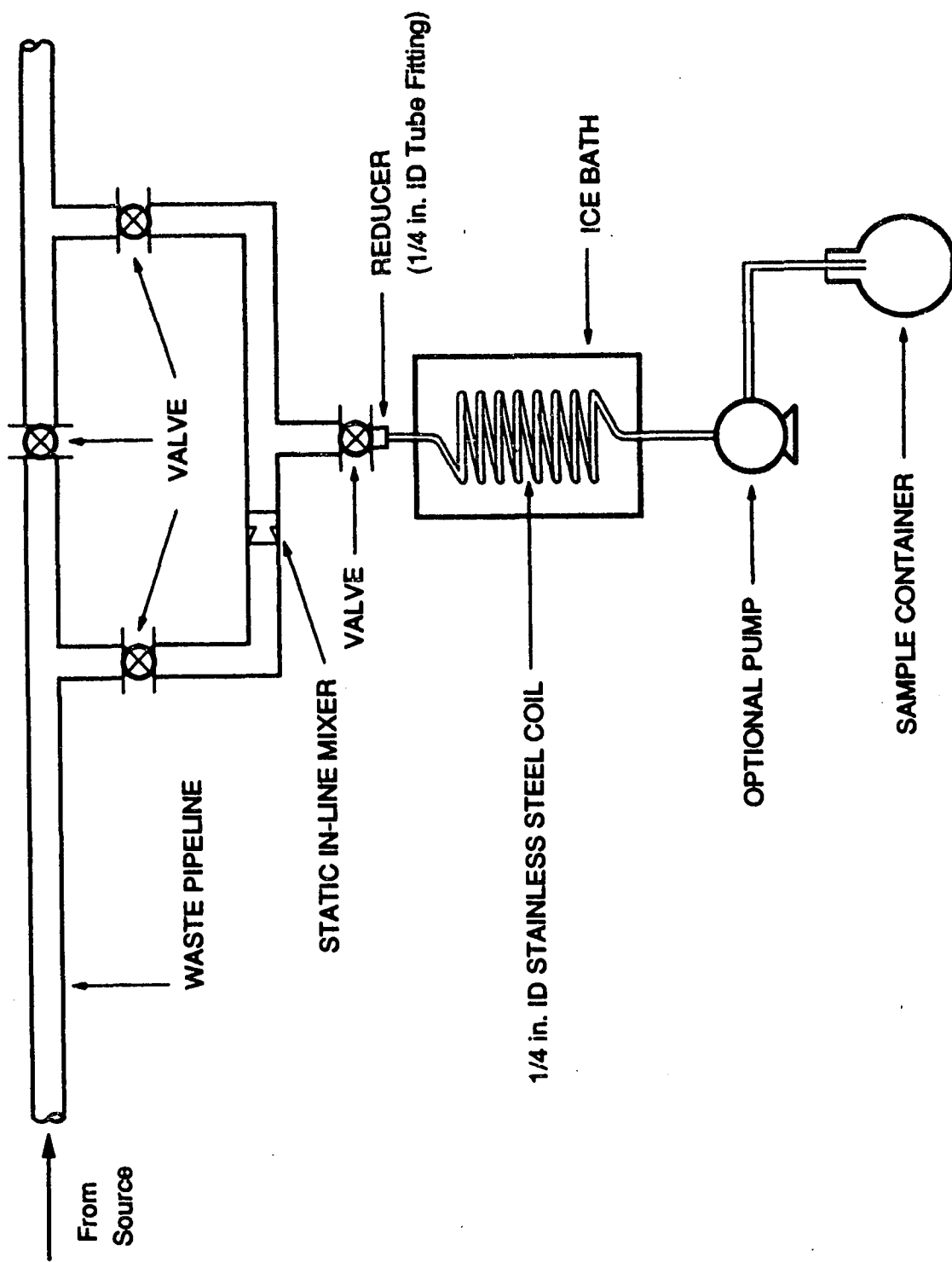


Figure 4. Schematic of Sampling Apparatus for Enclosed Pipe

4.1.2.2 Prepare the sampling containers as follows: Pour into the container an amount of PEG equal to the total volume of the sample container minus 10 ml. PEG will reduce but not eliminate the loss of organic compounds during sample collection. Weigh the sample container with the screw cap, the PEG, and any labels to the nearest 0.01 g and record the weight (m_w). Before sampling, store the containers in an ice bath until the temperature of the PEG is less than 40 °F.

4.1.2.3 Begin sampling by purging the sample lines and cooling coil with at least four volumes of waste. Collect the purged material in a separate container and dispose of it properly.

4.1.2.4 After purging, stop the sample flow and direct the sampling tube to a preweighed sample container, prepared as previously described in this section. Keep the tip of the tube below the surface of the PEG during sampling to minimize contact with the atmosphere. Sample at a flow rate such that the temperature of the waste is less than 10 °C. Fill the sample container and immediately cap it (within 5 seconds) so that a minimum headspace exists in the container. Store immediately in a cooler and cover with ice.

4.1.2.5 Alternative sampling techniques

may be used upon the approval of the Administrator.

4.2 Sample Recovery.

4.2.1 Assemble the purging apparatus as shown in Figures 1 and 2. Adjust the purging lance so that it reaches the bottom of the chamber.

4.2.2 Remove the sample container from the cooler, and wipe the exterior of the container to remove any extraneous ice, water, or other debris. Reweigh the sample container and sample to the nearest 0.01 g, and record the weight (m_w). Pour the contents of the sample container into the purging flask, rinse the sample container three times with PEG, transferring the rinsings to the purging flask after each rinse. Cap purging chamber between rinses. The total volume of PEG in the purging flask shall be approximately 50 ml. Add approximately 50 ml of water.

4.3 Sample Analysis.

4.3.1 Turn on the constant temperature bath and allow the temperature to equilibrate at 75 ± 5 °C. Turn the bypass valve so that the purge gas bypasses the purging chamber. Turn on the purge gas. Allow both the FID and the ELCD to warm up until a stable baseline is achieved on each detector. Pack the filter flask with ice. Change this after each run and dispose of the waste water

properly. When the temperature of the oven reaches 75 ± 5 °C, start both integrators and record baseline. After 1 min, turn the bypass valve so that the purge gas flows through the purging chamber. Continue recording the response of the FID and the ELCD. Monitor the readings of the pressure gauge and the rotameter. If the readings fall below established set points, stop the purging and determine the source of the leak before resuming.

4.3.2 As the purging continues, monitor the output of the detectors to make certain that the analysis is proceeding correctly and that the results are being properly recorded. Every 10 minutes read and record the purge flow rate, the pressure and the chamber temperature. Continue the purging for 30 minutes.

4.3.3 For each detector output, integrate over the entire area of the peak starting at 1 minute and continuing until the end of the run. Subtract the established baseline area from the peak area. Record the corrected area of the peak. See Figure 5 for an example integration.

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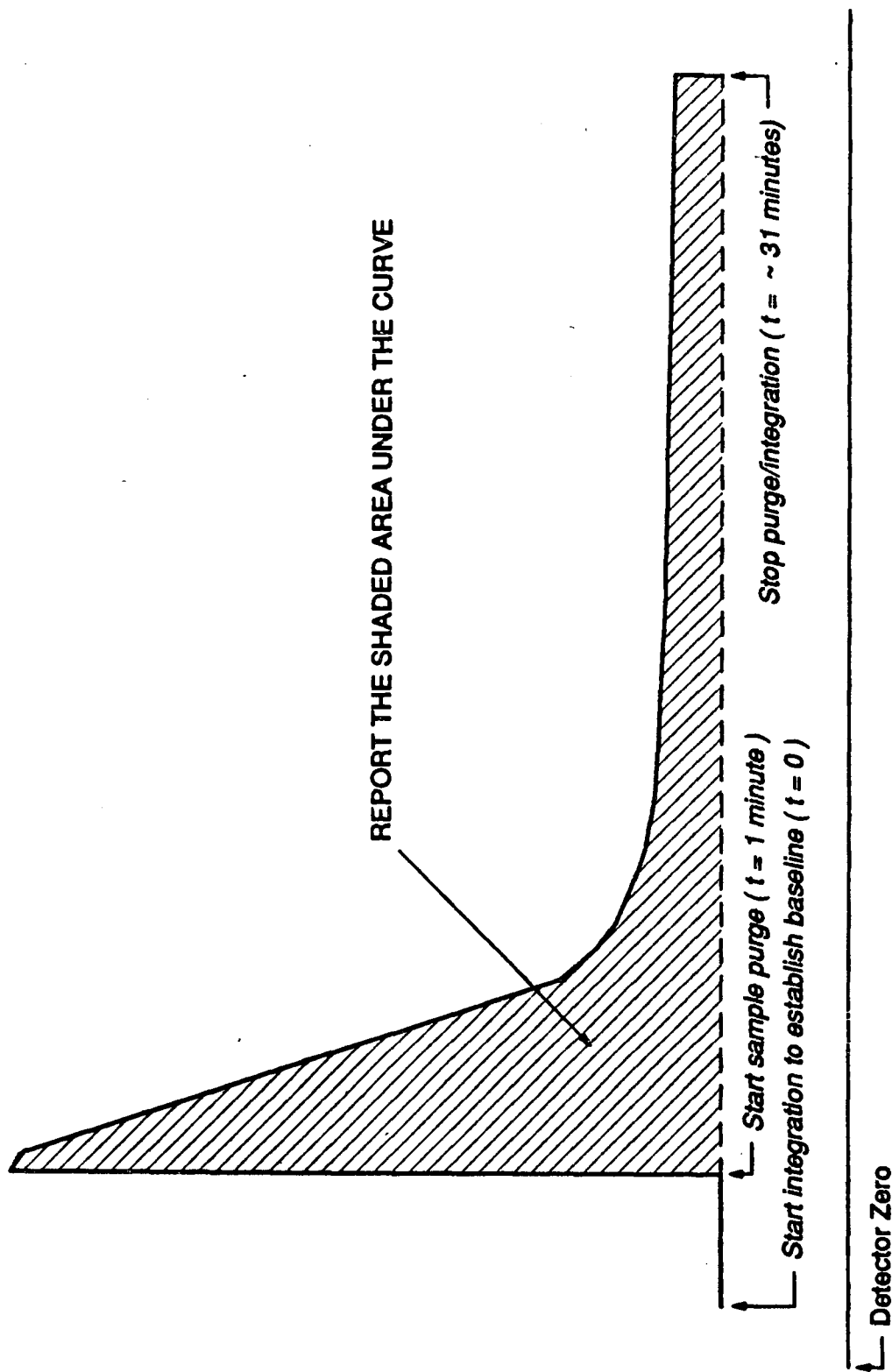


Figure 5. Sample Chromatogram and Integration for Either Detector

4.4 Water Blank. Transfer about 60 ml of water into the purging chamber. Add 50 ml of PEG to the purging chamber. Treat the blank as described in sections 4.2 and 4.3, excluding section 4.2.2.

5. Operational Checks and Calibration

Maintain a record of performance of each item.

5.1 Initial Performance Check of Purging System. Before placing the system in operation, after a shutdown of greater than six months, and after any major modifications, conduct the linearity checks described in sections 5.1.1 and 5.1.2. Install calibration gas at the three-way calibration gas valve. See Figure 1.

5.1.1 Linearity Check Procedure. Using the calibration standards described in section 3.2.2.3 and by varying the injection time, it is possible to calibrate at multiple concentration levels. Use Equation 3 to calculate three sets of calibration gas flow rates and run times needed to introduce a total methane mass (m_{co}) of 1, 5, and 10 mg into the system (low, medium, and high FID calibration, respectively). Use Equation 4 to calculate three sets of calibration gas flow rates and run times needed to introduce a total chloride mass (m_{ch}) of 1, 5, and 10 mg into the system (low, medium and high ELCD calibration, respectively). With the purging system (low, medium and high ELCD calibration, respectively). With the purging system operating as in section 4.3, allow the FID and the ELCD to establish a stable baseline. Set the secondary pressure regulator of the calibration gas cylinder to the same pressure as the purge gas cylinder and set the proper flow rate with the calibration flow controller (see Figure 1). The calibration gas flow rate can be measured with a flowmeter attached to the vent position of the calibration gas valve. Set the four-way bypass valve to standby position so the calibration gas flows through the coalescing filter only. Inject the calibration gas by turning the calibration gas valve from vent position to inject position. Continue the calibration gas flow for the appropriate period of time before switching the calibration valve to vent position. Continue recording the response of the FID and the ELCD for 5 min. after switching off calibration gas flow. Make triplicate injections of all six levels of calibration.

5.1.2 Linearity Criteria. Calculate the average response factor (Equations 5 and 6) and the relative standards deviation (RSD) (Equation 10) at each level of the calibration curve for both detectors. Calculate the overall mean of the three response factor averages for each detector. The FID linearity is acceptable if each response factor is within 5 percent of the overall mean and if the RSD for each set of triplicate injections is less than 5 percent. The ELCD linearity is acceptable if each response factor is within 10 percent of the overall mean and if the RSD for each set of triplicate injections is less than 10 percent. Record the overall mean value of the response factors for the FID and the ELCD. If the calibration for either the FID or the ELCD does not meet the criteria, correct the detector/system problem and repeat Section 5.1.1 and 5.1.2.

5.2 Daily Calibrations.

5.2.1 Daily Linearity Check. Follow the procedures outlined in Section 5.1.1 to analyze the medium level calibration for both the FID and the ELCD in duplicate at the start of the day. Calculate the response factors and the RSD's for each detector. For the FID, the calibration is acceptable if the average response factor is within 5 percent of the overall mean response factor (Section 5.1.2) and if the RSD for the duplicate injection is less than 5 percent. For the ELCD, the calibration is acceptable if the average response factor is within 10 percent of the overall mean response factor (section 5.1.2) and if the RSD for the duplicate injection is less than 10 percent. If the calibration for either the FID or the ELCD does not meet the criteria, correct the detector/system problem and repeat Sections 5.1.1 and 5.1.2.

5.2.2 Calibration Range Check.

5.2.2.1 If the waste concentration for either detector falls below the range of calibration for the detector, use the procedure outlined in Section 5.1.1 to choose 2 calibration points that bracket the new target concentration. Analyze each of these points in triplicate (as outlined in section 5.1.1) and use the criteria in section 5.1.2 to determine the linearity of the detector in this "mini-calibration" range.

5.2.2.2 After the initial linearity check of the mini-calibration curve, it is only necessary to test one of the points in duplicate for the daily calibration check (in addition to the points specified in section 5.2.1). The average daily mini-calibration point should fit the linearity criteria specified in section 5.2.1. If the calibration for either the FID or the ELCD does not meet the criteria, correct the detector/system problem and repeat the calibration procedure mentioned in the first paragraph of section 5.2.2. A mini-calibration curve for waste concentrations above the calibration curve for either detector is optional.

5.3 Analytical Balance. Calibrate against standard weights.

5.4 Audit Procedure. Concurrently analyze the audit sample and a set of compliance samples in the same manner to evaluate the technique of the analyst and the standards preparation. The same analyst, analytical reagents, and analytical system shall be used both for compliance samples and the EPA audit sample. If this condition is met, auditing of subsequent compliance analyses for the same enforcement agency within 30 days is not required. An audit sample set may not be used to validate different sets of compliance samples under the jurisdiction of different enforcement agencies, unless prior arrangements are made with both enforcement agencies.

5.5 Audit Samples. Audit Sample Availability. Audit samples will be supplied only to enforcement agencies for compliance tests. The availability of audit samples may be obtained by writing: Source Test Audit Coordinator (MD-778), Quality Assurance Division, Atmospheric Research and Exposure Assessment Laboratory, U.S. Environmental Protection Agency, Research Triangle Park, NC 27711.

or by calling the Source Test Audit Coordinator (STAC) at (919) 541-7834. The

request for the audit sample must be made at least 30 days prior to the scheduled compliance sample analysis.

5.6 Audit Results. Calculate the audit sample concentration according to the calculation procedure described in the audit instructions included with the audit sample. Fill in the audit sample concentration and the analyst's name on the audit response form included with the audit instructions. Send one copy to the EPA Regional Office or the appropriate enforcement agency and a second copy to the STAC. The EPA Regional Office or the appropriate enforcement agency will report the results of the audit to the laboratory being audited. Include this response with the results of the compliance samples in relevant reports to the EPA Regional Office or the appropriate enforcement agency.

6.0 Calculations.

6.1 Nomenclature.

A_b = Area under the water blank response curve, counts.

A_c = Area under the calibration response curve, counts.

A_s = Area under the sample response curve, counts.

C = Concentration of volatile organics in the sample, ppmw.

C_c = Concentration of carbon, as methane, in the calibration gas, mg/L

C_h = Concentration of chloride in the calibration gas, mg/L

DR_f = Average daily response factor of the FID, mg CH₄/counts.

DR_{ch} = Average daily response factor of the ELCD, mg Cl⁻/counts.

m_{co} = Mass of carbon, as methane, in a calibration run, mg.

m_{ch} = Mass of chloride in a calibration run, mg.

m_s = Mass of the waste sample, g.

m_{sc} = Mass of carbon, as methane, in the sample, mg.

m_{st} = Mass of sample container and waste sample, g.

m_{ch} = Mass of chloride in the sample, mg.

m_{st} = Mass of sample container prior to sampling, g.

m_{vo} = Mass of volatile organics in the sample, mg.

P_p = Percent propane in calibration gas (l/l)

P_{ve} = Percent 1,1-dichloroethylene in calibration gas (l/l)

Q_c = Flow rate of calibration gas, l/min.

t_c = Length of time standard gas is delivered to the analyzer, min.

6.2 Concentration of Carbon, as Methane, in the Calibration Gas.

$$C_c = (19.681 \times P_p) + (13.121 \times P_{ve}) \quad \text{Eq. 1}$$

6.3 Concentration of Chloride in the Calibration Gas.

$$C_h = 28.998 \times P_{ve} \quad \text{Eq. 2}$$

6.4 Mass of Carbon, as Methane, in a Calibration Run.

$$m_{co} = C_c \times Q_c \times t_c \quad \text{Eq. 3}$$

6.5 Mass of Chloride in a Calibration Run.

$$m_{ch} = C_h \times Q_c \times t_c \quad \text{Eq. 4}$$

6.6 FID Response Factor, mg/counts.

$$R_f = m_{co}/A_c \quad \text{Eq. 5}$$

6.7 ELCD Response Factor, mg/counts.

$$R_{cb} = m_{ch}/A_c \quad \text{Eq. 6}$$

6.8 Mass of Carbon, as Methane, in the Sample.

$$m_{sc} = DR_c (A_a - A_b) \quad \text{Eq. 7}$$

6.9 Mass of Chloride in the Sample.

$$m_{sh} = DR_{cb} (A_a - A_b) \quad \text{Eq. 8}$$

6.10 Mass of Volatile Organics in the Sample.

$$m_{vo} = m_{sc} + m_{sh} \quad \text{Eq. 9}$$

6.11 Relative Standard Deviation.

$$n$$

$$RSD = 100/\bar{x} \left\{ \sum_{i=1}^n (x_i - \bar{x})^2 / (n-1) \right\}^{1/2} \quad \text{Eq. 10}$$

$$i=1$$

6.12 Mass of Sample.

$$m_s = m_{st} - m_{st} \quad \text{Eq. 11}$$

6.13 Concentration of Volatile Organics in Waste.

$$C = (m_{vo} \times 1000)/m_s \quad \text{Eq. 12}$$

Method 25E—Determination of Vapor Phase Organic Concentration in Waste Samples

Introduction

Performance of this method should not be attempted by persons unfamiliar with the operation of a flame ionization detector (FID) nor by those who are unfamiliar with source sampling because knowledge beyond the scope of this presentation is required.

1. Applicability and Principle

1.1 Applicability. This method is applicable for determining the vapor pressure of waste samples from treatment, storage, and disposal facilities (TSDF).

1.2 Principle. A waste sample is collected from a source just prior to entering a tank. The headspace vapor of the sample is analyzed for carbon content by a headspace analyzer, which uses an FID.

2. Interferences

2.1 The analyst shall select the operating parameters best suited to his requirements for a particular analysis. The analyst shall produce confirming data through an adequate supplemental analytical technique and have the data available for review by the Administrator.

3. Apparatus

3.1 Sampling. The following equipment is required:

3.1.1 Sample Containers. Vials, glass, with butyl rubber septa, Perkin-Elmer Corporation Numbers 0105-0129 (glass vials), B001-0728

(gray butyl rubber septum, plug style), 0105-0131 (butyl rubber septa), or equivalent. The seal shall be made from butyl rubber. Silicone rubber seals are not acceptable.

3.1.2 Vial Sealer. Perkin-Elmer Number 105-0108, or equivalent.

3.1.3 Gas-Tight Syringe. Perkin-Elmer Number 00230117, or equivalent. pipe:

3.1.4.1 Static mixer. In-line or by-pass loop, sized so that the drop size of the dispersed phase is no greater than 1000 μm . If the mixer is installed as a by-pass loop, the entire waste stream shall be diverted through the mixer.

3.1.4.2 Tap.

3.1.4.3 Tubing. Teflon, 0.25-in. ID. Note: Mention of trade names or specific products does not constitute endorsement by the Environmental Protection Agency.

3.1.4.4 Cooling Coil. Stainless steel (304), 0.25 in.-ID, equipped with a thermocouple at the coil outlet.

3.2 Analysis. The following equipment is required:

3.2.1 Balanced Pressure Headspace Sampler. Perkin-Elmer HS-6, HS-100, or equivalent, equipped with a glass bead column instead of a chromatographic column.

3.2.2 FID. An FID meeting the following specifications is required:

3.2.2.1 Linearity. A linear response (± 5 percent) over the operating range as demonstrated by the procedures established in Section 6.1.2.

3.2.2.2 Range. A full scale range of 1 to 10,000 ppm CH_4 . Signal attenuators shall be available to produce a minimum signal response of 10 percent of full scale.

3.2.3 Data Recording System. Analog strip chart recorder or digital integration system compatible with the FID for permanently recording the output of the detector.

3.2.4 Thermometer. Capable of reading temperatures in the range of 30° to 60 °C with an accuracy of ± 0.1 °C.

4. Reagents

4.1 Analysis. The following items are required for analysis:

4.1.1 Hydrogen (H_2). Zero grade.

4.1.2 Carrier Gas. Zero grade nitrogen, containing less than 1 ppm carbon (C) and less than 1 ppm carbon dioxide.

4.1.3 Combustion Gas. Zero grade air or oxygen as required by the FID.

4.2 Calibration and Linearity Check.

4.2.1 Stock Cylinder Gas Standard. 100 percent propane. The manufacturer shall: (a)

certify the gas composition to be accurate to ± 3 percent or better (see section 4.2.1.1); (b) recommend a maximum shelf life over which the gas concentration does not change by greater than ± 5 percent from the certified value; and (c) affix the date of gas cylinder preparation, certified propane concentration, and recommended maximum shelf life to the cylinder before shipment to the buyer.

4.2.1.1 Cylinder Standards Certification. The manufacturer shall certify the concentration of the calibration gas in the cylinder by (a) directly analyzing the cylinder and (b) calibrating his analytical procedure on the day of cylinder analysis. To calibrate his analytical procedure, the manufacturer shall use, as a minimum, a three-point calibration curve.

4.2.1.2 Verification of Manufacturer's Calibration Standards. Before using, the manufacturer shall verify each calibration standard by (a) comparing it to gas mixtures prepared in accordance with the procedure described in section 7.1 of Method 106 of part 61, Appendix B, or by (b) calibrating it against Standard Reference Materials (SRM's) prepared by the National Bureau of Standards, if such SRM's are available. The agreement between the initially determined concentration value and the verification concentration value shall be within ± 5 percent. The manufacturer shall reverify all calibration standards on a time interval consistent with the shelf life of the cylinder standards sold.

5. Procedure

5.1 Sampling.

5.1.1 Sampling Plan Design and Development. Use the procedures in chapter nine of the Office of Solid Waste's publication, Test Methods for Evaluating Solid Waste, third edition (SW-846), as guidance in developing a sampling plan.

5.1.2 Sample according to the procedures in chapter nine of SV-846, or, if sampling from an enclosed pipe, sample according to the procedures described below.

5.1.2.1 The sampling apparatus designed to sample from an enclosed pipe is shown in Figure 1, and consists of an in-line static mixer, a tap, a cooling coil immersed in an ice bath, a flexible Teflon tube connected to the outlet of the cooling coil, and a sample container.

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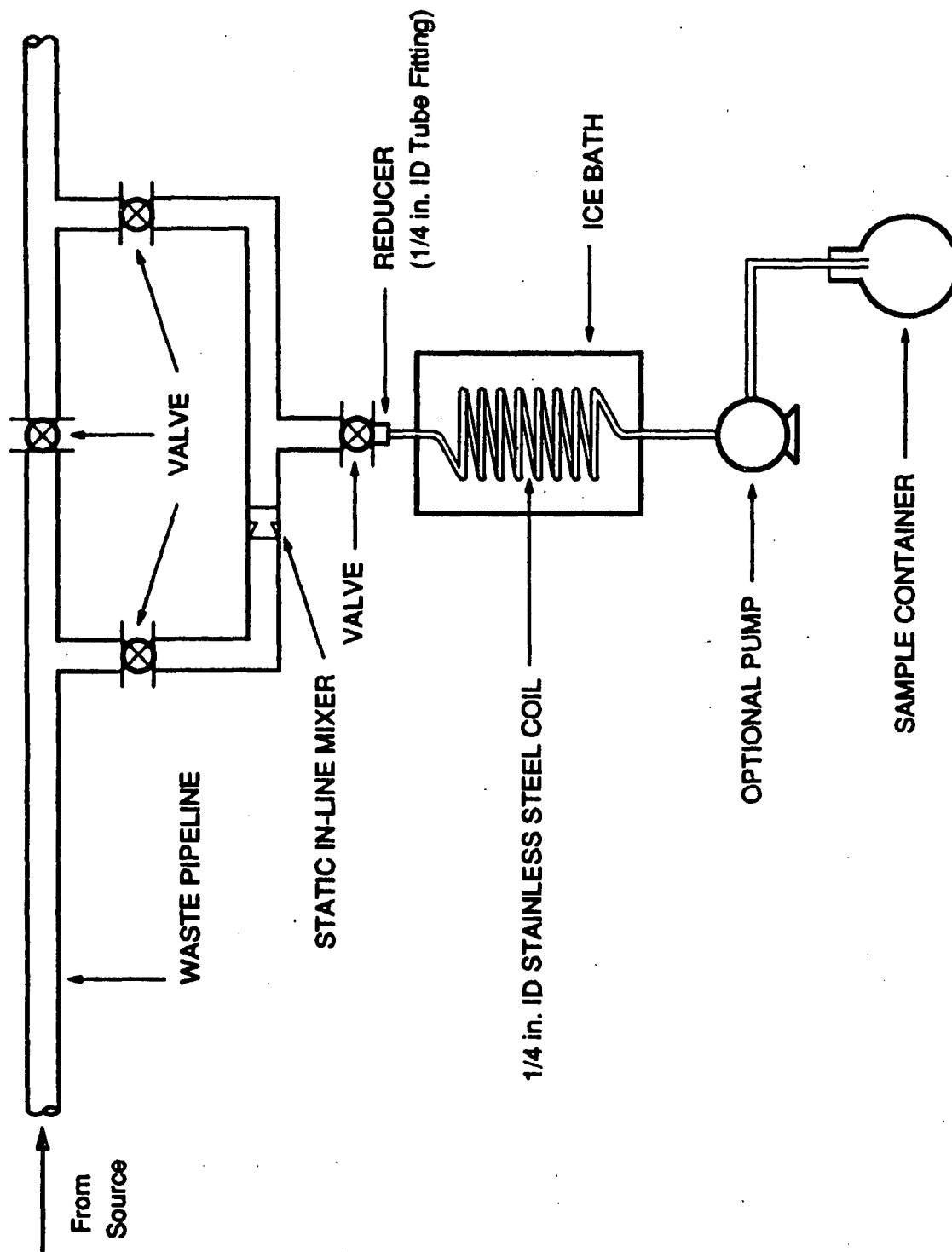


Figure 1. Schematic of Sampling Apparatus for Enclosed Pipe

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Locate the tap within two pipe diameters of the static mixer outlet. Install the static mixer in the process line or in a by-pass line.

5.1.2.2 Begin sampling by purging the sample lines and cooling coil with at least four volumes of waste. Collect the purged material in a separate container. Consider the purged material hazardous waste and dispose of it properly.

5.1.2.3 After purging, stop the sample flow and transfer the Teflon sampling tube to a sample container. Sample at a flow rate such that the temperature of the waste is <10 °C (<50 °F). Fill the sample container halfway (±5 percent) and cap it within 5 seconds.

5.1.2.4 Store the collected samples in ice or a refrigerator until analysis.

5.1.2.5 Alternative sampling techniques may be used upon the approval of the Administrator.

5.2 Analysis.

5.2.1 Allow one hour for the headspace vials to equilibrate at the temperature specified in the regulation. Allow the FID to warm up until a stable baseline is achieved on the detector.

5.2.2 Check the calibration of the FID daily using the procedures in Section 6.1.2.

5.2.3 Follow the manufacturer's recommended procedures for the normal operation of the headspace sampler and FID.

5.2.4 Use the procedures in sections 7.4 and 7.5 to calculate the vapor phase organic vapor pressure in the samples.

5.2.5 Monitor the output of the detector to make certain that the results are being properly recorded.

6. Operational Checks and Calibration

Maintain a record of performance of each item.

6.1 Use the procedures in section 6.1.1 to calibrate the headspace analyzer and FID and check for linearity before the system is first placed in operation, after any shutdown longer than 6 months, and after any modification of the system.

6.1.1 Calibration and Linearity. Use the procedures in section 6.2.1 of Method 18 of part 60, appendix A, to prepare the standards and calibrate the flowmeters, using propane as the standard gas. Fill the calibration standard vials halfway (±5 percent) with deionized water. Purge and fill the airspace calibration standards in triplicate at concentrations that will bracket the applicable cutoff. For a cutoff of 5.2 kPa (0.75 psi), prepare nominal concentrations of 30,000, 50,000, and 70,000 ppm as propane. For a cutoff of 27.6 kPa (4.0 psi), prepare nominal concentrations of 200,000, 300,000, and 400,000 ppm as propane.

6.1.1.1 Use the procedures in section 5.2.3 to measure the FID response of each standard. Use a linear regression analysis to calculate the values for the slope (k) and the y-intercept (b). Use the procedures in sections 7.2 and 7.3 to test the calibration and the linearity.

6.1.2 Daily FID Calibration Check. Check the calibration at the beginning and at the

end of the daily runs by using the following procedures. Prepare two calibration standards at the nominal cutoff concentration using the procedures in section 6.1.1. Place one at the beginning and one at the end of the daily run. Measure the FID response of the daily calibration standard and use the values for k and b from the most recent calibration to calculate the concentration of the daily standard. Use an equation similar to 25E-2 to calculate the percent difference between the daily standard and C_s. If the difference is within 5 percent, then the previous values for k and b may be used. Otherwise, use the procedures in section 6.1.1 to recalibrate the FID.

7. Calculations

7.1 Nomenclature.

- A=Measurement of the area under the response curve, counts.
- b=y-intercept of the linear regression line.
- C_s=Measured vapor phase organic concentration of sample, ppm as propane.
- C_{ma}=Average measured vapor phase organic concentration of standard, ppm as propane.
- C_m=Measured vapor phase organic concentration of standard, ppm as propane.
- C_s=Calculated standard concentration, ppm as propane.
- k=Slope of the linear regression line.
- P_{bar}=Atmospheric pressure at analysis conditions, mm Hg (in. Hg).
- p*=Organic vapor pressure in the sample, kPa (psi).
- β=1.333×10⁻⁷ kPa/[(mm Hg) (ppm)], (4.91×10⁻⁷ psi/[(in. Hg) (ppm)])

7.2 Linearity. Use the following equation to calculate the measured standard concentration for each standard vial.

$$C_m = k A + b \quad \text{Eq. 25E-1}$$

7.2.1 Calculate the average measured standard concentration (C_{ma}) for each set of triplicate standards and use the following equation to calculate the percent difference between C_{ma} and C_s.

$$\text{Percent Difference} = \frac{C_s - C_{ma}}{C_s} \times 100 \quad \text{Eq. 25E-2}$$

The instrument linearity is acceptable if the percent difference is within five for each standard.

7.3. Relative Standard Deviation (RSD). Use the following equation to calculate the RSD for each triplicate set of standards.

$$\text{RSD} = \frac{100}{C_{ma}} \frac{\sum(C_m - C_{ma})^2}{n-1} \quad \text{Eq. 25E-3}$$

The calibration is acceptable if the RSD is within five for each standard concentration.

7.4 Concentration of organics in the headspace. Use the following equation to calculate the concentration of vapor phase organics in each sample.

$$C_s = k A + b \quad \text{Eq. 25E-4}$$

7.5 Vapor Pressure of Organics in the Headspace Sample. Use the following equation to calculate the vapor pressure of organics in the sample.

$$p^* = \beta P_{bar} C_s \quad \text{Eq. 25E-5}$$

PART 260—HAZARDOUS WASTE MANAGEMENT SYSTEM: GENERAL

1. The authority citation for part 260 continues to read as follows:

Authority: 42 U.S.C. 6905, 6912(a), 6921-6927, 6930, 6934, 6935, 6937, 6938, 6939, and 6974.

2. Section 260.10 is amended by adding the following definitions in alphabetical order:

§ 260.10 Definitions.

* * * * *

Cover means a device or system which is placed on or over a waste being managed in a hazardous 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 hazardous waste management unit such as access hatches, sampling ports, and gauge wells, provided that each opening is closed and sealed when not in use. Examples of covers include a fixed roof installed on a tank, a floating membrane cover installed on a surface impoundment, a lid installed on a container, and an air-supported enclosure installed over a hazardous waste management unit.

* * * * *

External floating roof means a pontoon or double-deck type floating roof that rests on the surface of a waste being managed in a hazardous waste management unit that has no fixed roof.

* * * * *

Fixation means any physical or chemical process that either reduces the mobility of hazardous constituents in a waste or eliminates free liquids as determined by Test Method 9095 (Paint Filter Liquids Test) in "Test Methods for Evaluating Solid Waste, Physical/

Chemical Methods," EPA Publication No. SW-846. Fixation includes mixing the waste with binders or fixative materials, and curing the resulting waste and binder mixture. Other synonymous terms for fixation are stabilization and solidification.

Fixed roof means a rigid cover that is installed in a stationary position so that it does not move with fluctuations in the level of the waste placed in a hazardous waste management unit.

Floating roof means a cover consisting of a rigid deck or roof that rests upon and is supported by the waste being managed in a hazardous waste management unit, and is equipped with a closure seal or seals to close the space between the cover edge and the hazardous waste management unit wall.

Floating membrane cover means a cover consisting of a synthetic flexible membrane material that rests upon and is supported by the waste being managed in a hazardous waste management unit.

Internal floating roof means a floating roof that rests on the surface of a waste being managed in a hazardous 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 continuously around the circumference of the floating roof between the hazardous waste management unit wall and the edge of the floating roof.

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

Maximum organic vapor pressure means the equilibrium partial pressure exerted by a waste at the temperature equal to (1) the highest calendar-month average temperature of the waste if the temperature of the waste in the hazardous waste management unit is maintained at a temperature above or below the ambient temperature, or (2) the local maximum monthly average temperature as reported by the National Weather Service if the temperature of the waste in the hazardous waste management unit is maintained at the ambient temperature:

No detectable organic emissions means no escape of organics from a device or system to the atmosphere as determined by an instrument reading less than 500 ppm by volume (ppmv) above the background level at each joint, fitting, and seal when measured by

the methods specified in Reference Method 21 in 40 CFR part 60 appendix A, and by no visible openings or defects in the device or system such as rips, tears, or gaps.

Quiescent means a state in which a waste is managed without mixing, stirring, or shaking the waste using a device such as a mechanical mixer, agitator, aerator, or any system which creates flow induced turbulence.

Vapor-mounted seal means a foam-filled primary seal mounted continuously around the circumference of the hazardous waste management unit so that 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.

Volatile organic concentration means the concentration by weight of organic compounds in a hazardous waste as determined by Reference Method 25D in 40 CFR part 60 appendix A or Test Method 5100 in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication No. SW-846.

Waste dilution means the intentional or unintentional reduction in the organic concentration of a hazardous waste due to mixing the hazardous waste together with another hazardous waste, solid waste, or nonhazardous waste for any purpose.

3. Paragraph (a) of § 260.11 is amended by adding the following references:

§ 260.11 References.

(a) * * * "ASTM Standard Test Method for Vapor Pressure—Temperature Relationship and Initial Decomposition Temperature for Liquids by Isoteniscope," ASTM Standard D-2879-83, available from American Society for Testing and Materials (ASTM), 1916 Race Street, Philadelphia, Pennsylvania 19103;

"Evaporation Loss from External Floating Roof Tanks," API Bulletin 2517 [Second Edition (February 1980)], available from the American Petroleum Institute, 1220 L St., NW., Washington, DC 20037.

PART 264—STANDARDS FOR OWNERS AND OPERATORS OF HAZARDOUS WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES

4. The authority citation for part 264 continues to read as follows:

Authority: 42 U.S.C. 6905, 6912(a), 6924 and 6925.

Subpart B—General Facility Standards

§ 264.13 [Amended]

5-7. In § 264.13, paragraph (b)(6) is amended by adding "264.1082," after the phrase "as specified in §§ 264.17, 264.314, 264.341, 264.1034(d), 264.1063(d)."

8. In § 264.13, paragraph (b)(8) is added to read as follows:

§ 264.13 General waste analysis.

(b) * * * (8) For owners and operators seeking an exception to the air emission standards of subpart CC in accordance with § 264.1081—

(i) The procedures and schedules for waste sampling and analysis, and the analysis of test data to verify the exception.

(ii) Each generator's notice and certification of the volatile organic concentration in the waste if the waste is received from off site.

§ 264.15 [Amended]

9. In § 264.15, paragraph (b)(4) is amended by removing the word "and" after the phrase "frequencies called for in §§ 264.174, 264.194, 264.226, 264.253, 264.254, 264.303, 264.347, 264.602, 264.1033, 264.1052, 264.1053," and inserting "264.1086, 264.1087, and 264.1090(b)," after "264.1058,".

Subpart E—Manifest System, Recordkeeping, and Reporting

10. Section 264.73 is amended by revising paragraphs (b)(3) and (b)(6) to read as follows:

§ 264.73 Operating record.

(b) * * * (3) Records and results of waste determinations performed as specified in §§ 264.13, 264.17, 264.314, 264.341, 264.1034, 264.1063, 264.1082, 268.4(a), and 268.7 of this chapter.

(6) Monitoring, testing or analytical data, and corrective action where required by subpart F and §§ 264.226, 264.253, 264.254, 264.276, 264.278, 264.280,

264.303, 264.309, 264.347, 264.602,
264.1034(c)-(f), 264.1035, 264.1063(d)-(i),
264.1064, 264.1088, and 264.1090(b).

11. Section 264.77 is amended by
revising paragraph (c) to read as
follows:

§ 264.77 Additional reports.

(c) As otherwise required by subparts
F, K through N, AA, BB, and CC.

**Subpart I—Use and Management of
Containers**

12. Section 264.179 is added to read as
follows:

§ 264.179 Air Emission Standards.

Containers shall be managed in
compliance with the air emission
standards provided in subpart CC of this
part.

Subpart J—Tank Systems

13. Section 264.200 is added to read as
follows:

§ 264.200 Air emission standards.

Tanks shall be managed in
compliance with the air emission
standards provided in subpart CC of this
part.

Subpart K—Surface Impoundments

14. Section 264.232 is added to read as
follows:

§ 264.232 Air emission standards.

Surface impoundments shall be
managed in compliance with the air
emission standards provided in subpart
CC of this part.

Subpart X—Miscellaneous Units

§ 264.601 [Amended]

15. The introductory text of § 264.601
is amended by inserting the words "and
subparts AA through CC" after
"subparts I through O".

**Subpart AA—Air Emission Standards
for Process Vents**

16. Section 264.1033 is amended by
adding paragraph (m) to read as follows:

**§ 264.1033 Standards: Closed-vent
systems and control devices.**

(m) The owner or operator using a
carbon adsorption system shall certify
that all carbon removed from a carbon
adsorption system to comply with
§ 264.1033(g)-(h) of this part is either:

(1) Regenerated or reactivated by a
process that minimizes emissions of
organics to the atmosphere. (Note: EPA

interprets "minimizes" as used in this
paragraph to include the application of
effective control devices such as those
required in this subpart); or

(2) Incinerated by a process that
achieves the performance standards
specified in subpart O of this part.

17. In 40 CFR part 264, subpart CC is
added to read as follows:

**Subpart CC—Air Emission Standards for
Tanks, Surface Impoundments, and
Containers**

Sec.	
264.1080	Applicability.
264.1081	Exceptions to the standards.
264.1082	Waste determinations.
264.1083	Standards: tanks.
264.1084	Standards: surface impoundments.
264.1085	Standards: containers.
264.1086	Standards: closed vent systems and control devices.
264.1087	Monitoring and inspection requirements.
264.1088	Recordkeeping requirements.
264.1089	Reporting requirements.
264.1090	Alternative control requirements for tanks.

**Subpart CC—Air Emission Standards
for Tanks, Surface Impoundments, and
Containers**

§ 264.1080 Applicability.

(a) The regulations in this subpart
apply to owners and operators of
facilities that treat, store, or dispose of
hazardous waste in units that are
subject to subparts I, J, K, and X of this
part except as provided in § 264.1. of
this part.

(b) For owners or operators meeting
the applicability requirement in
paragraph (a) of this section who
received a final permit under section
3005 of RCRA prior to the effective date
of this rule (8 months after the
promulgation date of the final rule):

(1) The requirements of this subpart
shall be incorporated into the permit
when the permit is reissued under
§ 124.15 or reviewed under § 270.50(d).

(2) Until permit reissue or review, the
requirements of subpart CC in part 265
of this title apply.

§ 264.1081 Exceptions to the standards.

(a) A hazardous waste management
unit is excepted from standards
pursuant to §§ 264.1083, 264.1084, and
264.1085 of this subpart provided that
the owner or operator meets all of the
following requirements:

(1) Determines in accordance with the
procedures specified in § 264.1082 of this
subpart that the waste placed in the
hazardous waste management unit at all
times has a volatile organic
concentration less than 500 parts per
million by weight (ppmw) at either:

(i) A point before the waste is first
exposed to the atmosphere such as in
enclosed pipe or other closed system
that is used to transfer the waste after
generation to the first hazardous waste
management unit; or

(ii) The outlet from a treatment unit
that:

(A) Removes or destroys organics in
the waste using a means other than by
waste dilution or evaporation into the
atmosphere; and

(B) Is in compliance with all
applicable standards in this part.

(2) Performs the waste determination
required by paragraph (a)(1) of this
section at least once per year and
whenever the process, operation, or
source generating the waste changes in
such a manner that the volatile organic
concentration of the waste may change.

(b) An owner or operator may place
waste in a hazardous waste
management unit without the control
equipment specified in §§ 264.1083,
264.1084, and 264.1085 of this subpart
provided that the owner or operator
provides documentation certifying that
the waste placed in the hazardous waste
management unit complies with the
applicable treatment standards for
organic-containing waste pursuant to
the requirements of subpart D in part
268 of this title.

§ 264.1082 Waste determinations.

(a) Waste volatile organic
concentration determination for an
exception under § 264.1081(a)(1)(i) of
this subpart.

(1) The owner or operator shall use
either direct measurement, knowledge of
the waste, or waste certification to
determine the volatile organic
concentration of the waste in
accordance with the following
requirements:

(i) *Direct measurement.* (A) All waste
samples shall be collected at a point
before the waste is first exposed to the
atmosphere and at a time when the
maximum volatile organic concentration
in the waste stream is expected to occur.
The sampling program shall be
conducted in accordance with the
requirements specified in "Test Methods
for Evaluating Solid Waste, Physical/
Chemical Methods," EPA Publication
No. SW-848.

(B) A minimum of four representative
samples shall be collected and analyzed
using the test procedures specified in
Reference Method 25D in 40 CFR part 60
appendix A or Test Method 5100 in
"Test Methods for Evaluating Solid
Waste, Physical/Chemical Methods,"
EPA Publication No. SW-848; and the

calculation procedure specified in appendix X of this part.

(C) If the waste volatile organic concentration determined in paragraph (a)(1)(i)(B) of this section is less than 500 ppmw, then the waste may be placed in a hazardous waste management unit pursuant to § 264.1081(a) of this subpart.

(ii) *Knowledge of the waste.* The owner or operator shall provide sufficient information to document that the volatile organic concentration of the waste at all times is less than 500 ppmw. Examples of information that may be used include documentation that the waste is generated by a process for which no organics-containing materials are used, or the waste is generated by a process for which it previously has been determined by direct measurement at other locations using the same type of process that the waste has a volatile organic concentration less than 500 ppmw.

(iii) *Waste Certification.* If an owner or operator cannot perform the waste determination at a point before the waste is first exposed to the atmosphere because the waste is generated off site, then the owner or operator may determine the waste volatile organic concentration upon receiving the waste from the generator provided the waste is accompanied by:

(A) A notice that includes the following information:

(1) EPA Hazardous Waste Number,
(2) Manifest number associated with the shipment of hazardous waste, and
(3) Volatile organic concentration waste determination results obtained in accordance with the methods specified in paragraph (a)(1)(i) or (a)(1)(ii) of this section.

(B) Certification that is signed and dated by an authorized representative of the generator and states the following:

I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste, and I support this certification that the waste does not exceed a volatile organic concentration of 500 ppmw. I believe that the information submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.

(2) The Regional Administrator may request at any time that the owner or operator perform a waste determination in accordance with paragraph (a)(1)(i) of this section. A result from the waste determination requested by the Regional Administrator indicating that the waste volatile organic concentration is equal to or greater than 500 ppmw shall be conclusive evidence that each hazardous waste management unit in

which the waste has been placed is not excepted from standards pursuant to §§ 264.1083, 264.1084, and 264.1085 of this subpart.

(b) Waste determination of volatile organic concentration for an exception under § 264.1081(a)(1)(ii) of this subpart.

(1) The owner or operator shall use either direct measurement or knowledge of the waste to determine the volatile organic concentration of the waste at the outlet of the treatment unit and whether waste dilution was used to achieve this concentration in accordance with the following requirements:

(i) *Direct measurement.* (A) Determination of the volatile organic concentration of the waste at the outlet from the treatment unit.

(1) All waste samples shall be collected at the treatment unit outlet and at a time when the maximum volatile organic concentration in the waste stream is expected to occur. The sampling program shall be conducted in accordance with the requirements specified in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication No. SW-846.

(2) A minimum of four representative samples shall be collected and analyzed using the test procedures specified in Reference Method 25D in 40 CFR part 60 appendix A or Test Method 5100 in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication No. SW-846; and the calculation procedure specified in appendix X of this part.

(B) Determination that no waste dilution has occurred.

(1) Representative waste samples for each waste stream entering and exiting the treatment unit shall be collected as near in time as possible. The sampling program shall be conducted in accordance with the requirements specified in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication No. SW-846.

(2) The samples shall be analyzed using the test procedures specified in Reference Method 25D in 40 CFR part 60 appendix A or Test Method 5100 in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication No. SW-846 to determine the volatile organic concentration of each waste stream entering and exiting the treatment unit. A weighted average volatile organic concentration for all of the waste streams entering the treatment unit shall be calculated using the procedure specified in appendix XI of this part.

(3) If the weighted average volatile organic concentration for all streams entering the treatment unit is greater than the volatile organic concentration for the waste stream exiting the treatment unit as determined in accordance with paragraph (b)(1)(i)(B)(2) of this section, then no waste dilution has occurred.

(C) If the waste volatile organic concentration at the outlet of the treatment unit as determined in paragraph (b)(1)(i)(A) of this section is less than 500 ppmw and no waste dilution has occurred as determined in paragraph (b)(1)(i)(B) of this section, then the waste may be placed in a hazardous waste management unit in accordance with § 264.1081(a) of this subpart.

(ii) *Knowledge of the waste.* The owner or operator shall provide sufficient information to document that the volatile organic concentration of the waste exiting the treatment unit is less than 500 ppmw at all times and that no waste dilution has occurred.

(2) The Regional Administrator may request at any time that the owner or operator perform a waste determination in accordance with paragraph (b)(1)(i) of this section. A result from the waste determination requested by the Regional Administrator indicating that the waste volatile organic concentration is equal to or greater than 500 ppmw or that waste dilution has occurred shall be conclusive evidence that each hazardous waste management unit in which the waste has been placed is not excepted from standards pursuant to §§ 264.1083, 264.1084, and 264.1085 of this subpart.

(c) Waste determination of maximum organic vapor pressure for a tank having a design capacity equal to or greater than 75 m³ in accordance with § 264.1083(b)(2) of this subpart.

(1) The owner or operator shall use either direct measurement or knowledge of the waste to determine the maximum organic vapor pressure of the waste in accordance with the following requirements:

(i) *Direct measurement.* (A) All waste samples shall be collected at the inlet to the tank. Sampling shall be conducted in accordance with the requirements specified in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication No. SW-846.

(B) Any one of the following methods may be used to analyze the samples and compute the maximum organic vapor pressure:

(1) Reference Method 25E in 40 CFR part 60 appendix A or Test Method 5110

in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication No. SW-846;

(2) Methods described in American Petroleum Institute Bulletin 2517, "Evaporation Loss from External Floating Roof Tanks," (incorporated by reference—refer to § 260.11);

(3) Methods obtained from standard reference texts;

(4) ASTM Method 2879-83 (incorporated by reference—refer to § 260.11); or

(5) Any other method approved by the Regional Administrator.

(ii) *Knowledge of the waste.* The owner or operator shall provide sufficient information to document that the maximum organic vapor pressure at all times is less than the maximum vapor pressure limit for the appropriate tank design capacity category specified in § 264.1083(b)(2)(i)(D). Examples of information that may be used include documentation that the waste is generated by a process for which no organics-containing materials are used, or the waste is generated by a process for which at other locations it previously has been determined by direct measurement that the waste maximum organic vapor pressure is less than the maximum vapor pressure limit for the appropriate tank design capacity category specified in § 264.1083(b)(2)(i)(D) of this subpart.

(2) The Regional Administrator may request at any time that the owner or operator perform a waste determination in accordance with paragraph (c)(1)(i) of this section. A result from the waste determination requested by the Regional Administrator indicating that the waste maximum organic vapor pressure exceeds the appropriate maximum organic vapor pressure limit for the appropriate tank design capacity category specified in § 264.1083(b)(2)(i)(D) shall be conclusive evidence that each tank in which the waste has been placed is not excepted from requirements pursuant to § 264.1083(b)(1) of this subpart.

§ 264.1083 Standards: tanks.

(a) *Applicability.* This section applies to the owner or operator of a facility where hazardous waste is placed in tanks except as provided in § 264.1081 of this subpart.

(b) Design and operation of control equipment.

(1) The owner or operator shall meet one of the following control equipment requirements except as provided in paragraph (b)(2) of this section:

(i) Install, operate, and maintain a fixed roof cover and closed vent system

that routes the organic vapors vented from the tank to a control device.

(A) The fixed roof shall meet the following requirements:

(1) The cover and all cover openings (e.g., access hatches, sampling ports, and gauge wells) shall be designed to operate with no detectable organic emissions.

(2) Each cover 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 loading, removal, inspection, or sampling.

(B) The closed vent system and control device shall be designed and operated in accordance with the requirements of § 264.1085 of this subpart.

(ii) Install, operate, and maintain a pressurized tank that is designed to operate at a pressure in excess of 204.9 kPa (29.7 psi) and that operates with no detectable organic emissions.

(iii) Install, operate, and maintain alternative control equipment in accordance with the requirements of § 264.1090 of this subpart.

(2) As an alternative to the control equipment specified in paragraph (b)(1) of this section, an owner or operator may install, operate, and maintain on a tank that meets all of the conditions specified in paragraph (b)(2)(i) of this section a fixed roof as specified in paragraph (b)(2)(ii) of this section.

(i) The waste placed in the tank shall meet the following conditions:

(A) The waste is quiescent at all times that the waste is managed in the tank;

(B) The waste is not managed in the tank using a waste fixation process;

(C) The waste is not managed in the tank using a process that requires the addition of heat to the waste or produces an exothermic reaction; and

(D) The waste is either:

(1) Placed in a tank having a design capacity less than 75 m³ (19,789 gal);

(2) Placed in a tank having a design capacity greater than or equal to 75 m³ (19,789 gal) but less than 151 m³ (39,841 gal), and the waste has a maximum organic vapor pressure less than 27.6 kPa (4.0 psi); or

(3) Placed in a tank having a design capacity greater than or equal to 151 m³ (39,841 gal), and the waste has a maximum organic vapor pressure less than 5.2 kPa (0.75 psi).

(ii) The fixed roof shall meet the following requirements:

(A) The cover and all cover openings (e.g., access hatches, sampling ports, and gauge wells) shall be designed to operate with no detectable organic emissions.

(B) Each cover vent that discharges to the atmosphere shall be equipped with a pressure-relief valve, a pressure-vacuum valve, a pilot-operated relief valve, or equivalent pressure-relief device. The device shall be operated so that no detectable organic emissions occur from the vent except during periods when conditions such as filling or emptying the tank or diurnal temperature changes require venting of the tank to prevent physical damage or permanent deformation of the tank or cover.

(C) Each cover 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 loading, removal, inspection, or sampling.

(3) No waste shall be placed in the tank whenever control equipment specified in paragraphs (b)(1) or (b)(2) of this section is not in operation.

(c) The owner and operator shall install, operate, and maintain enclosed pipes or other closed systems to:

(1) Transfer waste to the tank from all other hazardous waste management units subject to standards pursuant to §§ 264.1083, 264.1084, and 264.1085 of this subpart, and

(2) Transfer waste from the tank to all other hazardous waste management units subject to standards pursuant to §§ 264.1083, 264.1084, and 264.1085 of this subpart.

§ 264.1084 Standards: surface impoundments.

(a) *Applicability.* This section applies to the owner or operator of a facility where hazardous waste is placed in surface impoundments, except as provided in § 264.1081 of this subpart.

(b) Design and operation of control equipment.

(1) The owner or operator shall install, operate, and maintain on each surface impoundment a cover (e.g., air-supported structure, rigid cover) and closed vent system that routes all organic vapors vented from the surface impoundment to a control device except as provided in paragraph (b)(2) of this section:

(i) The cover shall meet the following requirements:

(A) The cover and all cover openings (e.g., access hatches, sampling ports, and gauge wells) shall be designed to operate with no detectable organic emissions.

(B) Each cover 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 loading, removal, inspection, or sampling, or for equipment inspection, maintenance, or repair.

(ii) The closed vent system and control device shall be designed and operated in accordance with § 264.1086 of this subpart.

(2) As an alternative to the control equipment specified in paragraph (b)(1) of this section, an owner or operator may install, operate, and maintain on a surface impoundment that meets all of the conditions specified in paragraph (b)(2)(i) of this section either a floating membrane cover as specified in paragraph (b)(2)(ii) of this section or a cover as specified in paragraph (b)(2)(iii) of this section.

(i) The waste placed in the surface impoundment shall meet the following conditions:

(A) The waste is quiescent at all times that the waste is managed in the surface impoundment;

(B) The waste is not managed in the surface impoundment using a waste fixation process;

(C) The waste is not managed in the surface impoundment using a process that requires the addition of heat to the waste or produces an exothermic reaction.

(ii) The floating membrane cover shall meet the following requirements:

(A) Be designed, constructed, and installed so that when the surface impoundment is filled to capacity, the waste surface area is covered completely;

(B) The floating membrane cover and all cover openings (e.g., access hatches, sampling ports, and gauge wells) shall be designed to operate with no detectable organic emissions.

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

(D) The synthetic membrane material used for the floating membrane cover shall be either:

(1) High density polyethylene with a thickness no less than 2.5 mm (100 mils), or

(2) A material or a composite of different materials determined to have all of the following:

(i) Organic permeability properties that are equivalent to those of the material specified in paragraph (b)(2)(ii)(D)(1) of this section, and

(ii) Chemical and physical properties that maintain the material integrity for as long as the cover is in use. Factors

that shall be considered in selecting the material include: the effects of contact with the waste managed in the impoundment, weather exposure, and cover installation and operation practices.

(iii) The cover shall meet the following requirements:

(A) The cover and all cover openings (e.g., access hatches, sampling ports, and gauge wells) shall be designed to operate with no detectable organic emissions.

(B) The waste surface shall be completely enclosed by the cover and the air space underneath the cover shall not be vented to the atmosphere.

(3) No waste shall be placed in the surface impoundment whenever control equipment specified in paragraph (b)(1) or (b)(2) of this section is not in operation.

(c) The cover shall be used at all times that any waste is placed in the surface impoundment except during removal of treatment residues in accordance with § 268.4 of this title or closure of the surface impoundment in accordance with § 264.228 of this part.

(d) The owner or operator shall install, operate, and maintain enclosed pipes or other closed systems to:

(1) Transfer waste to the surface impoundment from all other hazardous waste management units subject to standards pursuant to §§ 264.1083, 264.1084, and 264.1085 of this subpart, and

(2) Transfer waste from the surface impoundment to all other hazardous waste management units subject to standards pursuant to §§ 264.1083, 264.1084, and 264.1085 of this subpart.

§ 264.1085 Standards: containers.

(a) *Applicability.* This section applies to the owner or operator of a facility where hazardous waste is placed in containers except as provided in § 264.1081 of this subpart.

(b) *Design and operation of control equipment.* (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:

(A) The cover and all cover openings (e.g., bungs, hatches, and sampling ports) shall be designed to operate with no detectable organic emissions.

(B) Each cover 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) Treatment of a waste in a container by either waste fixation, a process that requires the addition of heat to the waste, or a process that produces an exothermic reaction shall be performed by the owner or operator in a manner such that during the treatment process whenever it is necessary for the container to be open, the container is located under a cover (e.g., hood, enclosure) with a closed vent system that routes all organic vapors vented from the container to a control device.

(i) The cover and all cover openings (e.g., doors, hatches) shall be designed to operate with no detectable organic emissions.

(ii) The closed vent system and control device shall be designed and operated in accordance with § 264.1086 of this subpart.

(3) The owner or operator shall load pumpable waste into a container using a submerged fill pipe placed so that the outlet extends 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 cover openings shall be maintained in a closed, sealed position except for those cover 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.

§ 264.1086 Standards: closed vent systems and control devices.

(a) *Applicability.* This section applies to the owner or operator of a facility where a closed vent system and control device is used to comply with standards pursuant to §§ 264.1083, 264.1084, or 264.1085 of this subpart.

(b) The owner or operator shall properly design, install, operate, and maintain each closed vent system and control device in accordance with the following requirements:

(1) The closed vent system shall operate with no detectable organic emissions at all times that any waste is in the hazardous waste management unit being controlled.

(2) The control device shall operate at the conditions that reduce the organics in the gas stream vented to it by at least 95 percent by weight or at the conditions specified in § 264.1033 (c) and (d) of this part at all times that any waste is in the hazardous waste management unit being controlled.

(c) The owner or operator shall determine that each control device achieves the appropriate conditions specified in paragraph (b)(2) of this

section in accordance with the following requirements:

(1) The owner or operator of a control device other than a flare or carbon adsorption system shall use one of the following methods:

(i) Engineering calculations in accordance with requirements specified in § 264.1035(b)(4)(iii) of this part; or

(ii) Performance tests performed using the test methods and procedures in accordance with requirements specified in § 264.1034 (c)(1)-(c)(4) of this part.

(2) The owner or operator of a flare shall use the method specified in § 264.1033(e) of this part.

(3) The owner or operator of a carbon adsorption system shall use either one of the methods specified in paragraph (c)(1)(i) or (c)(1)(ii) of this section based on the total quantity of organics vented to the atmosphere from all carbon adsorption system equipment that is used for organic adsorption, organic desorption or carbon regeneration, organic recovery, and carbon disposal.

(d) If the owner or operator and the Regional Administrator do not agree on a determination using engineering calculations of a control device organic emission reduction or, for external combustion devices, organic compound concentrations, then the disagreement shall be resolved based on the results of performance tests performed by the owner or operator using the test methods and procedures as required in § 264.1034 (c)(1)-(c)(4) of this part. The Regional Administrator may elect to have an authorized representative observe the performance tests.

(e) The owner or operator using a carbon adsorption system shall comply with § 264.1033 (g) and (h) of this part, and shall certify that all carbon removed from the carbon adsorption system is either:

(1) Regenerated or reactivated by a process that minimizes emissions of organics to the atmosphere. (Note: EPA interprets "minimizes" as used in this paragraph to include the application of effective control devices such as those required in this subpart); or

(2) Incinerated by a process that achieves the performance standards specified in subpart 0 of this part.

§ 264.1087 Monitoring and Inspection requirements.

(a) Applicability. This section applies to the owner or operator of a facility where control equipment is used pursuant to §§ 264.1083, 264.1084, or 264.1085 of this subpart.

(b) The owner or operator shall monitor and inspect each cover, except for internal floating roofs and external floating roofs complying with § 264.1090,

in accordance with the following requirements:

(1) The owner or operator shall visually inspect each cover initially upon installation of the cover and thereafter at least once per week. The visual inspection shall include inspection of fabric and sealing material on all openings for evidence of visible defects such as rips, gaps, or tears. If visible defects are observed during an inspection, then a leak is detected and the leak shall be repaired in accordance with paragraph (b)(3) of this section.

(2) The owner or operator shall monitor each cover in the following manner:

(i) Each cover connection and seal shall be monitored initially upon installation of the cover and thereafter at least once every six months in accordance with Reference Method 21 in 40 part 60 appendix A.

(ii) If the monitoring instrument indicates detectable emissions (i.e., a concentration above 500 ppmv), then a leak is detected and the leak shall be repaired in accordance with paragraph (b)(3) of this section.

(iii) Seals on floating membrane covers shall be monitored around the entire perimeter of the cover at locations spaced no greater than 3 meters apart.

(3) When a leak is detected by either of the methods specified in paragraphs (b)(1) or (b)(2) of this section, the owner or operator shall repair the leak in the following manner:

(i) Repair of the leak shall be completed as soon as practicable, but no later than 15 calendar days after the leak is detected. If repairs cannot be completed within 15 days except as provided in paragraph (b)(3)(iii) of this section, the owner or operator shall not add waste to the hazardous waste management unit until the repair is complete.

(ii) A first attempt at repair of each leak shall be made no later than 5 calendar days after the leak is detected.

(iii) Repair of control equipment installed to comply with § 264.1084(b) of this subpart and for which leaks have been detected may be delayed beyond 15 calendar days if the owner or operator documents that the repair cannot be completed without a complete or partial facility or surface impoundment shutdown and that delaying the repair would not cause the control equipment to be significantly less protective of human health and the environment. Repair of this control equipment shall be completed before the end of the next facility or surface impoundment shutdown.

(c) The owner or operator shall monitor and inspect each closed vent

system and control device in accordance with the following requirements:

(1) The owner or operator shall monitor each control device in accordance with §§ 264.1033(f)(1) and 264.1033 (f)(2) of this part. The owner or operator shall inspect at least once each operating day all data recorded by the control device monitoring equipment (e.g., temperature monitors) to check that the control devices are being operated in compliance with this subpart.

(2) The owner or operator shall visually inspect each closed vent system and control device installed initially upon installation of the equipment and thereafter at least once per week. The visual inspection shall include inspection of ductwork and piping and their connections to covers and control devices for evidence of visible defects such as holes in ductwork or piping and loose connections. If visible defects are observed during an inspection, the closed vent system and control device shall be repaired in accordance with paragraph (c)(4) of this section.

(3) The owner or operator shall monitor each closed vent system and control device in the following manner:

(i) Each cover connection and seal shall be monitored initially upon installation of the equipment and thereafter at least once every year in accordance with Reference Method 21.

(ii) If the monitoring instrument indicates detectable emissions (i.e., a concentration above 500 ppmv), then a leak is detected and the leak shall be repaired in accordance with paragraph (c)(4) of this section.

(4) When a defect or leak is detected by either of the methods specified in paragraph (c)(2) or (c)(3) of this section, the owner or operator shall repair the defect or leak in the following manner:

(i) Repair of the defect or leak shall be completed as soon as practicable, but no later than 15 calendar days after the defect or leak is detected. If repairs cannot be completed within 15 days, then the owner or operator shall not add waste to the hazardous waste management unit until the repair is complete.

(ii) A first attempt at repair of each defect or leak shall be made no later than 5 calendar days after the defect or leak is detected.

(d) The owner or operator shall develop and follow a written schedule for all monitoring and inspection requirements of this section used to comply with this subpart. The owner or operator shall incorporate this schedule into the facility inspection plan described in § 264.15 of this part.

§ 264.1083 Recordkeeping requirements.

(a) An owner or operator placing waste in a hazardous waste management unit using control equipment pursuant to §§ 264.1083, 264.1084, or 264.1085 of this subpart shall record the following information:

(1) Engineering design documentation for each cover that includes:

- (i) Cover type,
- (ii) Cover manufacturer's name and model number,
- (iii) Cover dimensions,
- (iv) Materials used to fabricate cover,
- (v) Mechanism used to install cover on the waste management unit and seal the cover perimeter,
- (vi) Type, size, and location of each cover opening, and
- (vii) Mechanism used to close and seal each cover opening identified in paragraph (a)(1)(vi) of this section

(2) Documentation for each closed vent system and control device that includes:

(i) Certification that is signed and dated by the owner or operator stating that the control device is designed to operate at the performance level documented by paragraph (a)(2)(ii) or (a)(2)(iii) of this section when the hazardous waste management unit is or would be operating at capacity or the highest level reasonably expected to occur.

(ii) If engineering calculations are used, then design documentation as specified in § 264.1035(b)(4) of this part. Documentation provided by the control device manufacturer or vendor that describes the control device design in accordance with § 264.1035(b)(4)(iii) of this part and certifies that the control equipment meets the specifications may be used to comply with this requirement.

(iii) If performance tests are used, then a performance test plan as specified in § 264.1035(b)(3) of this part and all test results.

(iv) Information as required by § 264.1035 (c)(1) and (c)(2).

(3) Records for all visual inspections conducted in accordance with § 264.1087 of this subpart.

(4) Records for all Reference Method 21 monitoring conducted in accordance with § 264.1087 of this subpart.

(5) Records for all continuous monitoring conducted in accordance with § 264.1087 of this subpart.

(b) An owner or operator placing waste having a volatile organic concentration equal to or greater than 500 ppmw in a tank pursuant to § 264.1083(b)(2) of this subpart shall record the following information for each tank:

(1) Date, time, and location each waste sample is collected for direct

measurement waste determination of maximum organic vapor pressure in accordance with § 264.1082 of this subpart.

(2) Results of each waste determination for maximum organic vapor pressure performed in accordance with § 264.1082(c) of this subpart.

(3) Records specifying the tank dimensions and design.

(4) If the maximum organic vapor pressure of the waste placed in the tank exceeds the maximum organic vapor pressure limit for the tank's design capacity category specified in § 264.1083(b)(2)(i)(D) of this subpart, then an explanation of the reason or reasons why the waste was not managed in accordance with this subpart.

(c) An owner or operator placing waste in a hazardous waste management unit pursuant to § 264.1081(a)(1)(i) of this subpart shall record the following information for each waste management unit:

(1) Date, time, and location that each waste sample is collected for direct measurement waste determination of volatile organic concentration in accordance with § 264.1081(a) of this subpart.

(2) All waste determination volatile organic concentration results from either direct measurements performed in accordance with § 264.1082(a)(1)(i) of this subpart or knowledge documented in accordance with § 264.1082(a)(1)(ii) of this subpart.

(3) If the volatile organic concentration of the waste placed in the waste management unit is equal to or greater than 500 ppmw, then an explanation of the reason or reasons why the waste was not managed in accordance with this subpart.

(d) An owner or operator placing waste in a hazardous waste management unit pursuant to § 264.1081(a)(1)(ii) of this subpart shall record the following information for each waste management unit:

(1) Date, time, and location that each waste sample is collected for direct measurement determination of volatile organic concentration in accordance with § 264.1081(a) of this subpart.

(2) All waste determination volatile organic concentration results from either direct measurements performed in accordance with § 264.1082(b)(1)(i) of this subpart or knowledge documented in accordance with § 264.1082(b)(1)(ii) of this subpart.

(3) If the volatile organic concentration of the waste placed in the waste management unit is equal to or greater than 500 ppmw, then an explanation of the reason or reasons

why the waste was not managed in accordance with this subpart.

(e) All records required by paragraphs (a), (b), (c) and (d) of this section except as required in paragraphs (a)(3), (a)(4), and a(5) shall be maintained in the operating record until closure of the facility. All records required by paragraph (a)(3), (a)(4), and (a)(5) of this section shall be maintained in the operating record for a minimum of three years.

(f) The owner or operator of any facility that is subject to this subpart and to the control device regulations in 40 CFR 60 subpart VV, or 40 CFR 61 subpart V, may elect to demonstrate compliance with this subpart by documentation either pursuant to this subpart, or pursuant to the provisions of 40 CFR part 60 or 61, to the extent that the documentation under 40 CFR part 60 or part 61 duplicates the documentation required under this subpart.

(Approved by the Office of Management and Budget under control number 2080—)

§ 264.1089 Reporting requirements.

(a) The owner or operator of a facility where a hazardous waste management unit is excepted from standards pursuant to § 264.1081(a) shall report the results of each waste determination completed in accordance with § 264.1082 (a) or (b) whenever the volatile organic concentration of the waste placed in the hazardous waste management unit is equal to or greater than 500 ppmw. The report shall be signed and dated by an authorized representative of the owner or operator, and include the EPA identification number, facility name and address, and an explanation of the reason or reasons why the waste was not managed in accordance with this subpart. The owner or operator shall submit this report to the Regional Administrator within 30 calendar days after the owner or operator has completed the determination. Failure to report shall constitute noncompliance with this subpart.

(b) The owner or operator of a facility where a tank is excepted from standards pursuant to § 264.1083(b)(2) shall report the results of each waste determination completed in accordance with § 264.1082(c) whenever the maximum organic vapor pressure of the waste placed in the tank exceeds the maximum organic vapor pressure limit for the tank's design capacity category specified in § 264.1083(b)(2)(i)(D). The report shall be signed and dated by an authorized representative of the owner or operator, and include the EPA identification number, facility name and address, and an explanation of the

reason or reasons why the waste was not managed in accordance with this subpart. The owner or operator shall submit this report to the Regional Administrator within 30 calendar days after the owner or operator has completed the determination. Failure to report shall constitute noncompliance with this subpart.

(c) The owner or operator of a facility where a control device is used to comply with §§ 264.1083, 264.1084, or 264.1085 of this subpart shall report each occurrence when a control device is operated continuously at conditions which exceed for 24 hours or longer the appropriate control device operating values defined in § 264.1035(c)(4) of this part or that a flare is operated with visible emissions as defined in § 264.1033(d). The owner or operator shall submit this report to the Regional Administrator at least once every six month period. The report shall be signed and dated by an authorized representative of the owner or operator, and include the EPA identification number, facility name and address, and an explanation why the control device could not be returned to proper operation within 24 hours.

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

§ 264.1090 Alternative control requirements for tanks.

(a) The owner or operator of a hazardous waste management facility that manages waste in tanks may install and operate one of the following types of control equipment as an alternative to complying with § 264.1083(b)(1) of this subpart.

(1) A fixed roof and internal floating roof. The fixed roof shall comply with the requirements of § 264.1083(b)(1)(i)(A) of this subpart. The internal floating roof shall rest or float on the liquid surface (but not necessarily in complete contact with it) inside a tank that has a fixed roof. The internal floating roof shall be floating on the waste surface at all times, except during initial fill and during those intervals when the tank is completely emptied or subsequently emptied and refilled. When the roof is resting on the leg supports, the process of filling, emptying, or refilling shall be continuous and shall be accomplished as rapidly as possible.

(i) Each internal floating roof shall be equipped with one of the following closure devices between the wall of the tank and the edge of the internal floating roof:

(A) A foam- or liquid-filled seal mounted in contact with the liquid (liquid-mounted seal). A liquid-mounted seal means a foam- or liquid-filled seal

mounted in contact with the liquid between the wall of the tank and the floating roof continuously around the circumference of the tank.

(B) Two seals mounted one above the other so that each forms a continuous closure that completely covers the space between the wall of the tank and the edge of the internal floating roof. The lower seal may be vapor-mounted, but both shall be continuous.

(C) A mechanical shoe seal. A mechanical shoe seal is a metal sheet held vertically against the wall of the tank by springs or weighted levers and is connected by braces to the floating roof. A flexible coated fabric (envelope) spans the annular space between the metal sheet and the floating roof.

(ii) Each opening in a noncontact internal floating roof except for automatic bleeder vents (vacuum breaker vents) and the rim space vents is to provide a projection below the waste surface.

(iii) Each opening in the internal floating roof except for leg sleeves, automatic bleeder vents, rim space vents, column wells, ladder wells, sample wells, and stub drains is to be equipped with a cover or lid which is to be maintained in a closed position at all times (i.e., no visible gap) except when the device is in actual use. The cover or lid shall be equipped with a gasket. Covers on each access hatch and automatic gauge float well shall be bolted except when they are in use.

(iv) Automatic bleeder vents shall be equipped with a gasket and are to be closed at all times when the roof is floating except when the roof is being floated off or is being landed on the roof leg supports.

(v) Rim space vents shall be equipped with a gasket and are to be set to open only when the internal floating roof is not floating or at the manufacturer's recommended setting.

(vi) Each penetration of the internal floating roof for the purpose of sampling shall be a sample well. The sample well shall have a slit fabric cover that covers at least 90 percent of the opening.

(vii) Each penetration of the internal floating roof that allows for passage of a column supporting the fixed roof shall have a flexible fabric sleeve seal or a gasketed sliding cover.

(viii) Each penetration of the internal floating roof that allows for passage of a ladder shall have a gasketed sliding cover.

(2) An external floating roof. Each external floating roof shall meet the following specifications:

(i) Each external floating roof shall be equipped with a closure device between the wall of the tank and the roof edge.

The closure device is to consist of two seals, one above the other. The lower seal is referred to as the primary seal, and the upper seal is referred to as the secondary seal.

(A) The primary seal shall be either a mechanical shoe seal or a liquid-mounted seal. Except as provided in § 264.1090(b)(2)(iv) of this section, the seal shall completely cover the annular space between the edge of the floating roof and tank well.

(B) The secondary seal shall completely cover the annular space between the external floating roof and the wall of the storage vessel in a continuous fashion except as allowed in § 264.1090(b)(2)(iv) of this section.

(ii) Except for automatic bleeder vents and rim space vents, each opening in a noncontact external floating roof shall provide a projection below the waste surface. Except for automatic bleeder vents, rim space vents, roof drains, and leg sleeves, each opening in the roof is to be equipped with a gasketed cover, seal, or lid that is to be maintained in a closed position at all times (i.e., no visible gap) except when the device is in actual use. Automatic bleeder vents are to be closed at all times when the roof is floating except when the roof is being floated off or is being landed on the roof leg supports. Rim vents are to be set to open when the roof is being floated off the roof leg supports or at the manufacturer's recommended setting. Automatic bleeder vents and rim space vents are to be gasketed. Each emergency roof drain is to be provided with a slotted membrane fabric cover that covers at least 90% of the area of the opening.

(iii) The roof shall be floating on the waste at all times (i.e., off the roof leg supports) except during initial fill until the roof is lifted off leg supports and when the tank is completely emptied and subsequently refilled. The process of filling, emptying, or refilling when the roof is resting on the leg supports shall be continuous and shall be accomplished as rapidly as possible.

(3) An alternative means of emission limitation for which a Federal Register notice has been published according to the provision of 40 CFR 60.114b permitting its use as an alternative means for purposes of compliance with 40 CFR 60.112b.

(b) Monitoring and inspection of the control equipment described in paragraphs (a)(1) and (a)(2) of this section shall be conducted as follows:

(1) After installation, owners and operators of internal floating roofs shall:

(i) Visually inspect the internal floating roof, the primary seal, and the

secondary seal (if one is in service), prior to filling the tank with waste. If there are holes, tears, or other openings in the primary seal, the secondary seal, or the seal fabric, or defects in the internal floating roof, or both, the owner or operator shall repair the items before filling the tank.

(ii) For tanks equipped with a liquid mounted or mechanical shoe primary seal, visually inspect the internal floating roof and the primary seal or the secondary seal (if one is in service) through manholes and roof hatches on the fixed roof at least once every 12 months after initial fill. If the internal floating roof is not resting on the surface of the waste inside the tank, or there is liquid accumulated on the roof, or the seal is detached, or there are holes or tears in the seal fabric, the owner or operator shall repair the items or empty and remove the tank from service within 45 days. If a failure that is detected during inspections required in this paragraph cannot be repaired within 45 days and if the tank cannot be emptied within 45 days, a 30-day extension may be requested from the Regional Administrator in the inspection report required in § 264.1090(c)(1)(ii) of this section. Such a request for an extension shall document that alternate capacity is unavailable and specify a schedule of actions the company will take that will assure that the control equipment will be repaired or the tank will be emptied as soon as possible.

(iii) For tanks equipped with a double-seal system as specified in § 264.1090(a)(1)(i)(B) of this section:

(A) Visually inspect the tank as specified in paragraph (b)(1)(iv) of this section at least every 5 years; or

(B) Visually inspect the tank as specified in paragraph (b)(1)(ii) of this section.

(iv) Visually inspect the internal floating roof, the primary seal, the secondary seal (if one is in service), gaskets, slotted membranes (if any), and sleeve seals (if any) each time the tank is emptied and degassed. If the internal floating roof has defects, the primary seal has holes, tears, or other openings in the seal or the seal fabric, or the gaskets no longer close off the liquid surfaces from the atmosphere, or the slotted membrane has more than 10 percent open area, the owner or operator shall repair the items as necessary so that none of the conditions specified in this paragraph exist before refilling the tank with waste. In no event shall inspections conducted in accordance with this provision occur at intervals greater than 10 years in the case of tanks conducting the annual visual inspection as specified in

paragraph (b)(1)(ii) of this section, and at intervals no greater than 5 years in the case of tanks specified in paragraph (b)(1)(iii) of this section.

(v) Notify the Regional Administrator in writing at least 30 days prior to the filling or refilling of each tank for which an inspection is required by paragraphs (b)(1)(i) and (b)(1)(iv) of this section to afford the Regional Administrator the opportunity to have an observer present. If the inspection required by paragraph (b)(1)(iv) of this section is not planned and the owner or operator could not have known about the inspection 30 days in advance of refilling the tank, the owner or operator shall notify the Regional Administrator at least 7 days prior to the refilling of the tank. Notification shall be made by telephone immediately followed by written documentation demonstrating why the inspection was unplanned. Alternatively, this notification, including the written documentation, may be made in writing and sent by express mail so that it is received by the Regional Administrator at least 7 days prior to the refilling.

(2) After installation, owners and operators of external floating roofs shall:

(i) Determine the gap areas and maximum gap widths between the primary seal and the wall of the tank and between the secondary seal and the wall of the tank according to the following frequency.

(A) Measurements of gaps between the tank wall and the primary seal (seal gaps) shall be performed during the hydrostatic testing of the tank or within 60 days of the initial fill with waste and at least once every 5 years thereafter.

(B) Measurements of gaps between the tank wall and the secondary seal shall be performed within 60 days of the initial fill with waste and at least once per year thereafter.

(C) If any tank ceases to hold waste for a period of 1 year or more, subsequent introduction of waste into the tank shall be considered an initial fill for the purposes of paragraphs (b)(2)(i)(A) and (b)(2)(i)(B) of this section.

(ii) Determine the gap widths and areas in the primary and secondary seals individually by the following procedures:

(A) Measure seal gaps, if any, at one or more floating roof levels when the roof is floating off the roof leg supports.

(B) Measure seal gaps around the entire circumference of the tank in each place where a 0.32 cm (0.13 in) diameter uniform probe passes freely (without forcing or binding against the seal) between the seal and the wall of the

tank and measure the circumferential distance of each such location.

(C) The total surface area of each gap described in paragraph (b)(2)(ii)(B) of this section shall be determined by using probes of various widths to measure accurately the actual distance from the tank wall to the seal and multiplying each such width by its respective circumferential distance.

(iii) Add the gap surface area of each gap location for the primary seal and the secondary seal individually and divide the sum for each seal by the nominal diameter of the tank and compare each ratio to the respective standards in paragraph (b)(2)(iv) of this section.

(iv) Make necessary repairs or empty the tank within 45 days of identification in any inspection for seals not meeting the following requirements:

(A) The accumulated area of gaps between the tank wall and the mechanical shoe or liquid-mounted primary seal shall not exceed 212 cm² per meter (10.1 in² per foot) of tank diameter, and the width of any portion of any gap shall not exceed 3.81 cm (1.5 in).

(1) One end of the mechanical shoe is to extend into the stored waste, and the other end is to extend a minimum vertical distance of 61 cm (24.0 in) above the stored waste surface.

(2) There are to be no holes, tears, or other openings in the shoe, seal fabric, or seal envelope.

(B) The secondary seal is to meet the following requirements:

(1) The secondary seal is to be installed above the primary seal so that it completely covers the space between the roof edge and the tank wall except as provided in paragraph (b)(2)(ii)(C) of this section.

(2) The accumulated area of gaps between the tank wall and the secondary seal shall not exceed 21.2 cm² per meter (1.01 in² per foot) of tank diameter, and the width of any portion of any gap shall not exceed 1.27 cm (0.50 in).

(3) There are to be no holes, tears, or other openings in the seal or seal fabric.

(v) If a failure that is detected during inspections required in paragraph (b)(2)(i) of this section cannot be repaired within 45 days and if the tank cannot be emptied within 45 days, a 30-day extension may be requested from the Regional Administrator in the inspection report required in § 264.1090(c)(2)(iii) of this section. Such extension request shall include a demonstration of the unavailability of alternate storage capacity and a specification of a schedule that will assure that the control equipment will

be repaired or the tank will be emptied as soon as possible.

(vi) Notify the Regional Administrator 30 days in advance of any gap measurements required by paragraph (b)(2)(i) of this section to afford the Regional Administrator the opportunity to have an observer present.

(vii) Visually inspect the external floating roof, the primary seal, secondary seal, and fittings each time the vessel is emptied and degassed.

(A) If the external floating roof has defects, the primary seal has holes, tears, or other openings in the seal or the seal fabric, or the secondary seal has holes, tears, or other openings in the seal or the seal fabric, the owner or operator shall repair the items as necessary so that none of the conditions specified in this paragraph exist before filling or refilling the tank with waste.

(B) For all the inspections required by paragraph (b)(2)(vii) of this section, the owner or operator shall notify the Regional Administrator in writing at least 30 days prior to the filling or refilling of each tank to afford the Regional Administrator the opportunity to inspect the tank prior to refilling. If the inspection required by paragraph (b)(2)(vii) of this section is not planned and the owner or operator could not have known about the inspection 30 days in advance of refilling the tank, the owner or operator shall notify the Regional Administrator at least 7 days prior to the refilling of the tank.

Notification shall be made by telephone immediately followed by written documentation demonstrating why the inspection was unplanned. Alternatively, this notification, including the written documentation, may be made in writing and sent by express mail so that it is received by the Regional Administrator at least 7 days prior to the refilling.

(c) Owners and operators who elect and operate the control equipment in paragraph (a) of this section shall include the following information in the operating record:

(1) *Internal floating roof.* (i) Documentation that describes the control equipment design and certifies that the control equipment meets the specifications of § 264.1090 (a)(1) and (b)(1) of this section.

(ii) Records of each inspection performed as required by § 264.1090(b)(1) (i)-(iv) of this section. Each record shall identify the tank on which the inspection was performed and shall contain the date the tank was inspected and the observed condition of each component of the control equipment (seals, internal floating roof, and fittings).

(ii) If any of the conditions described in § 264.1090(b)(1)(ii) of this section are detected during the annual visual inspection required by § 264.1090(b)(1)(ii) of this section, the records shall identify the tank, the nature of the defects, and the date the tank was emptied or the nature of and date the repair was made.

(iii) After each inspection required by § 264.1090(b)(1)(iii) of this section that finds holes or tears in the seal or seal fabric, or defects in the internal floating roof, or other control equipment defects listed in § 264.1090(b)(1)(ii) of this section, the records shall identify the tank and the reason it did not meet the specifications of § 264.1090(a)(1) or § 264.1090(b)(1)(iii) of this section and describe each repair made.

(2) *External floating roof.* (i) Documentation that describes the control equipment design and certifies that the control equipment meets the specifications of § 264.1090(a)(2) and § 264.1090(b)(2) (ii)-(iv) of this section.

(ii) Records of each gap measurement performed as required by § 264.1090(b)(2) of this section. Each record shall identify the tank in which the measurement was performed, the date of measurement, the raw data obtained in the measurement, and the calculations described in § 264.1090(b)(2)(ii) and (b)(2)(iii) of this section.

(iii) Records for each seal gap measurement that detects gaps exceeding the limitations specified by § 264.1090(b)(2)(iv) of this section that identifies the tank, the date the tank was emptied or the repairs made, and the nature of the repair.

18. In 40 CFR part 264, appendix X is added to read as follows:

Appendix X to Part 264—Calculation Procedure for Determination of Waste Volatile Organic Concentration

Appendix X describes the calculation procedure that shall be used to compute the waste volatile organic concentration value for comparison to the limit specified in § 264.1081(a)(1) of this part. Any inferences derived from the value determined by the procedure described in this appendix apply only to those times at which sampling is performed. The procedure makes no attempt to draw inferences to any other times; however, the requirement to sample when the waste volatile organic concentration is expected to be highest suggests that waste concentrations at other times should not exceed the value determined by the procedure.

The mean of the logarithms of the sample measurements is calculated and a t-test is performed to determine whether the waste volatile organic concentration is less than 500 ppmw.

Notation

n_i = number of waste samples selected at the i^{th} time period (for any sampling period, n_i shall be at least 4).
 X_{ij} = natural logarithm of the measured volatile organic concentration of the j^{th} sample at time i ($i=0.1, 2, \dots$, and $j=1, 2, \dots, n_i$);
 \bar{X}_i = the mean of the X_{ij} at time period i .

$$\bar{X}_i = \frac{\sum_j X_{ij}}{n_i} \quad (\text{Eq. 1})$$

s_i = the standard deviation of the X_{ij} at time period i .

$$s_i = \sqrt{\frac{\sum_j X_{ij}^2 - (\sum_j X_{ij})^2/n_i}{n_i - 1}} \quad (\text{Eq. 2})$$

K_i = degrees of freedom used in t-test at time i :

$$K_i = (n_i - 1) \quad (\text{Eq. 3})$$

A t-test is used to determine if the waste volatile organic concentration is below the action level, 500 ppmw. The null hypothesis is that the true geometric mean of samples taken at time i is 500 ppmw (or more); the alternative hypothesis is that it is less than 500 ppmw. The test is conducted at the 0.10 significance level. Critical values of the t-distribution with K_i degrees of freedom (the upper 90th percentage point) are given in Column 2 of Table X.1 and are denoted below as t_i . The null hypothesis for time i is rejected (i.e., the waste is judged to qualify for management in units that are not controlled for organic air emissions) if:

$$\frac{\bar{X}_i - \ln(500)}{s_i/\sqrt{n_i}} < -t_i \quad (\text{Eq. 4})$$

Or equivalently, if:

$$\exp(\bar{X}_i + t_i s_i/\sqrt{n_i}) < 500 \quad (\text{Eq. 5})$$

For waste determinations, X_i is calculated by averaging the logarithms of the measured values using Equation 1. The other values for the t-test, s_i and K_i , are calculated from Equations 2 and 3, respectively.

TABLE X.1. PERCENTAGE POINTS OF t-DISTRIBUTIONS

Degrees of Freedom, K_i	90-th percent-age point, t_i
1	3.078
2	1.888

TABLE X.1. PERCENTAGE POINTS OF t-DISTRIBUTIONS—Continued

Degrees of Freedom, K _t	90-th percentage point, t _t
3	1.638
4	1.533
5	1.476
6	1.440
7	1.415
8	1.397
9	1.383
10	1.372
11	1.363
12	1.356
13	1.350
14	1.345
15	1.341
16	1.337
17	1.333
18	1.330
19	1.328
20	1.325
21	1.323
22	1.321
23	1.319
24	1.318
25	1.316
26	1.315
27	1.314
28 and over	1.313

19. In 40 CFR part 264, appendix XI is added to read as follows:

Appendix XI to Part 264—Calculation Procedure for Weighted Average Waste Volatile Organic Concentration

Appendix XI describes the calculation procedure that shall be used to compute the weighted average waste volatile organic concentration value for determining if waste dilution has occurred per § 264.1082(b)(2) of this part. The equation is used to calculate the weighted average volatile organic concentration for all of the waste streams entering the treatment unit. For a waste stream entering the treatment unit having a volatile organic concentration equal to or greater than 500 ppmw, the measured concentration is used in the equation. For a waste stream entering the treatment unit having a volatile organic concentration less than 500 ppmw, the value of 500 ppmw is used in the equation.

$$C = \frac{\sum_{j=1}^m (Q_{aj} \times 500 \text{ ppmw}) + \sum_{i=1}^n (Q_{bi} \times C_{bi})}{\sum_{j=1}^m Q_{aj} + \sum_{i=1}^n Q_{bi}} \quad (\text{Eq. 6})$$

where:
 C=volatile organic concentration (ppm by weight)

Q_{aj}=quantity of each waste stream (j) to be treated that has a volatile organic concentration greater than or equal to 500 ppmw (Mg), concentration as measured at the point described in § 264.1082(a)(1)

Q_{bi}=quantity of each waste stream (i) to be treated that has a volatile organic concentration less than 500 ppmw (Mg)

C_{bi}=the concentration of each waste stream (i) to be treated that is less than 500 ppmw (ppmw), as measured at the point described in § 264.1082(a)(1)

m=the number of waste streams with concentration greater than or equal to 500 ppmw

n=the number of waste streams with concentration less than 500 ppmw.

PART 265—INTERIM STATUS STANDARDS FOR OWNERS AND OPERATORS OF HAZARDOUS WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES

20. The authority citation for part 265 continues to read as follows:

Authority: 42 U.S.C. 6905, 6912(a), 6924, 6925, and 6935.

Subpart A—General

§ 265.1 [Amended]

21–23. Section 265.1(b) is amended by adding the phrase “Except as provided in § 265.1080(b),” before the phrase “The standards of this part apply to * * *”

Subpart B—General Facility Standards

§ 265.13 [Amended]

24. In § 265.13, paragraph (b)(6) is amended by adding “265.1083,” after the phrase “as specified in §§ 265.200, 265.225, 265.252, 265.273, 265.314, 265.341, 265.375, 265.402, 265.1034(d), 265.1063(d),”.

25. In § 265.13, paragraph (b)(8) is added to read as follows:

§ 265.13 General waste analysis.

* * *

(b) * * *

(8) For owners and operators seeking an exception to the air emission standards of subpart CC in accordance with § 265.1082—

(i) The procedures and schedules for waste sampling and analysis, and the analysis of test data to verify the exception.

(ii) Each generator's notice and certification of the volatile organic concentration in the waste if the waste is received from offsite.

* * *

§ 265.15 [Amended]

26. In § 265.15, paragraph (b)(4) is amended by removing the word “and” after the phrase “frequencies called for in §§ 265.174, 265.193, 265.195, 265.226,

265.347, 265.377, 265.403, 265.1033, 265.1052, 265.1053,” and inserting “265.1087, 265.1088, and 265.1090(b),” after “265.1058,”.

Subpart E—Manifest System, Recordkeeping, and Reporting

27. Section 265.73 is amended by revising paragraphs (b)(3) and (b)(6) to read as follows:

§ 265.73 Operating record.

* * *

(b) * * *

(3) Records and results of waste analysis and trial tests performed as specified in §§ 265.13, 265.193, 265.225, 265.252, 265.273, 265.314, 265.341, 265.375, 265.402, 265.1034, 265.1063, 265.1083, 268.4(a), and 268.7 of this chapter.

* * *

(6) Monitoring, testing or analytical data when required by §§ 265.90, 265.94, 265.191, 265.193, 265.195, 265.276, 265.278, 265.280(d)(1), 265.347, 265.377, 265.1034(c)–(f), 265.1035, 265.1083(d)–(i), 265.1064, 265.1089, and 265.1090(b).

* * *

28. In Section 265.77, paragraph (d) is revised to read as follows:

§ 265.77 Additional reports.

* * *

(d) As otherwise required by subparts AA, BB, and CC.

Subpart I—Use and Management of Containers

29. Section 265.178 is added to read as follows:

§ 265.178 Air emission standards.

Containers shall be managed in compliance with the air emission standards in subparts AA, BB, and CC of this part.

Subpart J—Tank Systems

30. Section 265.202 is added to read as follows:

§ 265.202 Air emission standards.

Tanks shall be managed in compliance with the air emission standards in subparts AA, BB, and CC of this part.

Subpart K—Surface Impoundments

31. Section 265.231 is added to read as follows:

§ 265.231 Air emission standards.

Surface impoundments shall be managed in compliance with the air emission standards in subparts AA, BB, and CC of this part.

Subpart AA—Air Emission Standards for Process Vents

32. Section 265.1033 is amended by adding paragraph (l) to read as follows:

§ 265.1033 Standards: Closed-vent systems and control devices.

(l) The owner or operator using a carbon adsorption system shall certify that all carbon removed from a carbon adsorption system to comply with § 265.1033 (g)–(h) of this part is either:

(1) Regenerated or reactivated by a process that minimizes emissions of organics to the atmosphere. (Note: EPA interprets "minimizes" as used in this paragraph to include the application of effective control devices such as those required in this subpart); or

(2) Incinerated by a process that achieves the performance standards specified in subpart O of part 264 of this title.

33. In 40 CFR part 265, subpart CC is added to read as follows:

Subpart CC—Air Emission Standards for Tanks, Surface Impoundments, and Containers

Sec.

265.1080	Applicability.
265.1081	Schedule for implementation of air emission standards.
265.1082	Exceptions to the standards.
265.1083	Waste determinations.
265.1084	Standards: tanks.
265.1085	Standards: surface impoundments.
265.1086	Standards: containers.
265.1087	Standards: closed vent systems and control devices.
265.1088	Monitoring and inspection requirements.
265.1089	Recordkeeping requirements.
265.1090	Alternative control requirements for tanks.

Subpart CC—Air Emission Standards for Tanks, Surface Impoundments, and Containers**§ 265.1080 Applicability.**

(a) The regulations in this subpart apply to owners and operators of facilities that treat, store, or dispose of hazardous waste in units that are subject to subparts I, J, and K of this part except as provided in § 265.1 of this part.

(b) The regulations in this subpart apply to owners and operators of facilities that treat, store, or dispose of hazardous waste in units that are subject to subparts I, J, and K of part 265 who received a final permit under section 3005 of RCRA prior to the effective date of this rule (6 months after the promulgation date of the final rule) until permit reissue or review.

§ 265.1081 Schedule for implementation of air emission standards.

(a) Owners or operators of all hazardous waste facilities existing on the date when the final rule is published in the Federal Register and subject to subparts I, J, and K of this part.

(1) Owners or operators shall, where applicable, install and operate control equipment as provided in §§ 265.1084 through 265.1087 by the effective date of the final rule (6 months after promulgation in the Federal Register).

(2) When control equipment is required and cannot be installed and operating by the effective date, the owner or operator must—

(i) Install and operate the control equipment as soon as possible but no later than 2 years after the date on which the final rule is promulgated in the Federal Register, and

(ii) For facilities subject to the recordkeeping requirements of § 265.73, enter and maintain an implementation schedule in the operating record on the effective date of the final rule.

(iii) For facilities not subject to § 265.73, the owner or operator shall enter, by the effective date of the final rule, and maintain an implementation schedule in a permanent, readily available file located at the plant site.

(b) Owners or operators of facilities in existence on the effective date of statutory or regulatory amendments under the Act that render the facility subject to subparts I, J, and K of this part.

(1) Owners or operators shall, where applicable, install and operate control equipment as provided in §§ 265.1084 through 265.1087 by the effective date of the amendment.

(2) When control equipment is required and cannot be installed and operating by the effective date of the amendment, the owner or operator shall—

(i) Install and operate the control equipment as soon as possible but no later than 18 months after the effective date, and

(ii) For facilities subject to the recordkeeping requirements of § 265.73, enter and maintain an implementation schedule in the operating record on the effective date of the final rule.

(iii) For facilities not subject to § 265.73, the owner or operator shall enter, by the effective date of the final rule, and maintain an implementation schedule in a permanent, readily available file located at the plant site.

§ 265.1082 Exceptions to the standards.

(a) A hazardous waste management unit is excepted from standards pursuant to §§ 265.1084, 265.1085, and

265.1086 of this subpart provided that the owner or operator meets all of the following requirements:

(1) Determines in accordance with the procedures specified in § 265.1083 of this subpart that the waste placed in the hazardous waste management unit at all times has a volatile organic concentration less than 500 parts per million by weight (ppmw) at either:

(i) A point before the waste is first exposed to the atmosphere such as in an enclosed pipe or other closed system that is used to transfer the waste after generation to the first hazardous waste management unit; or

(ii) The outlet of a treatment unit that:

(A) Removes or destroys organics in the waste using a means other than by waste dilution or evaporation into the atmosphere; and

(B) Is in compliance with all applicable standards in this part.

(2) Performs the waste determination required by paragraph (a)(1) of this section at least once per year and whenever the process, operation, or source generating the waste changes in such a manner that the volatile organic concentration of the waste may change.

(b) An owner or operator may place waste in a hazardous waste management unit without the control equipment specified in §§ 265.1084, 265.1085, and 265.1086 of this subpart provided that the owner or operator provides documentation certifying that the waste placed in the hazardous waste management unit complies with the applicable treatment standards for organic-containing waste pursuant to the requirements of subpart D in part 268 of this title.

§ 265.1083 Waste determinations.

(a) Waste volatile organic concentration determination for an exception under § 265.1082(a)(1)(i) of this subpart.

(1) The owner or operator shall use either direct measurement, knowledge of the waste, or waste certification to determine the volatile organic concentration of the waste in accordance with the following requirements:

(i) *Direct measurement.* (A) All waste samples shall be collected at a point before the waste is first exposed to the atmosphere and at a time when the maximum volatile organic concentration in the waste stream is expected to occur. The sampling program shall be conducted in accordance with the requirements specified in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication No. SW-846.

(B) A minimum of four representative samples shall be collected and analyzed using the test procedures specified in Reference Method 25D in 40 CFR part 60 appendix A or Test Method 5100 in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication No. SW-846; and the calculation procedure specified in Appendix VI of this part.

(C) If the waste volatile organic concentration determined in paragraph (a)(1)(i)(B) of this section is less than 500 ppmw then the waste may be placed in a hazardous waste management unit pursuant to § 265.1082(a) of this subpart.

(i) *Knowledge of the waste.* The owner or operator shall provide sufficient information to document that the volatile organic concentration of the waste at all times is less than 500 ppmw. Examples of information that may be used include documentation that the waste is generated by a process for which no organics-containing materials are used, or the waste is generated by a process for which it previously has been determined by direct measurement at other locations using the same type of process that the waste has a volatile organic concentration less than 500 ppmw.

(ii) *Waste Certification.* If an owner or operator cannot perform the waste determination at a point before the waste is first exposed to the atmosphere because the waste is generated off site, then the owner or operator may determine the waste volatile organic concentration upon receiving the waste from the generator provided the waste is accompanied by:

(A) A notice that includes the following information:

- (1) EPA Hazardous Waste Number,
- (2) Manifest number associated with the shipment of hazardous waste, and
- (3) Volatile organic concentration waste determination results obtained in accordance with the methods specified in paragraph (a)(1)(i) or (a)(1)(ii) of this section.

(B) Certification that is signed and dated by an authorized representative of the generator and states the following:

I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste, and I support this certification that the waste does not exceed a volatile organic concentration of 500 ppmw. I believe that the information submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.

(2) The Regional Administrator may request at any time that the owner or operator perform a waste determination

in accordance with paragraph (a)(1)(i) of this section. A result from the waste determination requested by the Regional Administrator indicating that the waste volatile organic concentration is equal to or greater than 500 ppmw shall be conclusive evidence that each hazardous waste management unit in which the waste has been placed is not excepted from standards pursuant to §§ 265.1084, 265.1085, and 265.1086 of this subpart.

(b) Waste determination of volatile organic concentration for an exception under § 265.1082(a)(1)(ii) of this subpart.

(1) The owner or operator shall use either direct measurement or knowledge of the waste to determine the volatile organic concentration of the waste at the outlet of the treatment unit and whether waste dilution was used to achieve this concentration in accordance with the following requirements:

(i) *Direct measurement.* (A) Determination of the volatile organic concentration of the waste at the outlet from the treatment unit.

(1) All waste samples shall be collected at the treatment unit outlet and at a time when the maximum volatile organic concentration in the waste stream is expected to occur. The sampling program shall be conducted in accordance with the requirements specified in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication No. SW-846.

(2) A minimum of four representative samples shall be collected and analyzed using the test procedures specified in Reference Method 25D in 40 CFR part 60 appendix A or Test Method 5100 in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication No. SW-846; and the calculation procedure specified in appendix VI of this part.

(B) Determination that no waste dilution has occurred.

(1) Representative waste samples for each waste stream entering and exiting the treatment unit shall be collected as near in time as possible. The sampling program shall be conducted in accordance with the requirements specified in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication No. SW-846.

(2) The samples shall be analyzed using the test procedures specified in Reference Method 25D in 40 CFR part 60 appendix A or Test Method 5100 in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication No. SW-846 to determine the volatile organic

concentration of each waste stream entering and exiting the treatment unit. A weighted average volatile organic concentration for all of the waste streams entering the treatment unit shall be calculated using the procedure specified in appendix VII of this part.

(3) If the weighted average volatile organic concentration for all streams entering the treatment unit is greater than the volatile organic concentration for the waste stream exiting the treatment unit as determined in accordance with paragraph (b)(1)(i)(B)(2) of this section, then no waste dilution has occurred.

(C) If the waste volatile organic concentration at the outlet of the treatment unit as determined in paragraph (b)(1)(i)(A) of this section is less than 500 ppmw and no waste dilution has occurred as determined in paragraph (b)(1)(i)(B), of this section, then the waste may be placed in a hazardous waste management unit in accordance with § 265.1082(a) of this subpart.

(ii) *Knowledge of the waste.* The owner or operator shall provide sufficient information to document that the volatile organic concentration of the waste exiting the treatment unit is less than 500 ppmw at all times and that no waste dilution has occurred.

(2) The Regional Administrator may request at any time that the owner or operator perform a waste determination in accordance with paragraph (b)(1)(i) of this section. A result from the waste determination requested by the Regional Administrator indicating that the waste volatile organic concentration is equal to or greater than 500 ppmw or that waste dilution has occurred shall be conclusive evidence that each hazardous waste management unit in which the waste has been placed is not excepted from standards pursuant to §§ 265.1084, 265.1085, and 265.1086 of this subpart.

(c) Waste determination of maximum organic vapor pressure for a tank having a design capacity equal to or greater than 75 m³ in accordance with § 265.1084(b)(2) of this subpart.

(1) The owner or operator shall use either direct measurement or knowledge of the waste to determine the maximum organic vapor pressure of the waste in accordance with the following requirements:

(i) *Direct measurement.* (A) All waste samples shall be collected at the inlet to the tank. Sampling shall be conducted in accordance with the requirements specified in "Test Methods for Evaluating Solid Waste, Physical/

Chemical Methods," EPA Publication No. SW-846.

(B) Any one of the following methods may be used to analyze the samples and compute the maximum organic vapor pressure:

(1) Reference Method 25E in 40 CFR part 60 appendix A or Test Method 5110 in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication No. SW-846;

(2) Methods described in American Petroleum Institute Bulletin 2517, "Evaporation Loss From External Floating Roof Tanks," (incorporated by reference—refer to § 260.11);

(3) Methods obtained from standard reference texts;

(4) ASTM Method 2879-83 (incorporated by reference—refer to § 260.11); or

(5) Any other method approved by the Regional Administrator.

(ii) *Knowledge of the waste.* The owner or operator shall provide sufficient information to document that the maximum organic vapor pressure at all times is less than the maximum vapor pressure limit for the appropriate tank design capacity category specified in § 265.1084(b)(2)(i)(D). Examples of information that may be used include documentation that the waste is generated by a process for which no organics-containing materials are used, or the waste is generated by a process for which at other locations it previously has been determined by direct measurement that the waste maximum organic vapor pressure is less than the maximum vapor pressure limit for the appropriate tank design capacity category specified in § 265.1084(b)(2)(i)(D).

(2) The Regional Administrator may request at any time that the owner or operator perform a waste determination in accordance with paragraph (c)(1)(i) of this section. A result from the waste determination requested by the Regional Administrator indicating that the waste maximum organic vapor pressure exceeds the appropriate maximum organic vapor pressure limit for the appropriate tank design capacity category specified in § 265.1084(b)(2)(i)(D) shall be conclusive evidence that each tank in which the waste has been placed is not excepted from requirements pursuant to § 265.1084(b)(1) of this subpart.

§ 265.1084 Standards: tanks.

(a) *Applicability.* This section applies to the owner or operator of a facility where hazardous waste is placed in tanks except as provided in § 265.1082 of this subpart.

(b) *Design and operation of control equipment.* (1) The owner or operator shall meet one of the following control equipment requirements except as provided in paragraph (b)(2) of this section:

(i) Install, operate, and maintain a fixed roof cover and closed vent system that routes the organic vapors vented from the tank to a control device.

(A) The fixed roof shall meet the following requirements:

(1) The cover and all cover openings (e.g., access hatches, sampling ports, and gauge wells) shall be designed to operate with no detectable organic emissions.

(2) Each cover 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 loading, removal, inspection, or sampling.

(B) The closed vent system and control device shall be designed and operated in accordance with the requirements of § 265.1087 of this subpart.

(ii) Install, operate, and maintain a pressurized tank that is designed to operate at a pressure in excess of 204.9 kPa (29.7 psi) and that operates with no detectable organic emissions.

(iii) Install, operate, and maintain alternative control equipment in accordance with the requirements of § 265.1090 of this subpart.

(2) As an alternative to the control equipment specified in paragraph (b)(1) of this section, an owner or operator may install, operate, and maintain on a tank that meets all of the conditions specified in paragraph (b)(2)(i) of this section a fixed roof as specified in paragraph (b)(2)(ii) of this section.

(i) The waste placed in the tank shall meet the following conditions:

(A) The waste is quiescent at all times that the waste is managed in the tank;

(B) The waste is not managed in the tank using a waste fixation process;

(C) The waste is not managed in the tank using a process that requires the addition of heat to the waste or produces an exothermic reaction; and

(D) The waste is either:

(1) Placed in a tank having a design capacity less than 75 m³ (19,789 gal);

(2) Placed in a tank having a design capacity greater than or equal to 75 m³ (19,789 gal) but less than 151 m³ (39,841 gal), and the waste has a maximum organic vapor pressure less than 27.6 kPa (4.0 psi); or

(3) Placed in a tank having a design capacity greater than or equal to 151 m³ (39,841 gal), and the waste has a

maximum organic vapor pressure less than 5.2 kPa (0.75 psi).

(ii) The fixed roof shall meet the following requirements:

(A) The cover and all cover openings (e.g., access hatches, sampling ports, and gauge wells) shall be designed to operate with no detectable organic emissions.

(B) Each cover vent that discharges to the atmosphere shall be equipped with a pressure-relief valve, a pressure-vacuum valve, a pilot-operated relief valve, or equivalent pressure-relief device. The device shall be operated so that no detectable organic emissions occur from the vent except during periods when conditions such as filling or emptying the tank or diurnal temperature changes require venting of the tank to prevent physical damage or permanent deformation of the tank or cover.

(C) Each cover 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 loading, removal, inspection, or sampling.

(3) No waste shall be placed in the tank whenever control equipment specified in paragraphs (b)(1) or (b)(2) of this section is not in operation.

(c) The owner and operator shall install, operate, and maintain enclosed pipes or other closed systems to:

(1) Transfer waste to the tank from all other hazardous waste management units subject to standards pursuant to §§ 265.1084, 265.1085, and 265.1086 of this subpart, and

(2) Transfer waste from the tank to all other hazardous waste management units subject to standards pursuant to §§ 265.1084, 265.1085, and 265.1086 of this subpart.

§ 265.1085 Standards: surface impoundments.

(a) *Applicability.* This section applies to the owner or operator of a facility where hazardous waste is placed in surface impoundments, except as provided in § 265.1082 of this subpart.

(b) *Design and operation of control equipment.* (1) The owner or operator shall install, operate, and maintain on each surface impoundment a cover (e.g., air-supported structure, rigid cover) and closed vent system that routes all organic vapors vented from the surface impoundment to a control device except as provided in paragraph (b)(2) of this section:

(i) The cover shall meet the following requirements:

(A) The cover and all cover openings (e.g., access hatches, sampling ports,

and gauge wells) shall be designed and operated with no detectable organic emissions.

(B) Each cover 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 loading, removal, inspection, or sampling, or for equipment inspection, maintenance, or repair.

(ii) The closed vent system and control device shall be designed and operated in accordance with § 265.1087 of this subpart.

(2) As an alternative to the control equipment specified in paragraph (b)(1) of this section, an owner or operator may install, operate, and maintain on a surface impoundment that meets all of the conditions specified in paragraph (b)(2)(i) of this section either a floating membrane cover as specified in paragraph (b)(2)(ii) of this section or a cover as specified in paragraph (b)(2)(iii) of this section.

(i) The waste placed in the surface impoundment shall meet the following conditions:

(A) The waste is quiescent at all times that the waste is managed in the surface impoundment;

(B) The waste is not managed in the surface impoundment using a waste fixation process;

(C) The waste is not managed in the surface impoundment using a process that requires the addition of heat to the waste or produces an exothermic reaction.

(ii) The floating membrane cover shall meet the following requirements:

(A) Be designed, constructed, and installed so that when the surface impoundment is filled to capacity, the waste surface area is covered completely;

(B) The floating membrane cover and all cover openings (e.g., access hatches, sampling ports, and gauge wells) shall be designed and operated with no detectable organic emissions.

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

(D) The synthetic membrane material used for the floating membrane cover shall be either:

(1) High density polyethylene with a thickness no less than 2.5 mm (100 mils), or

(2) A material or a composite of different materials determined to have all of the following:

(i) Organic permeability properties that are equivalent to those of the material specified in paragraph (b)(2)(ii)(D)(1) of this section, and

(ii) Chemical and physical properties that maintain the material integrity for as long as the cover is in use. Factors that shall be considered in selecting the material include: the effects of contact with the waste managed in the impoundment, weather exposure, and cover installation and operation practices.

(iii) The cover shall meet the following requirements:

(A) The cover and all cover openings (e.g., access hatches, sampling ports, and gauge wells) shall be designed and operated with no detectable organic emissions.

(B) The waste surface shall be completely enclosed by the cover and the air space underneath the cover shall not be vented to the atmosphere.

(3) No waste shall be placed in the surface impoundment whenever control equipment specified in paragraphs (b)(1) or (b)(2) of this section is not in operation.

(c) The cover shall be used at all times that any waste is placed in the surface impoundment except during removal of treatment residues in accordance with § 268.4 of this title, or closure of the surface impoundment in accordance with § 265.228 of this part.

(d) The owner or operator shall install, operate, and maintain enclosed pipes or other closed systems to:

(1) Transfer waste to the surface impoundment from all other hazardous waste management units subject to standards pursuant to §§ 265.1084, 265.1085, and 265.1086 of this subpart, and

(2) Transfer waste from the surface impoundment to all other hazardous waste management units subject to standards pursuant to §§ 265.1084, 265.1085, and 265.1086 of this subpart.

§ 265.1086 Standards: containers.

(a) *Applicability.* This section applies to the owner or operator of a facility where hazardous waste is placed in containers except as provided in § 265.1082 of this subpart.

(b) *Design and operation of control equipment.* (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 cover openings (e.g., bungs, hatches, and sampling

ports) shall be designed to operate with no detectable organic emissions.

(ii) Each cover 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) Treatment of a waste in a container by either waste fixation, a process that requires the addition of heat to the waste, or a process that produces an exothermic reaction shall be performed by the owner or operator in a manner such that during the treatment process whenever it is necessary for the container to be open, the container is located under a cover (e.g., hood, enclosure) with a closed vent system that routes all organic vapors vented from the container to a control device.

(i) The cover and all cover openings (e.g., doors, hatches) shall be designed to operate with no detectable organic emissions.

(ii) The closed vent system and control device shall be designed and operated in accordance with § 265.1087 of this subpart.

(3) The owner or operator shall load pumpable waste into a container using a submerged fill pipe placed so that the outlet extends 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 cover openings shall be maintained in a closed, sealed position except for those cover 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.

§ 265.1087 Standards: closed vent systems and control devices.

(a) *Applicability.* This section applies to the owner or operator of a facility where a closed vent system and control device is used to comply with standards pursuant to §§ 265.1084, 265.1085, or 265.1086 of this subpart.

(b) The owner or operator shall properly design, install, operate, and maintain each closed vent system and control device in accordance with the following requirements:

(1) The closed vent system shall operate with no detectable organic emissions at all times that any waste is in the hazardous waste management unit being controlled.

(2) The control device shall operate at the conditions that reduce the organics

in the gas stream vented to it by at least 95 percent by weight or at the conditions specified in § 265.1033 (c) and (d) of this part at all times that any waste is in the hazardous waste management unit being controlled.

(c) The owner or operator shall determine that each control device achieves the appropriate conditions specified in paragraph (b)(2) of this section in accordance with the following requirements:

(1) The owner or operator of a control device other than a flare or carbon adsorption system shall use one of the following methods:

(i) Engineering calculations in accordance with requirements specified in § 265.1035(b)(4)(iii) of this part; or

(ii) Performance tests performed using the test methods and procedures in accordance with requirements specified in § 265.1034 (c)(1)-(c)(4) of this part.

(2) The owner or operator of a flare shall use the method specified in § 265.1033(e) of this part.

(3) The owner or operator of a carbon adsorption system shall use either one of the methods specified in paragraph (c)(1)(i) or (c)(1)(ii) of this section based on the total quantity of organics vented to the atmosphere from all carbon adsorption system equipment that is used for organic adsorption, organic desorption or carbon regeneration, organic recovery, and carbon disposal.

(d) If the owner or operator and the Regional Administrator do not agree on a determination using engineering calculations of a control device organic emission reduction or, for external combustion devices, organic compound concentrations, then the disagreement shall be resolved based on the results of performance tests performed by the owner or operator using the test methods and procedures as required in § 265.1034 (c)(1)-(c)(4) of this part. The Regional Administrator may elect to have an authorized representative observe the performance tests.

(e) The owner or operator using a carbon adsorption system shall certify that all carbon removed from a carbon adsorption system to comply with § 265.1033 (g) and (h) of this part is either:

(1) Regenerated or reactivated by a process that minimizes emissions of organics to the atmosphere. (Note: EPA interprets "minimizes" as used in this paragraph to include the application of effective control devices such as those required in this subpart); or

(2) Incinerated by a process that achieves the performance standards specified in subpart O of part 264 of this title.

§ 265.1089 Monitoring and inspection requirements.

(a) *Applicability.* This section applies to the owner or operator of a facility where control equipment is used pursuant to §§ 265.1084, 265.1085, or 265.1086 of this subpart.

(b) The owner or operator shall monitor and inspect each cover, except for internal floating roofs and external floating roofs complying with § 265.1090, in accordance with the following requirements:

(1) The owner or operator shall visually inspect each cover initially upon installation of the cover and thereafter at least once per week. The visual inspection shall include inspection of fabric and sealing material on all openings for evidence of visible defects such as rips, gaps, or tears. If visible defects are observed during an inspection, then a leak is detected and the leak shall be repaired in accordance with paragraph (b)(3) of this section.

(2) The owner or operator shall monitor each cover in the following manner:

(i) Each cover connection and seal shall be monitored initially upon installation of the cover and thereafter at least once every six months in accordance with Reference Method 21 in 40 CFR part 60 appendix A.

(ii) If the monitoring instrument indicates detectable emissions (i.e., a concentration above 500 ppmv), then a leak is detected and the leak shall be repaired in accordance with paragraph (b)(3) of this section.

(iii) Seals on floating membrane covers shall be monitored around the entire perimeter of the cover at locations spaced no greater than 3 meters apart.

(3) When a leak is detected by either of the methods specified in paragraphs (b)(1) or (b)(2) of this section, the owner or operator shall repair the leak in the following manner.

(i) Repair of the leak shall be completed as soon as practicable, but no later than 15 calendar days after the leak is detected. If repairs cannot be completed within 15 days except as provided in paragraph (b)(3)(iii) of this section, the owner or operator shall not add waste to the hazardous waste management unit until the repair is complete.

(ii) A first attempt at repair of each leak shall be made no later than 5 calendar days after the leak is detected.

(iii) Repair of control equipment installed to comply with § 265.1085(b) of this subpart and for which leaks have been detected may be delayed beyond 15 calendar days if the owner or operator documents that the repair cannot be completed without a complete

or partial facility or impoundment shutdown and that delaying the repair would not cause the control equipment to be significantly less protective of human health and the environment. Repair of this control equipment shall be completed before the end of the next facility or impoundment shutdown.

(c) The owner or operator shall monitor and inspect each closed vent system and control device in accordance with the following requirements:

(1) The owner or operator shall monitor each control device in accordance with §§ 265.1033(f)(1) and 265.1033(f)(2) of this part. The owner or operator shall inspect at least once each operating day all data recorded by the control device monitoring equipment (e.g., temperature monitors) to check that the control devices are being operated in compliance with this subpart.

(2) The owner or operator shall visually inspect each closed vent system and control device installed initially upon installation of the equipment and thereafter at least once per week. The visual inspection shall include inspection of ductwork and piping and their connections to covers and control devices for evidence of visible defects such as holes in ductwork or piping and loose connections. If visible defects are observed during an inspection, the closed vent system and control device shall be repaired in accordance with paragraph (c)(4) of this section.

(3) The owner or operator shall monitor each closed vent system and control device in the following manner:

(i) Each cover connection and seal shall be monitored initially upon installation of the equipment and thereafter at least once every year in accordance with Reference Method 21.

(ii) If the monitoring instrument indicates detectable emissions (i.e., a concentration above 500 ppmv), then a leak is detected and the leak shall be repaired in accordance with paragraph (c)(4) of this section.

(4) When a defect or leak is detected by either of the methods specified in paragraphs (c)(2) or (c)(3) of this section, the owner or operator shall repair the defect or leak in the following manner:

(i) Repair of the defect or leak shall be completed as soon as practicable, but no later than 15 calendar days after the defect or leak is detected. If repairs cannot be completed within 15 days, then the owner or operator shall not add waste to the hazardous waste management unit until the repair is complete.

(ii) A first attempt at repair of each defect or leak shall be made no later

than 5 calendar days after the defect or leak is detected.

(d) The owner or operator shall develop and follow a written schedule for all monitoring and inspection requirements of this section used to comply with this subpart. The owner or operator shall incorporate this schedule into the facility inspection plan described in 265.15 of this part.

§ 265.1089 Recordkeeping requirements.

(a) An owner or operator placing waste in a hazardous waste management unit using control equipment pursuant to §§ 265.1084, 265.1085, or 265.1086 of this subpart shall record the following information:

(1) Engineering design documentation for each cover that includes:

- (i) Cover type,
- (ii) Cover manufacturer's name and model number,
- (iii) Cover dimensions,
- (iv) Materials used to fabricate cover,
- (v) Mechanism used to install cover on the waste management unit and seal the cover perimeter,
- (vi) Type, size, and location of each cover opening, and
- (vii) Mechanism used to close and seal each cover opening identified in paragraph (a)(1)(vi) of this section.

(2) Documentation for each closed vent system and control device that includes:

- (i) Certification that is signed and dated by the owner or operator stating that the control device is designed to operate at the performance level documented by paragraph (a)(2)(ii) or (a)(2)(iii) of this section when the hazardous waste management unit is or would be operating at capacity or the highest level reasonably expected to occur.

(ii) If engineering calculations are used, then design documentation as specified in § 265.1035(b)(4) of this part. Documentation provided by the control device manufacturer or vendor that describes the control device design in accordance with § 265.1035(b)(4)(iii) of this part and certifies that the control equipment meets the specifications may be used to comply with this requirement.

(iii) If performance tests are used, then a performance test plan as specified in § 265.1035(b)(3) of this part and all test results.

(iv) Information as required by § 265.1035(c)(1) and (c)(2).

(3) Records for all visual inspections conducted in accordance with § 265.1087 of this subpart.

(4) Records for all Reference Method 21 monitoring conducted in accordance with § 265.1088 of this subpart.

(5) Records for all continuous monitoring conducted in accordance with § 265.1088 of this subpart.

(b) An owner or operator placing waste having a volatile organic concentration equal to or greater than 500 ppmw in a tank pursuant to § 265.1084(b)(2) of this subpart shall record the following information for each tank:

(1) Date, time, and location each waste sample is collected for direct measurement waste determination of maximum organic vapor pressure in accordance with § 265.1083 of this subpart.

(2) Results of each waste determination for maximum organic vapor pressure performed in accordance with § 265.1083(c) of this subpart.

(3) Records specifying the tank dimensions and design.

(4) If the maximum organic vapor pressure of the waste placed in the tank exceeds the maximum organic vapor pressure limit for the tank's design capacity category specified in § 265.1084(b)(2)(i)(D) of this subpart, then an explanation of the reason or reasons why the waste was not managed in accordance with this subpart.

(c) An owner or operator placing waste in a hazardous waste management unit pursuant to § 265.1082(a)(1)(i) of this subpart shall record the following information for each waste management unit:

(1) Date, time, and location that each waste sample is collected for direct measurement waste determination of volatile organic concentration in accordance with § 265.1082(a) of this subpart.

(2) All waste determination volatile organic concentration results from either direct measurements performed in accordance with § 265.1083(a)(1)(i) of this subpart or knowledge documented in accordance with § 265.1083(a)(1)(ii) of this subpart.

(3) If the volatile organic concentration of the waste placed in the waste management unit is equal to or greater than 500 ppmw, then an explanation of the reason or reasons why the waste was not managed in accordance with this subpart.

(d) An owner or operator placing waste in a hazardous waste management unit pursuant to § 265.1082(a)(1)(ii) of this subpart shall record the following information for each waste management unit:

(1) Date, time, and location that each waste sample is collected for direct measurement determination of volatile organic concentration in accordance with § 265.1082(a) of this subpart.

(2) All waste determination volatile organic concentration results from either direct measurements performed in accordance with § 265.1083(b)(1)(i) of this subpart or knowledge documented in accordance with § 265.1083(b)(1)(ii) of this subpart.

(3) If the volatile organic concentration of the waste placed in the waste management unit is equal to or greater than 500 ppmw, then an explanation of the reason or reasons why the waste was not managed in accordance with this subpart.

(e) All records required by paragraphs (a), (b), (c) and (d) of this section except as required in paragraphs (a)(3), (a)(4), and (a)(5) shall be maintained in the operating record until closure of the facility. All records required by paragraphs (a)(3), (a)(4), and (a)(5) of this section shall be maintained in the operating record for a minimum of three years.

(f) The owner or operator of any facility that is subject to this subpart and to the control device regulations in 40 CFR 60 subpart VV or 40 CFR 61 subpart V, may elect to demonstrate compliance with this subpart by documentation either pursuant to this subpart, or pursuant to the provisions of 40 CFR part 60 or 61, to the extent that the documentation under 40 CFR part 60 or part 61 duplicates the documentation required under this subpart.

(Approved by the Office of Management and Budget under control number 2080-____.)

§ 265.1090 Alternative control requirements for tanks.

(a) The owner or operator of a hazardous waste management facility that manages waste in tanks may install and operate one of the following types of control equipment as an alternative to complying with § 265.1084(b)(1).

(1) *A fixed roof and internal floating roof.* The fixed roof shall comply with the requirements of paragraph § 265.1084(b)(1)(i)(A). The internal floating roof shall rest or float on the liquid surface (but not necessarily in complete contact with it) inside a tank that has a fixed roof. The internal floating roof shall be floating on the waste surface at all times, except during initial fill and during those intervals when the tank is completely emptied or subsequently emptied and refilled. When the roof is resting on the leg supports, the process of filling, emptying, or refilling shall be continuous and shall be accomplished as rapidly as possible.

(i) Each internal floating roof shall be equipped with one of the following

closure devices between the wall of the tank and the edge of the internal floating roof:

(A) A foam- or liquid-filled seal mounted in contact with the liquid (liquid-mounted seal). A liquid-mounted seal means a foam- or liquid-filled seal mounted in contact with the liquid between the wall of the tank and the floating roof continuously around the circumference of the tank.

(B) Two seals mounted one above the other so that each forms a continuous closure that completely covers the space between the wall of the tank and the edge of the internal floating roof. The lower seal may be vapor-mounted, but both shall be continuous.

(C) A mechanical shoe seal. A mechanical shoe seal is a metal sheet held vertically against the wall of the tank by springs or weighted levers and is connected by braces to the floating roof. A flexible coated fabric (envelope) spans the annular space between the metal sheet and the floating roof.

(ii) Each opening in a noncontact internal floating roof except for automatic bleeder vents (vacuum breaker vents) and the rim space vents is to provide a projection below the waste surface.

(iii) Each opening in the internal floating roof except for leg sleeves, automatic bleeder vents, rim space vents, column wells, ladder wells, sample wells, and stub drains is to be equipped with a cover or lid which is to be maintained in a closed position at all times (i.e., no visible gap) except when the device is in actual use. The cover or lid shall be equipped with a gasket. Covers on each access hatch and automatic gauge float well shall be bolted except when they are in use.

(iv) Automatic bleeder vents shall be equipped with a gasket and are to be closed at all times when the roof is floating except when the roof is being floated off or is being landed on the roof leg supports.

(v) Rim space vents shall be equipped with a gasket and are to be set to open only when the internal floating roof is not floating or at the manufacturer's recommended setting.

(vi) Each penetration of the internal floating roof for the purpose of sampling shall be a sample well. The sample well shall have a slit fabric cover that covers at least 90 percent of the opening.

(vii) Each penetration of the internal floating roof that allows for passage of a column supporting the fixed roof shall have a flexible fabric sleeve seal or a gasketed sliding cover.

(viii) Each penetration of the internal floating roof that allows for passage of a

ladder shall have a gasketed sliding cover.

(2) *An external floating roof.* Each external floating roof shall meet the following specifications:

(i) Each external floating roof shall be equipped with a closure device between the wall of the tank and the roof edge. The closure device is to consist of two seals, one above the other. The lower seal is referred to as the primary seal, and the upper seal is referred to as the secondary seal.

(A) The primary seal shall be either a mechanical shoe seal or a liquid-mounted seal. Except as provided in § 265.1090(b)(2)(iv) of this section, the seal shall completely cover the annular space between the edge of the floating roof and tank well.

(B) The secondary seal shall completely cover the annular space between the external floating roof and the wall of the storage vessel in a continuous fashion except as allowed in § 265.1090(b)(2)(iv) of this section.

(ii) Except for automatic bleeder vents and rim space vents, each opening in a noncontact external floating roof shall provide a projection below the waste surface. Except for automatic bleeder vents, rim space vents, roof drains, and leg sleeves, each opening in the roof is to be equipped with a gasketed cover, seal, or lid that is to be maintained in a closed position at all times (i.e., no visible gap) except when the device is in actual use. Automatic bleeder vents are to be closed at all times when the roof is floating except when the roof is being floated off or is being landed on the roof leg supports. Rim vents are to be set to open when the roof is being floated off the primary seal or the secondary seal (if one is in service) through manholes and roof hatches on the fixed roof at least once every 12 months after initial fill. If the internal floating roof is not resting on the surface of the waste inside the tank, or there is liquid accumulated on the roof, or the seal is detached, or there are holes or tears in the seal fabric, the owner or operator shall repair the items or empty and remove the tank from service within 45 days. If a failure that is detected during inspections required in this paragraph cannot be repaired within 45 days and if the tank cannot be emptied within 45 days, a 30-day extension may be requested from the Regional Administrator in the inspection report required in § 265.1090(c)(1)(ii) of this section. Such a request for an extension shall document that alternate capacity is unavailable and specify a schedule of actions the company will take that will assure that the control equipment will

be repaired or the tank will be emptied as soon as possible.

(iii) For tanks equipped with a double-seal system as specified in § 265.1090(a)(1)(i)(B) of this section:

(A) Visually inspect the tank as specified in paragraph (b)(1)(iv) of this section at least every 5 years; or

(B) Visually inspect the tank as specified in paragraph (b)(1)(ii) of this section.

(iv) Visually inspect the internal floating roof, the primary seal, the secondary seal (if one is in service), gaskets, slotted membranes (if any), and sleeve seals (if any) each time the tank is emptied and degassed. If the internal floating roof has defects, the primary seal has holes, tears, or other openings in the seal or the seal fabric, or the gaskets no longer close off the liquid surfaces from the roof leg supports or at the manufacturer's recommended setting. Automatic bleeder vents and rim space vents are to be gasketed. Each emergency roof drain is to be provided with a slotted membrane fabric cover that covers at least 90% of the area of the opening.

(v) The roof shall be floating on the waste at all times (i.e., off the roof leg supports) except during initial fill until the roof is lifted off leg supports and when the tank is completely emptied and subsequently refilled. The process of filling, emptying, or refilling when the roof is resting on the leg supports shall be continuous and shall be accomplished as rapidly as possible.

(3) An alternative means of emission limitation for which a Federal Register notice has been published according to the provision of 40 CFR 60.114b permitting its use as an alternative means for purposes of compliance with 40 CFR 60.112b.

(b) Monitoring and inspection of the control equipment described in paragraphs (a)(1) and (a)(2) of this section shall be conducted as follows:

(1) After installation, owners and operators of internal floating roofs shall:

(i) Visually inspect the internal floating roof, the primary seal, and the secondary seal (if one is in service), prior to filling the tank with waste. If there are holes, tears, or other openings in the primary seal, the secondary seal, or the seal fabric or defects in the internal floating roof, or both, the owner or operator shall repair the items before filling the tank.

(ii) For tanks equipped with a liquid mounted or mechanical shoe primary seal, visually inspect the internal floating roof and the atmosphere, or the slotted membrane has more than 10 percent open area, the owner or

operator shall repair the items as necessary so that none of the conditions specified in this paragraph exist before refilling the tank with waste. In no event shall inspections conducted in accordance with this provision occur at intervals greater than 10 years in the case of tanks conducting the annual visual inspection as specified in paragraph (b)(1)(ii) of this section, and at intervals no greater than 5 years in the case of tanks specified in paragraph (b)(1)(iii) of this section.

(v) Notify the Regional Administrator in writing at least 30 days prior to the filling or refilling of each tank for which an inspection is required by paragraphs (b)(1)(i) and (b)(1)(iv) of this section to afford the Regional Administrator the opportunity to have an observer present. If the inspection required by paragraph (b)(1)(iv) of this section is not planned and the owner or operator could not have known about the inspection 30 days in advance of refilling the tank, the owner or operator shall notify the Regional Administrator at least 7 days prior to the refilling of the tank. Notification shall be made by telephone immediately followed by written documentation demonstrating why the inspection was unplanned. Alternatively, this notification, including the written documentation, may be made in writing and sent by express mail so that it is received by the Regional Administrator at least 7 days prior to the refilling.

(2) After installation, owners and operators of external floating roofs shall:

(i) Determine the gap areas and maximum gap widths between the primary seal and the wall of the tank and between the secondary seal and the wall of the tank according to the following frequency.

(A) Measurements of gaps between the tank wall and the primary seal (seal gaps) shall be performed during the hydrostatic testing of the tank or within 60 days of the initial fill with waste and at least once every 5 years thereafter.

(B) Measurements of gaps between the tank wall and the secondary seal shall be performed within 60 days of the initial fill with waste and at least once per year thereafter.

(C) If any tank ceases to hold waste for a period of 1 year or more, subsequent introduction of waste into the tank shall be considered an initial fill for the purposes of paragraphs (b)(2)(i)(A) and (b)(2)(i)(B) of this section.

(ii) Determine the gap widths and areas in the primary and secondary seals individually by the following procedures:

(A) Measure seal gaps, if any, at one or more floating roof levels when the roof is floating off the roof leg supports.

(B) Measure seal gaps around the entire circumference of the tank in each place where a 0.32 cm (0.13 in) diameter uniform probe passes freely (without forcing or binding against seal) between the seal and the wall of the tank and measure the circumferential distance of each such location.

(C) The total surface area of each gap described in paragraph (b)(2)(i)(B) of this section shall be determined by using probes of various widths to measure accurately the actual distance from the tank wall to the seal and multiplying each such width by its respective circumferential distance.

(iii) Add the gap surface area of each gap location for the primary seal and the secondary seal individually and divide the sum for each seal by the nominal diameter of the tank and compare each ratio to the respective standards in paragraph (b)(2)(iv) of this section.

(iv) Make necessary repairs or empty the tank within 45 days of identification in any inspection for seals not meeting the following requirements:

(A) The accumulated area of gaps between the tank wall and the mechanical shoe or liquid-mounted primary seal shall not exceed 212 cm² per meter (10.1 in² per foot) of tank diameter, and the width of any portion of any gap shall not exceed 3.81 cm (1.5 in).

(1) One end of the mechanical shoe is to extend into the stored waste, and the other end is to extend a minimum vertical distance of 61 cm (24.0 in) above the stored waste surface.

(2) There are to be no holes, tears, or other openings in the shoe, seal fabric, or seal envelope.

(B) The secondary seal is to meet the following requirements:

(1) The secondary seal is to be installed above the primary seal so that it completely covers the space between the roof edge and the tank wall except as provided in paragraph (b)(2)(ii)(C) of this section.

(2) The accumulated area of gaps between the tank wall and the secondary seal shall not exceed 21.2 cm² per meter (1.01 in² per foot) of tank diameter, and the width of any portion of any gap shall not exceed 1.27 cm (0.50 in).

(3) There are to be no holes, tears, or other openings in the seal or seal fabric.

(v) If a failure that is detected during inspections required in paragraph (b)(2)(i) of this section cannot be repaired within 45 days and if the tank cannot be emptied within 45 days, a 30-day extension may be requested from

the Regional Administrator in the inspection report required in § 265.1090(c)(2)(iii) of this section. Such extension request shall include a demonstration of the unavailability of alternate storage capacity and a specification of a schedule that will assure that the control equipment will be repaired or the tank will be emptied as soon as possible.

(vi) Notify the Regional Administrator 30 days in advance of any gap measurements required by paragraph (b)(2)(i) of this section to afford the Regional Administrator the opportunity to have an observer present.

(vii) Visually inspect the external floating roof, the primary seal, secondary seal, and fittings each time the vessel is emptied and degassed.

(A) If the external floating roof has defects, the primary seal has holes, tears, or other openings in the seal or the seal fabric, or the secondary seal has holes, tears, or other openings in the seal or the seal fabric, the owner or operator shall repair the items as necessary so that none of the conditions specified in this paragraph exist before filling or refilling the tank with waste.

(B) For all the inspections required by paragraph (b)(2)(vii) of this section, the owner or operator shall notify the Regional Administrator in writing at least 30 days prior to the filling or refilling of each tank to afford the Regional Administrator the opportunity to inspect the tank prior to refilling. If the inspection required by paragraph (b)(2)(vii) of this section is not planned and the owner or operator could not have known about the inspection 30 days in advance of refilling the tank, the owner or operator shall notify the Regional Administrator at least 7 days prior to the refilling of the tank. Notification shall be made by telephone immediately followed by written documentation demonstrating why the inspection was unplanned.

Alternatively, this notification, including the written documentation, may be made in writing and sent by express mail so that it is received by the Regional Administrator at least 7 days prior to the refilling.

(c) Owners and operators who elect to install and operate the control equipment in paragraph (a) of this section shall include the following information in the operating record:

(1) *Internal floating roof.* (i) Documentation that describes the control equipment design and certifies that the control equipment meets the specifications of § 265.1090 (a)(1) and (b)(1) of this section.

(ii) Records of each inspection performed as required by § 265.1090(b)(1) (i)-(iv) of this section. Each record shall identify the tank on which the inspection was performed and shall contain the date the tank was inspected and the observed condition of each component of the control equipment (seals, internal floating roof, and fittings).

(iii) If any of the conditions described in § 265.1090(b)(1)(ii) of this section are detected during the annual visual inspection required by § 265.1090(b)(1)(ii) of this section, the records shall identify the tank, the nature of the defects, and the date the tank was emptied or the nature of and date the repair was made.

(iv) After each inspection required by § 265.1090(b)(1)(iii) of this section that finds holes or tears in the seal or seal fabric, or defects in the internal floating roof, or other control equipment defects listed in § 265.1090(b)(1)(ii) of this section, the record shall identify the tank and the reason it did not meet the specifications of § 265.1090(a)(1) or § 265.1090(b)(1)(iii) of this section and describe each repair made.

(2) External floating roof. (i) Documentation that describes the control equipment design and certifies that the control equipment meets the specifications of § 265.1090(a)(2) and § 265.1090(b)(2)(ii)-(iv) of this section.

(ii) Records of each gap measurement performed as required by § 265.1090(b)(2) of this section. Each record shall identify the tank in which the measurement was performed, the date of measurement, the raw data obtained in the measurement, and the calculations described in § 265.1090 (b)(2)(ii) and (b)(2)(iii) of this section.

(iii) Records for each seal gap measurement that detects gaps exceeding the limitations specified by § 265.1090(b)(2)(iv) of this section that identifies the tank, the date the tank was emptied or the repairs made, and the nature of the repair.

34. In 40 CFR part 265, Appendix VI is added to read as follows:

Appendix VI to Part 265—Calculation Procedure for Determination of Waste Volatile Organic Concentration

Appendix VI describes the calculation procedure that shall be used to compute the waste volatile organic concentration value for comparison to the limit specified in § 265.1082(a)(1) of this part. Any inferences derived from the value determined by the procedure described in this appendix apply only to those times at which sampling is performed. The procedure makes no attempt to draw inferences to any other times; however, the requirement to sample when the waste volatile organic concentration is

expected to be highest suggests that waste concentrations at other times should not exceed the value determined by the procedure.

The mean of the logarithms of the sample measurements is calculated and a t-test is performed to determine whether the waste volatile organic concentration is less than 500 ppmw.

Notation

n_i = number of waste samples selected at the i^{th} time period (for any sampling period, n_i shall be at least 4).
 X_{ij} = natural logarithm of the measured volatile organic concentration of the j^{th} sample at time i ($i=0,1,2,\dots$, and $j=1,2,\dots,n_i$).
 \bar{X}_i = the mean of the X_{ij} at time period i .

$$\bar{X}_i = \sum_j X_{ij} / n_i \quad (\text{Eq. 1})$$

s_i = the standard deviation of the X_{ij} at time period i .

$$s_i = \sqrt{\frac{\sum_j X_{ij}^2 - (\sum_j X_{ij})^2 / n_i}{n_i - 1}} \quad (\text{Eq. 2})$$

K_i = degrees of freedom used in t-test at time i :

$$K_i = (n_i - 1) \quad (\text{Eq. 3})$$

A t-test is used to determine if the waste volatile organic concentration is below the action level, 500 ppmw. The null hypothesis is that the true geometric mean of samples taken at time i is 500 ppmw (or more); the alternative hypothesis is that it is less than 500 ppmw. The test is conducted at the 0.10 significance level. Critical values of the t-distribution with K_i degrees of freedom (the upper 90th percentage point) are given in Column 2 of Table X.1 and are denoted below as t_i . The null hypothesis for time i is rejected (i.e., the waste is judged to qualify for management in units that are not controlled for organic air emissions) if:

$$\frac{\bar{X}_i - \ln(500)}{s_i / \sqrt{n_i}} < -t_i \quad (\text{Eq. 4})$$

Or equivalently, if:

$$\exp(\bar{X}_i + t_i s_i / \sqrt{n_i}) < 500 \quad (\text{Eq. 5})$$

For waste determinations, X_i is calculated by averaging the logarithms of the measured values using Equation 1. The other values for the t-test, s_i and K_i , are calculated from Equations 2 and 3, respectively.

TABLE VI.1.—PERCENTAGE POINTS OF T-DISTRIBUTIONS

Degrees of freedom, K_i	90-th Percentage point, t_i
1.....	3.078
2.....	1.886
3.....	1.638
4.....	1.533
5.....	1.476
6.....	1.440
7.....	1.415
8.....	1.397
9.....	1.383
10.....	1.372
11.....	1.363
12.....	1.356
13.....	1.350
14.....	1.345
15.....	1.341
16.....	1.337
17.....	1.333
18.....	1.330
19.....	1.326
20.....	1.325
21.....	1.323
22.....	1.321
23.....	1.319
24.....	1.318
25.....	1.316
26.....	1.315
27.....	1.314
28 and over.....	1.313

35. In 40 CFR part 265, appendix VII is added to read as follows:

Appendix VII to Part 265—Calculation Procedure for Weighted Average Waste Volatile Organic Concentration

Appendix VII describes the calculation procedure that shall be used to compute the weighted average waste volatile organic concentration value for determining if waste dilution has occurred per § 265.1083(b)(2) of this part. The equation is used to calculate the weighted average volatile organic concentration for all of the waste streams entering the treatment unit. For a waste stream entering the treatment unit having a volatile organic concentration equal to or greater than 500 ppmw, the measured concentration is used in the equation. For a waste stream entering the treatment unit having a volatile organic concentration less than 500 ppmw, the value of 500 ppmw is used in the equation.

$$C = \frac{\sum_{j=1}^m (Q_{a_j} \times 500 \text{ ppmw}) + \sum_{i=1}^n (Q_{b_i} \times C_{b_i})}{\sum_{j=1}^m Q_{a_j} + \sum_{i=1}^n Q_{b_i}} \quad (\text{Eq. 6})$$

where
 C = volatile organic concentration (ppm by weight)

Qa_i=quantity of each waste stream (j) to be treated that has a volatile organic concentration greater than or equal to 500 ppmw (Mg), concentration as measured at the point described in § 265.1083(a)(1)
Qb_i=quantity of each waste stream (i) to be treated that has a volatile organic concentration less than 500 ppmw (Mg)
Cb_i=the concentration of each waste stream (i) to be treated that is less than 500 ppmw (ppmw), as measured at the point described in § 265.1083(a)(1)
m=the number of waste streams with concentration greater than or equal to 500 ppmw
n=the number of waste streams with concentration less than 500 ppmw.

Part 270—EPA Administered Permit Programs: The Hazardous Waste Management Program

36. The authority citation for part 270 continues to read as follows:

Authority: 42 U.S.C. 6905, 6912, 6924, 6925, 6927, 6939, and 6974.

Subpart A—General Information

37. Section 270.4 is amended by revising paragraph (a) to read as follows:

§ 270.4 Effect of a permit.

(a) Compliance with an RCRA permit during its term constitutes compliance for purpose of enforcement with Subtitle C of RCRA except for those requirements not included in the permit which become effective by statute, or which are promulgated under Subparts AA, BB, and CC of Part 265 of this chapter limiting air emissions, or which are promulgated under Part 268 of this chapter restricting the placement of hazardous waste in or on the land.

Subpart B—Permit Application

38. Section 270.14 is amended by revising paragraphs (b)(5), (b)(8)(vi), and (b)(13) to read as follows:

§ 270.14 Contents of part B: General requirements.

(b) * * *
(5) A copy of the general inspection schedule required by § 264.15(b). Include where applicable, as part of the inspection schedule, specific requirements in §§ 264.174, 245.193(i), 264.195, 264.226, 264.254, 264.273, 264.303, 264.602, 264.1033, 264.1052, 264.1053, 264.1058, 264.1087, 264.1088, and 264.1090.

(8) * * *
(vi) Prevent releases to the atmosphere.

(13) A copy of the closure plan and, where applicable, the postclosure plan required by §§ 264.112, 264.118, ad 264.197. Include, where applicable, as part of the plans, specific requirements in §§ 264.178, 264.197, 264.228, 264.258, 264.280, 264.310, 264.351, 264.601, 264.603, and 264.1084.

39. Section 270.15 is amended by adding paragraph (e) to read as follows:

§ 270.15 Specific part B information requirements for containers.

(e) Information on air emission control equipment as required in § 270.26.

40. Section 270.16 is amended by adding paragraph (k) to read as follows:

§ 270.16 Specific part B information requirements for tank systems.

(k) Information on air emission control equipment as required in § 270.26.

41. Section 270.17 is amended by adding paragraph (j) to read as follows:

§ 270.17 Specific part B information requirements for surface impoundments.

(j) Information on air emission control equipment as required in § 270.26.

42. Part 270 subpart B is amended by adding § 270.26 to read as follows:

§ 270.26 Specific part B information requirements for air emission controls for tanks, surface impoundments, and containers.

Except as otherwise provided in § 264.1083, owners and operators of facilities that require air emission controls for tanks, surface impoundments, and containers shall provide the following additional information:

(a) For closed vent systems and control devices, design and performance information as specified in § 270.24 (b) and (c).

(b) For facilities required to install covers or enclosures to comply with 40 CFR 264 subpart CC or 40 CFR part 265 subpart CC, detailed design specifications.

(c) An emission monitoring plan for both Reference Method 21 and control device monitoring methods, including:

- (1) Monitoring point(s),
- (2) Monitoring methods for control devices,

- (3) Monitoring frequency,
- (4) Procedures for documenting exceedances, and
- (5) Procedures for mitigating noncompliances.

(d) For tanks managing waste greater than the vapor pressure limits provided in § 264.1083, the predicted tank holding temperatures and ambient temperatures.

(e) For facilities that cannot install control equipment to comply with the provisions of 40 CFR part 265 subpart CC on the effective date that the facility became subject to the provisions of 40 CFR part 264 subpart CC or 40 CFR part 265 subpart CC, an implementation schedule that includes dates by which the control equipment will be installed and in operation. The schedule shall also include a rationale why the installation could not be completed at an earlier date. The controls shall be installed as soon as possible, but the implementation schedule may allow up to 18 months after the effective date that the facility becomes subject to the provisions of 40 CFR part 264 subpart CC or 40 CFR part 265 subpart CC for installation and startup. All units that begin operation 6 months after the promulgation date of the final rule shall comply with the rules immediately (i.e., shall have control equipment installed and operating on startup of the affected unit).

(f) Documentation demonstrating that a waste is in compliance with the applicable land disposal performance standards in 40 CFR part 268, subpart D for the treatment of organic-containing waste and is, therefore, not required to comply with the control and monitoring requirements of 40 CFR part 264 subparts CC or 40 CFR part 265 subpart CC.

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

PART 271—REQUIREMENTS FOR AUTHORIZATION OF STATE HAZARDOUS WASTE PROGRAMS

43. The authority citation for part 271 continues to read as follows:

Authority: 42 U.S.C. 6905, 6912(a), and 6926.

Subpart A—Requirements for Final Authorization

§ 271.1 [Amended]

44. Section 271.1(j) is amended by adding the following entry to Table 1 in chronological order by date of publication:

TABLE 1.—REGULATIONS IMPLEMENTING THE HAZARDOUS AND SOLID WASTE AMENDMENTS OF 1984

Promulgation date	Title of regulation	Federal Register reference	Effective date
(Publication date of final rule).....	Air standards for Tanks, Surface Impoundments, and Containers.	(Insert Federal Register reference of final rule).	(Publication date of final rule plus 6 months).

§ 271.1 [Amended]

44. Section 271.1(j) is amended by adding the following entry to Table 2 in

chronological order by date of publication:

TABLE 2.—SELF-IMPLEMENTING PROVISIONS OF THE HAZARDOUS AND SOLID WASTE AMENDMENTS OF 1984

Effective date	Self-implementing provision	RCRA citation	Federal Register reference
(Publication date of final rule plus 6 months).	Air standards for Tanks, Surface Impoundments, and Containers.	3004(n).....	(Insert Federal Register reference of final rule).

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