ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 136 and 445

[FRL–6503–5]

RIN 2040–AC23

Effluent Limitations Guidelines, Pretreatment Standards, and New Source Performance Standards for the Landfills Point Source Category

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: This final rule represents the culmination of the Agency's effort to develop Clean Water Act (CWA) national effluent limitations guidelines and pretreatment standards for wastewater discharges from certain landfills. The final regulation establishes technology-based effluent limitations for wastewater discharges associated with the operation and maintenance of new and existing hazardous and non-hazardous landfill facilities regulated, respectively, under Subtitle C and Subtitle D of the Resource Conservation and Recovery Act (RCRA). Sources of landfill wastewater include, but are not limited to, landfill leachate and gas collection condensate. Today's final rule does not establish pretreatment standards for the introduction of pollutants into Publicly Owned Treatment Works (POTW) from the operation of new and existing landfills regulated under Subtitle C or Subtitle D of RCRA.

The rule does not apply to wastewater discharges from ''captive'' landfills—those landfills associated with other industrial or commercial activities, in most circumstances. For example, it does not apply to captive landfills that only receive wastes generated by the industrial operation directly associated with the landfill. In addition, the rule does not apply to captive landfills that receive both wastes generated by the industrial operation directly associated with the landfill as well as other wastes, so long as the other wastes are similar in nature to the wastes generated by the industrial operation directly associated with the landfill. Further, the regulation does not apply to wastewater discharges associated with treatment of contaminated ground water from hazardous and non-hazardous landfills.

The final effluent limitations guidelines will benefit the environment by removing 900,000 pounds of pollutants per year at an estimated annualized cost of $7.6 million.

DATES: This regulation shall become effective February 18, 2000.

ADDRESSES: For additional technical information write to Mr. Michael C. Ebner, Engineering and Analysis Division (4303), U.S. EPA, 401 M Street S.W., Washington, D.C. 20460 or send E-mail to: *ebner.michael@epa.gov* or call at (202)260–5397. For additional economic information contact Mr. William Anderson at the address above or send E-mail to: *anderson.william@epa.gov* or call (202) 260–5131.

The complete record (excluding confidential business information) for this Clean Water Act rulemaking is available for review at EPA's Water Docket, Room EB57; 401 M Street, SW, Washington, DC 20460. For access to Docket materials, call (202) 260–3027 between 9 a.m. and 3:30 p.m. for an appointment. The record for this rulemaking has been established under docket number W–97–17, and includes supporting documentation, but does not include any information claimed as Confidential Business Information (CBI). The EPA public information regulation (40 CFR Part 2) provides that a reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: For additional technical information call Mr. Michael Ebner at (202) 260–5397. For additional information on the economic impact analyses contact Mr. William Anderson at (202) 260–5131.

SUPPLEMENTARY INFORMATION:

Judicial Review

In accordance with 40 CFR 23.2, this rule will be considered promulgated for purposes of judicial review at 1:00 p.m. Eastern time on February 2, 2000. Under section 509(b)(1) of the Act, judicial review of this regulation can be obtained only by filing a petition for review in the United States Court of Appeals within 120 days after the regulation is considered final for purposes of judicial review. Under section 509(b)(2) of the Act, the requirements in this regulation may not be challenged later in civil or criminal proceedings brought by EPA to enforce these requirements.

Regulated Entities: Entities potentially regulated by this action include:

Category	Examples of regulated entities
Industry	Landfills regulated under Subtitle C or Subtitle D of RCRA that collect and discharge landfill generated wastewater to surface waters of the U.S., unless the landfills are directly associated with other industrial or commercial facilities.
State, municipal or tribal Government.	Landfills regulated under Subtitle C or Subtitle D of RCRA that collect and discharge landfill generated wastewater to surface waters of the U.S., unless the landfills are directly associated with other industrial or commercial facilities.
Federal Government	Landfills regulated under Subtitle C or Subtitle D of RCRA that collect and discharge landfill generated wastewater to surface waters of the U.S., unless the landfills are directly associated with other industrial or commercial facilities.

The preceding table is not intended to be exhaustive, but rather provides a guide for readers regarding entities likely to be regulated by this action. This table lists the types of entities that EPA is now aware could potentially be regulated by this action. Other types of entities not listed in the table could also be regulated. To determine whether your facility is regulated by this action, you should carefully examine the applicability criteria in § 445.1 of the final rule. If you have questions regarding the applicability of this action to a particular entity, consult one of the persons listed in the preceding **FOR FURTHER INFORMATION CONTACT** section.

Compliance Dates

The compliance date for NSPS is the date the new source commences discharging. Compliance deadline for BPT, BCT, and BAT for a facility is immediately upon issuance or reissuance of the National Pollutant Discharge Elimination System (NPDES) permit.

Supporting Documentation

Several major documents further describe the technical and economic basis for the regulations promulgated today. These include:

1. ''Development Document for Final Effluent Limitations Guidelines and Standards for the Landfills Point Source

Category'' (EPA 821–R–99–019). Hereafter referred to as the Technical Development Document, it presents EPA's technical conclusions concerning the rule. EPA describes, among other things, the data collection activities in support of the rule, the wastewater treatment technology options, wastewater characterization, and the estimation of costs to the industry.

2. ''Economic Analysis for Final Effluent Limitations Guidelines and Standards for the Landfills Point Source Category'' (EPA 821–B–99–005).

3. ''Statistical Support Document for Final Effluent Limitations Guidelines and Standards for the Landfills Point Source Category'' (EPA 821–B–99–007).

4. ''Environmental Assessment for Final Effluent Limitations Guidelines and Standards for the Landfills Point Source Category'' (EPA 821–B–99–006).

EPA made drafts of these documents available for comment at proposal and revised the materials where warranted in response to the comments. EPA did not submit the documents for peer review because the Agency concluded that additional review was not required because the scientific and technical methodologies being used are not significantly different from those used in the development of past effluent guidelines.

How to Obtain Supporting Documents:

The Technical and Economic Development Documents can be obtained through EPA's website on the Internet, located at www.epa.gov/OST/guide/2lndfls. All of the supporting documents are also available from the Office of Water Resource Center, RC–4100, U.S. EPA, 401 M Street SW, Washington, D.C., 20460; telephone (202) 260–7786 for the voice mail publication request.

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I. Legal Authority

The U.S. Environmental Protection Agency is promulgating these regulations under the authority of Sections 301, 304, 306, 307, 308, 402, and 501 of the Clean Water Act, 33 U.S.C.1311, 1314, 1316, 1317, 1318, 1342, and 1361.

II. Background

A. Clean Water Act

Congress adopted the Clean Water Act (CWA) to ''restore and maintain the chemical, physical, and biological integrity of the Nation's waters'' (Section 101(a), 33 U.S.C. 1251(a)). To achieve this goal, the CWA prohibits the discharge of pollutants into navigable waters except in compliance with the statute. The Clean Water Act confronts the problem of water pollution on a number of different fronts. Its primary reliance, however, is on establishing restrictions on the types and amounts of pollutants discharged from various industrial, commercial, and public sources of wastewater.

Congress recognized that regulating only those sources that discharge effluent directly into the nation's waters would not be sufficient to achieve the CWA's goals. Consequently, the CWA requires EPA to promulgate nationally applicable pretreatment standards which restrict pollutant discharges for those who discharge wastewater indirectly through sewers flowing to publicly-owned treatment works (POTWs) (Section 307(b) and (c), 33 U.S.C. 1317(b) and (c)). National pretreatment standards are established for those pollutants in wastewater from indirect dischargers which may pass through or interfere with POTW operations. Generally, pretreatment standards are designed to ensure that wastewater from direct and indirect industrial dischargers are subject to similar levels of treatment. In addition, POTWs are required to implement local pretreatment limits applicable to their industrial indirect dischargers to satisfy any local requirements (40 CFR 403.5).

Direct dischargers must comply with effluent limitations in National Pollutant Discharge Elimination System (''NPDES'') permits; indirect dischargers must comply with pretreatment standards. These limitations and standards are established by regulation for categories of industrial dischargers and are based on the degree of control that can be achieved using various levels of pollution control technology.

1. Best Practicable Control Technology Currently Available (BPT)—Sec. 304(b)(1) of the CWA

In the regulations for an industry category, EPA defines BPT effluent limits for conventional, priority,[1] and

[1] In the initial stages of EPA CWA regulation, EPA efforts emphasized the achievement of BPT limitations for control of the ''classical'' pollutants (*e.g.,* TSS, pH, BOD_5). However, nothing on the face of the statute explicitly restricted BPT limitations to such pollutants. Following passage of the Clean Water Act of 1977 with its requirement for point sources to achieve best available technology limitations to control discharges of toxic pollutants, EPA shifted its focus to address the listed priority pollutants under the guidelines program. BPT

Continued

nonconventional pollutants. In specifying BPT, EPA looks at a number of factors. EPA first considers the cost of achieving effluent reductions in relation to the effluent reduction benefits. The Agency also considers the age of the equipment and facilities, the processes employed and any required process changes, engineering aspects of the control technologies, non-water quality environmental impacts (including energy requirements), and such other factors as the Agency deems appropriate (CWA 304(b)(1)(B)). Traditionally, EPA establishes BPT effluent limitations based on the average of the best performances of facilities within the industry of various ages, sizes, processes or other common characteristic. Where existing performance is uniformly inadequate, EPA may require higher levels of control than currently in place in an industrial category if the Agency determines that the technology can be practically applied.

2. Best Conventional Pollutant Control Technology (BCT)—Sec. 304(b)(4) of the CWA

The 1977 amendments to the CWA required EPA to identify effluent reduction levels for conventional pollutants associated with BCT for discharges from existing industrial point sources. In addition to other factors specified in Section 304(b)(4)(B), the CWA requires that EPA establish BCT limitations after consideration of a two part ''cost-reasonableness'' test. EPA explained its methodology for the development of BCT limitations in July 1986 (51 FR 24974).

Section 304(a)(4) designates the following as conventional pollutants: biochemical oxygen demand (BOD_5), total suspended solids (TSS), fecal coliform, pH, and any additional pollutants defined by the Administrator as conventional. The Administrator designated oil and grease as an additional conventional pollutant on July 30, 1979 (44 FR 44501).

3. Best Available Technology Economically Achievable (BAT)—Sec. 304(b)(2) of the CWA

In general, BAT effluent limitations guidelines represent the best economically achievable performance of plants in the industrial subcategory or category. The factors considered in assessing BAT include the cost of achieving BAT effluent reductions, the age of equipment and facilities involved, the process employed, potential process changes, and non-water quality environmental impacts, including energy requirements. The Agency retains considerable discretion in assigning the weight to be accorded these factors. BAT limitations may be based on effluent reductions attainable through changes in a facility's processes and operations. As with BPT, where existing performance is uniformly inadequate, BAT may require a higher level of performance than is currently being achieved based on technology transferred from a different subcategory or category. BAT may be based upon process changes or internal controls, even when these technologies are not common industry practice.

4. New Source Performance Standards (NSPS)—Sec. 306 of the CWA

NSPS reflect effluent reductions that are achievable based on the best available demonstrated control technology. New facilities have the opportunity to install the best and most efficient production processes and wastewater treatment technologies. As a result, NSPS should represent the most stringent controls attainable through the application of the best available control technology for all pollutants (*i.e.,* conventional, nonconventional, and priority pollutants). In establishing NSPS, EPA is directed to take into consideration the cost of achieving the effluent reduction and any non-water quality environmental impacts and energy requirements.

5. Pretreatment Standards for Existing Sources (PSES)—Sec. 307(b) of the CWA

PSES are designed to prevent the discharge of pollutants that pass through, interfere-with, or are otherwise incompatible with the operation of publicly-owned treatment works (POTW). The CWA authorizes EPA to establish pretreatment standards for pollutants that pass through POTWs or interfere with treatment processes or sludge disposal methods at POTWs. Pretreatment standards for existing sources are technology-based and analogous to BAT effluent limitations guidelines.

The General Pretreatment Regulations, which set forth the framework for the implementation of categorical pretreatment standards, are found at 40 CFR Part 403. Those regulations contain a definition of pass-through that addresses localized rather than national instances of pass-through and establish pretreatment standards that apply to all non-domestic discharges. See 52 FR 1586, January 14, 1987.

6. Pretreatment Standards for New Sources (PSNS)—Sec. 307(b) of the CWA

Like PSES, PSNS are designed to prevent the discharges of pollutants that pass through, interfere-with, or are otherwise incompatible with the operation of POTWs. PSNS are to be issued at the same time as NSPS. New indirect dischargers have the opportunity to incorporate into their plants the best available demonstrated technologies. The Agency considers the same factors in promulgating PSNS as it considers in promulgating NSPS.

B. Section 304(m) Requirements

Section 304(m) of the CWA, added by the Water Quality Act of 1987, requires EPA to establish schedules for (1) reviewing and revising existing effluent limitations guidelines and standards (''effluent guidelines'') and (2) promulgating new effluent guidelines. On January 2, 1990, EPA published an Effluent Guidelines Plan (55 FR 80) that established schedules for developing new and revised effluent guidelines for several industry categories. One of the industries for which the Agency established a schedule was the Hazardous Waste Treatment Industry.

The Natural Resources Defense Council (NRDC) and Public Citizen, Inc. filed suit against the Agency, alleging violation of Section 304(m) and other statutory authorities requiring promulgation of effluent guidelines (*NRDC et al.* v. *Reilly,* Civ. No. 89–2980 (D.D.C.)). Under the terms of the consent decree in that case, as amended, EPA agreed, among other things, to propose effluent guidelines for the ''Landfills and Industrial Waste Combusters'' category by November 1997 and final action by November 1999. Although the Consent Decree lists ''Landfills and Industrial Waste Combusters'' as a single entry, EPA is publishing separate regulations for Industrial Waste Combusters and for Landfills.

C. Brief History of Landfills Industry and Proposed Guidelines

The growth of the landfills industry is a direct result of the Resource Conservation and Recovery Act (RCRA) and subsequent EPA and State regulations that establish the conditions under which solid waste may be disposed. The implementation of the increased control measures required by RCRA has had a number of ancillary effects on the landfill industry. On the one hand, it has forced many landfills to close because they lacked adequate on-site controls to protect against migration of hazardous constituents

guidelines continue to include limitations to address all pollutants.

from the landfill, and it was not economical to upgrade the landfill facility. As a result, a large number of landfills, especially facilities serving small populations, have closed rather than incur the significant expense of upgrading.

Conversely, large landfill operations have taken advantage of economies of scale by serving wide geographic areas and accepting an increasing portion of the nation's solid waste. For example, responses to EPA's Waste Treatment Industry Survey indicated that 75 percent of the nation's municipal solid waste is deposited in large landfills representing only 25 percent of the landfill population.

EPA has identified several trends in the waste disposal industry that may increase the quantity of leachate produced by landfills. More stringent RCRA regulation and the restrictions on the management of wastes have increased the amount of waste disposed at landfills as well as the number of facilities choosing to send wastes off-site to commercial facilities in lieu of pursuing on-site management options. This will increase treated leachate discharges from the nation's landfills, thus potentially putting at risk the integrity of the nation's waters. Further, as a result of the increased number of leachate collection systems, the volume of leachate requiring treatment and disposal has greatly increased.

On February 6, 1998, EPA proposed Clean Water Act (CWA) national effluent limitations guidelines and pretreatment standards for wastewater discharges from landfill facilities regulated under Subtitle C or Subtitle D of the Resource Conservation and Recovery Act (RCRA). 63 FR 6425.

The proposed regulation divided the landfills industry into two subcategories: (1) RCRA Subtitle C Hazardous Waste Landfill Subcategory, and (2) RCRA Subtitle D Non-Hazardous Waste Landfill Subcategory. For the RCRA Subtitle C subcategory, EPA proposed BPT, BAT, BCT, and NSPS concentration-based limitations for 15 pollutants: BOD_5, TSS, ammonia, arsenic (total), chromium (total), zinc (total), alpha-terpineol, aniline, benzene, benzoic acid, naphthalene, p-cresol, phenol, pyridine, and toluene; EPA also proposed limitations for pH. For PSES and PSNS for the hazardous waste landfill subcategory, EPA proposed pretreatment standards for six pollutants: ammonia, alpha-terpineol, aniline, benzoic acid, p-cresol, and toluene.

For the RCRA Subtitle D subcategory, EPA proposed BPT, BAT, BCT, and NSPS concentration-based limitations for nine parameters. These were BOD_5, TSS, ammonia, zinc (total), alpha-terpineol, benzoic acid, p-cresol, phenol, toluene; EPA also proposed limitations for pH. EPA did not propose PSES or PSNS for the RCRA Subtitle D subcategory.

As proposed, the guidelines would not apply to wastewater discharges from captive landfills located at industrial facilities under certain conditions. The guidelines did not apply if the industrial facility commingled landfill process wastewater with non-landfill process wastewater for treatment, provided that the landfill received only waste generated on-site or waste generated from a similar activity at another facility under the same corporate structure. Further, the proposed regulation did not apply to wastewater discharges associated with treatment of contaminated ground water from hazardous and non-hazardous landfills.

EPA solicited public comment on the proposed rule; the comment period was open from February 6 to May 7, 1998. Section [X] describes the major comments on the proposed rule and EPA's responses. The public record includes a comment summary and response document for this rulemaking.

III. The Final Landfills Effluent Limitations Guidelines and Standards

This section discusses the applicability of the final rule, the landfill wastewater flows subject to the rule, regulatory options considered, and the rationale for the selected technology options.

A. Overview of Final Rule

Today EPA is promulgating technology-based effluent limitations for wastewater discharges to navigable waters associated with the operation of new and existing hazardous and non-hazardous landfill facilities regulated under Subtitle C or Subtitle D of the Resource Conservation and Recovery Act (RCRA). EPA decided to promulgate effluent limitation guidelines using the same subcategorization approach outlined in the proposal. For the RCRA Subtitle C subcategory, EPA is promulgating BPT, BAT, BCT, and NSPS (BPT/BCT/BAT/NSPS) limitations for fourteen parameters. These are BOD_5, TSS, ammonia, arsenic (total), chromium (total), zinc (total), alpha-terpineol, aniline, benzoic acid, naphthalene, p-cresol, phenol, pyridine, and pH. For the RCRA Subtitle D subcategory, EPA is promulgating BPT/BCT/BAT/NSPS limitations for nine parameters. These are BOD_5, TSS, ammonia, zinc (total), alpha-terpineol, benzoic acid, p-cresol, phenol, and pH. Chapter 7 of the Technical Development Document describes in detail EPA's selection of pollutants to regulate. The final rule does not establish PSES or PSNS for either subcategory.

B. Applicability and Scope of the Final Rule

Today's final effluent limitations guidelines and standards cover pollutants in wastewater discharges associated only with the operation and maintenance of those landfills regulated under Subtitles C and D of the Resource Conservation and Recovery Act (RCRA).[2] The rule applies to wastewater generated at active landfills subject to Subtitle C of RCRA and Subtitle C landfills that closed after November 19, 1980, the effective date of 40 CFR Part 265. The guidelines do not apply to discharges of landfill wastewater associated with hazardous landfills that went into a permanently inactive status (*i.e.,* they were not receiving any more waste) before the effective date of 40 CFR Part 265. Similarly, the rule applies to wastewater generated at active landfills subject to Subtitle D of RCRA and Subtitle D landfills that closed after October 15, 1979, the effective date of 40 CFR Part 257. The guidelines do not apply to discharges of landfill wastewater associated with non-hazardous landfills that went into a permanently inactive status (*i.e.,* they were not receiving any more waste) before the effective date of 40 CFR Part 257.

Furthermore, this rule does not apply to wastewater discharges associated with the operation and maintenance of land application or treatment units, surface impoundments, underground injection wells, waste piles, salt dome or bed formations, underground mines, caves or corrective action units.[3] Additionally, this guideline does not apply to waste transfer stations, or any wastewater not directly attributed to the operation and maintenance of Subtitle C or Subtitle D landfill units. Consequently, wastewater such as that generated in off-site washing of vehicles used in landfill operations is not within the scope of this guideline.

[2] EPA's Subtitle C and Subtitle D regulations define ''landfill''. *See* 40 CFR 257.2, 258.2 (''municipal solid waste landfill'') and 260.10. Permitted Subtitle C landfills are authorized to accept hazardous wastes as defined in 40 CFR Part 261. Subtitle D landfills are authorized to receive municipal, commercial or industrial waste that is not hazardous (as well as hazardous waste excluded from regulation under Subtitle C).

[3] These terms are defined at 40 CFR 257.2 and 260.10.

1. Captive Landfills

In developing the proposed guidelines, an important question EPA addressed was how to treat landfill leachate generated at a landfill that is associated with an industrial or commercial operation—so-called ''captive'' landfills. Currently, in the case of wastewater sources that are not subject to effluent limitations guidelines and standards, NPDES permit writers must impose limitations on discharges of these wastewater sources that are developed on a case-by-case, best professional judgment (BPJ) basis. Similarly, an indirect discharger may not introduce any pollutants to a POTW from these sources that will pass through or interfere with the POTW's operations. Generally, each POTW is required to develop a pretreatment program and enforce the prohibition on pass through and interference through specific local limits.

EPA initially considered development of effluent guidelines to address any landfill discharging directly to surface waters of the United States or introducing pollutants into a POTW. Consequently, EPA's technical evaluation for the proposal included an assessment of virtually all landfill facilities which collect wastewater as a result of landfilling operations. EPA proposed to exclude wastewater discharges from captive landfills located at industrial facilities in specific circumstances. In the proposal, a captive landfill would not have been subject to the guidelines (1) if it commingled landfill process wastewater with non-landfill process wastewater for treatment, and (2) the landfill received only waste generated on-site or waste generated from a similar activity at another facility under the same corporate structure.

EPA now determined that these requirements are too restrictive and therefore the Agency has decided not to include captive landfills within the scope of this guideline except in a limited number of circumstances. The Agency wants to stress, however, that the effect of today's decisions is not to allow these wastewater sources to escape treatment. Landfill wastewater at captive facilities is and will remain subject to treatment and controls on its discharge. The CWA requires wastewater discharges to meet technology-based effluent limitations on the discharge whether the mechanism for imposing these limitations is EPA-established national effluent limitations guidelines or a permit writer's imposition on a case-by-case basis of BPJ limitations. In like manner, in order to prevent pass through or interference, indirect dischargers must limit their introduction of pollutants to a POTW whether EPA has established national categorical pretreatment standards for the discharge or a POTW has established local limits.

The following describes the applicability of the final rule to captive landfills. The final rule does not apply to discharges of landfill wastewater from captive landfills so long as one or more of the following conditions are met:

—The captive landfill is operated in conjunction with other industrial or commercial operations, and it only receives wastes generated by the industrial or commercial operation directly associated with the landfill.

—The landfill is operated in conjunction with other industrial or commercial operations and it receives both wastes generated by the industrial or commercial operation directly associated with the landfill as well as other wastes and the other wastes received for landfill disposal are generated by a facility that is subject to the same provisions in 40 CFR Subchapter N as the receiving facility directly associated with the landfill.

—The landfill is operated in conjunction with other industrial or commercial operations and it receives wastes generated by the industrial or commercial operation directly associated with the landfill as well as other wastes and the other wastes are similar in nature to the wastes generated by the industrial or commercial operation directly associated with the landfill.

—The landfill is operated in conjunction with a Centralized Waste Treatment (CWT) facility subject to 40 CFR Part 437 so long as the CWT facility commingles the landfill wastewater with other non-landfill wastewater for treatment. If a CWT facility discharges landfill wastewater separately from other CWT wastewater or commingles the wastewater from its landfill only with wastewater from other landfills, then the landfill discharge is subject to this part.

—The landfill is operated in conjunction with other industrial or commercial operations, and it receives wastes from public service activities (as defined in Appendix A) and the landfill does not receive a fee or other remuneration for the disposal service.

For the final rule, EPA has modified the proposal to remove the requirement that a facility must commingle its wastewater from a captive landfill with the facility's non-landfill process wastewater for treatment in order not to be subject to the landfills effluent guideline, in most circumstances. For the reasons described in detail below, EPA did not remove the commingling requirement for CWTs. In addition, EPA also changed the conditions under which captive landfills may accept off-site wastes and not be subject to this guideline.

In the proposal, EPA stated that the commingling requirement ensures that wastewater from captive landfills will undergo adequate treatment (treatment that is comparable to the level of treatment that would be required by the landfills effluent guideline) prior to discharge. EPA determined that the commingling of landfill wastewater with industrial wastewater for treatment was an unnecessary requirement to impose in nationally applicable regulations for the reasons discussed below. Permit writers are establishing appropriate limits on these discharges by either applying the effluent limitations guidelines applicable to the associated industrial activity to the discharge or developing other BPJ limitations. EPA recommends that permit writers use this guideline when developing these BPJ limitations.

From the information developed by the Agency for this rulemaking and confirmed by comments on the proposal, EPA has concluded that landfill wastewater generated by captive landfills operated in conjunction with and receiving the bulk of their waste from an industrial or commercial operation will have a similar pollutant profile to the wastewater generated in the industrial or commercial operation. EPA has further concluded that the wastewater generated by landfill operations at most of the captive facilities are already subject to effluent guidelines. In the circumstances in which the wastewater is not expressly subject to effluent guidelines, EPA has determined that permit writers generally impose BPJ limitations on the discharge of landfill wastewater that are similar to the limitations applicable to the discharge of industrial process wastewater whether commingled or not. EPA has compared the wastewater treatment technologies employed at many of the industrial facilities operating landfills in conjunction with the industrial or commercial operations to the treatment technologies that EPA used as the basis for the BPT/BAT limits in this effluent guideline. The Agency's review of such situations shows that the landfill wastewater receives treatment that is comparable or better than the level of treatment that would be required by the landfills effluent guideline.

Consequently, EPA has decided to eliminate the requirement of commingling as a condition for a captive landfill not to be subject to landfill limitations and standards (except in the case of CWTs). EPA has concluded that landfill wastewater at captive landfills is now and will continue to receive adequate treatment because the landfill wastewater generally must meet the same effluent limitations that would have been required had the waste streams been commingled. In cases where the permit writer is establishing BPJ limitations for the discharge of captive landfill wastewater that is not commingled for treatment, the permit writer should look at the effluent guidelines applicable to the associated industrial operation and the effluent guidelines being promulgated today for potential guidance in setting those limitations.

Because of the nature of most CWTs, EPA determined that the reasons that generally supported exclusion of other captive landfills would not apply in the case of CWTs. As explained above, EPA concluded that a captive landfill which only received wastes generated in an industrial or commercial operation directly associated with the landfill or similar wastes would generate a leachate with a similar pollutant profile to the other wastewater streams produced at the industrial operation. In such circumstances, the data reviewed by EPA showed that the landfill wastewater and other industrial wastewater are generally commingled for treatment and subject to the same discharge limitations. In these circumstances, it was appropriate not to subject the landfill wastestream to this guideline.

Because a CWT, by its very nature, may generate a wide array of different solid wastes for landfill disposal, it may generate a leachate that varies significantly from other streams being treated at the CWT at the time the leachate is collected. Therefore, EPA concluded that the basis for the exclusion—the similarity in wastewater—would not necessarily apply in the case of CWTs. EPA decided that, in order to ensure that the CWT landfill wastewater is treated adequately, that the landfill wastewater from a CWT landfill should be commingled with other CWT wastewater for treatment.

Based on comments received, the Agency also determined that the requirement in the proposal that solid wastes deposited in the captive landfill must either be generated on-site or from an off-site facility under the same corporate structure was too restrictive and could often prohibit a company from safely and properly disposing of solid wastes accepted from tolling, remediation, product stewardship, and public service activities.

In the proposal, EPA narrowly limited the universe of captive landfills that fall outside the scope of this rule to captive landfills that only accepted wastes from on-site or from off-site facilities under the same corporate structure. The reason for this was essentially to ensure that the captive landfills were only accepting wastes that would be similar to those wastes generated on-site. This in turn would provide some degree of assurance that the leachate generated from these wastes would be compatible with the on-site industrial wastewater treatment. However, from the comments submitted on this issue, EPA determined this waste acceptance criterion for the captive exclusion was too restrictive. Those commenting on this issue identified several waste acceptance practices that are commonly used by captive landfills that would not meet the proposed exclusion criteria but are consistent with EPA's objective that landfill leachate receive treatment compatible with its expected constituents. Many of these current waste disposal practices are activities that EPA encourages, and therefore EPA has revised the exclusion criteria pertaining to waste acceptance for captive/intracompany landfills in order to accommodate these disposal practices.

Specifically, several commenters requested that EPA broaden the criteria for determining those captive landfills that fall outside the scope of this rule to include waste acceptance from tolling and contract manufacturers, product stewardship, company partnerships, and remediation activities. EPA concluded that waste disposal at captive landfills from these types of activities will, in most cases, result in leachate that will be adequately controlled through the implementation of categorical or BPJ limitations at the facility. However, EPA remains concerned that there are circumstances in which inter-company waste products deposited in the landfill may result in contaminants in the leachate that may not be compatible with the existing industrial wastewater treatment system or may not be covered adequately by the existing industrial effluent guideline. Therefore, one of the alternative conditions for the revised applicability provisions of the guideline described above for captive landfills provides that waste accepted at the captive landfill must be of a similar nature to the wastes generated at the operation with the associated landfill. Thus, the permitting authority must determine that wastes accepted for disposal at a captive landfill are of a similar nature to the waste generated at the facility directly associated with the captive landfill. Factors that the permit writer should consider in determining whether a waste is similar are described at Section [VIII].

In addition, commenters also requested that EPA include the acceptance of wastes for disposal as a public service as a category of landfill practices that qualify for the captive exclusion. EPA agrees and has included such a provision. EPA applauds the efforts of manufacturing facilities who provide members of their communities with a cost effective and environmentally safe means for disposing of their solid waste. Therefore, in the final rule, EPA determined that this rule shall not apply to those landfills operated in conjunction with other industrial or commercial operations which receive other wastes from public service activities so long as the company owning the landfill does not receive a fee or other remuneration for the disposal service. EPA's decision not to subject captive landfills that accept off-site wastes for disposal as a public service is not inconsistent with its decision generally to condition non-applicability on the similarity of wastes accepted for disposal. Based on its review of data collected for this guideline and comments received, EPA concluded that the quantity of wastes accepted for disposal as a public service would not in any measurable way affect the pollutant profile of the leachate generated by the landfill even if dissimilar. Of course, these wastewater flows still remain subject to treatment to achieve BPJ permit limits reflecting the landfill contribution to the facility discharge.

The Agency has determined that whether captive landfills accepting wastes from off-site or from a company not within the same corporate structure on a non-commercial basis should be subject to the landfills effluent guideline should hinge on the ability of the captive landfill to handle the waste in an appropriate manner. Therefore, the Agency concluded that waste acceptance criterion for determining those captive landfills that fall outside the scope of this rule should be based on the similarity of the waste accepted for disposal from another facility to the waste generated by the industrial or commercial operation directly associated with the landfill. In the case of captive landfills treating similar

wastes, the permit writer should base permit limits on limitations for the guideline to which the industrial or commercial operation is subject or establish BPJ limitations. Again, the permit writer, if developing BPJ limitations, should consider today's guidelines as guidance in this effort.

2. Landfill Wastewater—The wastewater covered by the rule includes leachate, gas collection condensate, drained free liquids, laboratory-derived wastewater, contaminated storm water and contact washwater from truck exteriors and surface areas which have come in direct contact with solid waste at the landfill facility. However, ground water and wastewater from recovery pumping well operations which have been contaminated by a landfill and are collected and discharged are excluded from this guideline and covered by BPJ limitations. This section later discusses the exclusion from the rule for contaminated ground water flows and Section [VIII] of today's final rule addresses implementation issues associated with contaminated ground water. The wastewater associated with the landfills industry is described below.

a. Leachate, as defined in 40 CFR 258.2, is liquid that has passed through or emerged from solid waste and contains soluble, suspended, or miscible materials removed from such waste. Over time the potential for certain pollutants to move into the wider environment increases. As water passes through the landfill, it may ''leach'' pollutants from the disposed waste moving them deeper into the soil. This presents a potential hazard to public health and the environment through ground water contamination and other means. One measure used to prevent the movement of toxic and hazardous waste constituents from a landfill is a landfill liner operated in conjunction with a leachate collection system. Leachate is typically collected from a liner system placed at the bottom of the landfill. Leachate also may be collected through the use of slurry walls, trenches or other containment systems. The leachate generated varies from site to site based on a number of factors including: the types of waste accepted; operating practices (including shedding, daily cover and capping); the depth of fill; compaction of wastes; annual precipitation; and landfill age. Landfill leachate accounts for over 95 percent of the wastewater covered by this rule.

b. Gas Collection Condensate is liquid which has condensed in a gas collection system during the extraction of gas from the landfill. Gases such as methane and carbon dioxide are generated due to microbial activity within the landfill and must be removed to avoid hazardous, explosive conditions. In gas collection systems, gases containing high concentrations of water vapor condense in traps staged throughout the gas collection network. The gas condensate may contain volatile, semi-volatile, and metal compounds and usually accounts for a relatively small percentage of flow from a landfill.

c. Drained Free Liquids are aqueous wastes drained from waste containers (e.g. drums, trucks) or wastewater resulting from waste stabilization prior to landfilling. Landfills which accept containerized waste may generate this type of wastewater. Wastewater generated from these waste processing activities is collected and usually combined with other landfill generated wastewater for treatment at the wastewater treatment plant.

d. Truck/Equipment Washwater is generated during either truck or equipment washes at landfills. During routine maintenance or repair operations, trucks and/or equipment used within the landfill (e.g., loaders, compactors, or dump trucks) are washed and the resultant wastewater is collected for treatment. In addition, it is common practice for many facilities to wash the wheels, body, and undercarriage of trucks used to deliver the waste to the open landfill face upon leaving the landfill. On-site wastewater treatment equipment and storage tanks are also periodically cleaned.

e. Laboratory-Derived Wastewater is generated from on-site laboratories which characterize incoming waste streams and monitor on-site treatment performance.

f. Contaminated storm water is storm water which comes in direct contact with landfill wastes, the waste handling and treatment areas, or wastewater that is subject to the limitations and standards. Some specific areas of a landfill that may produce contaminated storm water include (but are not limited to) the open face of an active landfill with exposed waste (no cover added), the areas around wastewater treatment operations, trucks, equipment or machinery that has been in direct contact with the waste, and waste dumping areas.

g. Non-contaminated storm water includes storm water which does not come in direct contact with landfill wastes, the waste handling and treatment areas, or wastewater that are subject to the limitations and standards. Non-contaminated storm water includes storm water which flows off the cap, cover, intermediate cover, daily cover, and/or final cover of the landfill.

EPA received extensive comments on its proposal to include contaminated storm water as a regulated waste stream under the landfills effluent guidelines. Several commenters stated that contaminated storm water (storm water that comes into contact with solid waste at the landfill site) should not be subject to the landfills effluent limitations guidelines because this is already covered by the Final National Pollutant Discharge Elimination System Storm Water Multi-sector General Permit (MSGP) for Industrial Activities (60 FR 50803).

The Storm Water Pollution Prevention Plan (SWPPP) required by the storm water MSGP or an authorized State's equivalent general permit requires landfill facilities to identify all of the sources of storm water contamination at the landfill and then implement measures and controls (such as good housekeeping for materials storage, sediment and erosion controls—particularly from intermediate and final covers) in an effort to prevent storm water contamination. EPA believes that the storm water MSGP (or an authorized State's equivalent general permit) adequately controls pollutants from storm water runoff from covered areas of the landfill.

Covered areas of the landfill include the following: capped, final cover, intermediate cover, and daily cover areas. The Agency believes that the SWPPP and the monitoring requirements in the storm water MSGP provide adequate controls for reducing the level of pollutants in storm water from these areas of landfills.

EPA recognizes that there may be some incidental contact with wastes when storm water flows over a daily or intermediate cover. However, EPA concluded that such contact will not lead to any meaningful ''contamination'' of the storm water so long as the landfill complies with the requirements of the storm water MSGP or an authorized State's equivalent general permit. For example, the Best Management Practices (BMPs) outlined in Table L–1 and L–2 of the storm water MSGP (60 FR 50940) and the monitoring requirements in Table L–5 and L–6 for TSS and total recoverable iron (60 FR 50943) provide adequate controls for the pollutants that would most likely be associated with runoff from covered areas of non-hazardous landfills.

Similarly, for hazardous landfills, BMPs and monitoring requirements outlined in Table K–2 (60 FR 50935) and Table K–3 (60 FR 50936), respectively, also require controls for pollutants associated with runoff from covered areas of a landfill. In EPA's

view, BMPs provide a fair degree of control of these pollutants and the monitoring requirements of the MSGP provide a tool for evaluating the effectiveness of the pollution prevention plan.

As part of the Agency's continuing effort to improve its environmental and pollution control programs, EPA has concluded that, although the MSGP provides some control for contaminated storm water runoff, the landfills effluent limitations guidelines provide a more comprehensive level of control for storm water runoff that has come in direct contact with solid waste, waste handling and treatment areas, or wastewater flows that are controlled under this rule. Although the storm water MSGP considered circumstances in which untreated leachate may be incidently commingled with storm water, the Agency explicitly acknowledged in the MSGP that insufficient data were available to establish numeric limits for storm water that might be contaminated based on best available technology for municipal solid waste landfills (MSWLFs) (60 FR 50942), non-hazardous industrial landfills (60 FR 50943), and hazardous landfills (60 FR 50935).

However, EPA has now concluded that the data collected in support of the landfills effluent limitations guidelines provide the basis for establishing appropriate numeric limitations for contaminated storm water. EPA specifically noted in the preamble for the storm water MSGP that it was developing these guidelines and that where the guidelines applied to discharges, facilities must comply with them. (60 FR 50942). In addition, EPA intends to propose a reissuance of the storm water MSGP which would include the promulgated landfills effluent limitations for contaminated storm water (as defined by these guidelines).

EPA fully explains its rationale for including contaminated storm water as a regulated wastewater for the landfills effluent guideline in the Comment Response document found in the Landfills Public Record.

h. Contaminated ground water is water below the land surface in the zone of saturation which has been contaminated by landfill leachate. For the final rule, EPA has not included within the scope of regulated flows ground water which has been contaminated by a landfill and is collected and discharged. The reasons for this decision are as follows.

During development of the rule, EPA considered whether it should also include contaminated ground water flows within the scope of this guideline. Historically, many landfill operations have caused the contamination of local ground water, mostly as a result of leakage from unlined landfill units in operation prior to the minimum technology standards for landfills established by RCRA Subtitle C and D regulations. Subsequently, State and Federal action under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) has required facilities to clean up contaminated ground water. In many cases this has resulted in the collection, treatment and discharge of treated ground water to surface waters. In addition, in the case of RCRA Subtitle C hazardous waste landfills and municipal solid waste landfills (MSWLFs), applicable regulatory standards require ground water monitoring and post-closure care and, in the event of ground water contamination, corrective action measures. These requirements may also result in treatment of contaminated ground water by such landfill facilities.

EPA evaluated flows, pollutant concentrations, treatment in place, and current treatment standards for discharges of contaminated ground water from landfills. From this evaluation, EPA concluded that pollutants in contaminated ground water flows are often very dilute or are treated to very low levels prior to discharge. EPA concluded that, whether as a result of corrective action measures taken pursuant to RCRA authority or State action to clean up contaminated landfill sites, landfill discharges of treated contaminated ground water are being adequately controlled. Consequently, further regulation under this rule would be redundant and unnecessary.

EPA is aware that there are landfill facilities that collect and treat both landfill leachate and contaminated ground water flows. In the case of such facilities, EPA has concluded that decisions regarding the appropriate discharge limits should be left to the judgment of the permit writer. As indicated above, contaminated ground water may be very dilute or may have characteristics similar in nature to leachate. In cases where the ground water is very dilute the Agency is concerned that contaminated ground water may be used as a dilution flow. In these cases, the permit writer should develop BPJ permit limits based on separate treatment and/or discharge of the ground water flows or develop BPT/BAT limits based on a flow-weighted building block approach in order to prevent dilution of the regulated leachate flows. However, in cases where the ground water may exhibit characteristics similar to leachate, commingled treatment is appropriate because it is more cost effective and environmentally beneficial than separate treatment. EPA recommends that the permit writer consider the characteristics of the contaminated ground water before making a determination if commingling ground water and leachate for treatment is appropriate. See Section [VIII].

i. Recovering Pumping Wells wastewater is generated as a result of the various ancillary operations associated with ground water pumping operations. These operations include construction and development, well maintenance, and well sampling (*i.e.,* purge water). The wastewater will have very similar characteristics to contaminated ground water. Therefore, for the same reasons that EPA did not include contaminated ground water as a regulated wastewater, these regulations do not apply to wastewater from recovering pumping well operations.

C. Subcategorization

EPA proposed to divide the landfills point source category into two subcategories and to develop different limitations and standards for RCRA Subtitle C landfills and RCRA Subtitle D landfills. After reviewing comments on the subcategorization approach, EPA decided to promulgate effluent limitations guidelines using the same subcategorization approach outlined in the proposed rule.

For today's final rule, EPA decided that a single set of effluent limitations were not appropriate for the landfills industry and thus EPA developed different limitations for subcategories within the industry. In reaching its decision that subcategorization is required, EPA considered various factors. In developing effluent limitation guidelines, the Clean Water Act (CWA) requires EPA to assess a number of factors, including manufacturing processes, products, the size and age of a site, water use, and wastewater characteristics. The landfills industry is not typical of many other industries regulated under the CWA. Therefore, EPA looked at additional factors specifically tailored to the characteristics of landfill operations in deciding what limitations were appropriate for landfills. The factors considered for subcategorization included RCRA classification, types of wastes received, wastewater characteristics, facility size, age, ownership status, location, economic impacts, treatment technology

employed, energy requirements, and non-water quality environmental impacts. Based on an evaluation of these factors, EPA determined that there was a notable distinction between wastewater associated with Subtitle C landfills and that from Subtitle D landfills. A wider range of toxic organic pollutants and higher concentration of metals were found at the Subtitle C landfills. Thus, the most significant differences observed in wastewater characteristics at landfills are directly related to the wastes received at the landfill, which, in turn, is most obviously linked to the landfill's RCRA status. Therefore, EPA concluded that the most appropriate basis for subcategorization is by landfill classification under RCRA.

Additionally, the Agency believes that this subcategorization approach has the virtue of being easiest to implement because it follows the same classification previously established under RCRA and currently in use (and widely understood) by permit writers and regulated entities. The Agency believes that any subcategorization at odds with existing RCRA classification approaches would potentially create unnecessary confusion to the regulated community.

Subpart A of 40 CFR Part 445, ''RCRA Subtitle C Hazardous Waste Landfill Subcategory,'' applies to wastewater discharges from a solid waste disposal facility subject to the criteria in 40 CFR Part 264 Subpart N—Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities and 40 CFR Part 265 Subpart N—Interim Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities. Hazardous waste landfills are subject to requirements outlined in 40 CFR Parts 264 and 265 that include the requirement to maintain a leachate collection and removal systems during the active life and post-closure period of the landfill. For a discussion of these criteria, see the preamble to the proposed landfill guideline at 63 FR 6426, 6430–31. (February 6, 1998).

Subpart B of 40 CFR Part 445, ''RCRA Subtitle D Non-Hazardous Waste Landfill Subcategory,'' applies to wastewater discharges from all landfills classified as RCRA Subtitle D non-hazardous landfills subject to either of the criteria established in 40 CFR Parts 257 (Criteria for Classification of Solid Waste Disposal Facilities and Practices) or 258 (Criteria for Municipal Solid Waste Landfills). For a discussion of these criteria, see the preamble to the proposed landfill guideline at 63 FR 6426, 6431–32. (February 6, 1998).

EPA received a number of comments requesting that EPA further subdivide Subtitle D landfill facilities according to the specific type of waste received. These commenters claimed that the differences in wastewater characteristics between municipal solid waste landfills and monofills warranted further subcategorization. In addition, a group representing utility ash monofills suggested EPA develop separate limitations for such landfills. The group asserted that the organic content in ash monofill wastewater was so low that it would not sustain biological treatment, which EPA used as the basis for BPT, BCT, BAT and NSPS limitations. EPA did consider subcategorizing the Non-Hazardous subcategory further but chose not to based on several factors explained in detail in Section [X]. EPA decided to include monofills in the Non-Hazardous subcategory and concluded that, based on the available raw wastewater data, such facilities can meet the BPT/BAT limitations using technologies that are available at costs no greater than those technologies EPA evaluated (and determined to be economically achievable) for the universe of Subtitle D facilities.

D. Profile of the Landfills Industry

At proposal, EPA stated that there were approximately 11,000 landfill facilities located throughout the country in 1992. EPA has determined that the vast majority of these facilities either closed prior to the enactment of Subtitle C or Subtitle D regulations or do not generate wastewater covered by this regulation. Based on survey responses, EPA believes that the final guidelines will affect 143 facilities.

In the case of landfills subject to regulation under Subtitle D, EPA projects that there are 143 stand-alone landfill facilities that discharge in-scope wastewater directly to receiving streams. EPA estimates that there are 756 stand-alone Subtitle D landfill facilities that collect in-scope wastewater but discharge indirectly to a POTW. These facilities will not be affected by this final rule because EPA is not establishing pretreatment standards for non-hazardous, Subtitle D landfills. EPA determined that these discharges did not generally pass through or interfere with POTW operations so as to require national pretreatment standards. There are an additional 338 Subtitle D facilities that collect in-scope wastewater but do not discharge to surface waters or to POTWs and are also not affected by today's rule. These facilities dispose of their wastewater by hauling off-site to a centralized waste treatment facility, evaporation, recirculation back to the landfill, or land application.

With respect to landfills subject to regulation under Subtitle C, EPA estimates that there are no hazardous stand-alone landfill facilities discharging directly to surface waters. It is possible, however, that EPA's data collection efforts did not identify an existing, stand-alone direct discharging hazardous landfill facility or that an indirect (or zero discharging), stand-alone hazardous landfill facility may become a direct discharger. Consequently, EPA is establishing effluent limitations for direct discharging hazardous landfills. EPA estimates that there are six stand-alone hazardous landfill facilities that discharge indirectly to POTWs. In response to comments on the proposal, EPA decided not to establish pretreatment standards for hazardous Subtitle C landfills again because it decided national standards were not required. EPA estimates that there are 139 hazardous landfills which collect in-scope wastewater but do not discharge wastewater to surface waters or to a POTW. Methods of wastewater disposal include hauling wastewater off-site to a centralized waste treatment facility, underground injection, and solidification. Additionally, EPA estimates that there are more than 150 industrial facilities which contain landfills but would be excluded from this regulation as a result of the factors discussed at Section [III.B].

E. Technology Basis for Final Rule

This section explains how EPA selected the technologies that form the basis for effluent limitations and standards being promulgated today for the Hazardous Landfill and Non-Hazardous Landfill subcategories. For both the proposed and final rule, EPA developed information to evaluate the performance of various systems for treating landfill wastewater. EPA's database consisted of daily effluent data collected from the Detailed Monitoring Questionnaire and EPA's Wastewater Sampling Program. (EPA's data gathering efforts are explained in detail in the preamble to the proposal at 63 FR 6433–35.)

EPA has revised the database since the proposal for a number of reasons. First, the regulatory status for some landfills in the database has changed. EPA excluded from the analysis landfills that were no longer considered in the scope of the rule (for example, some captive landfills). Second, some landfills in the database have changed discharge status. EPA had inadvertently included two landfill facilities as direct

dischargers in the analyses for the proposal when the facilities were actually indirect dischargers. Third, in the loadings reduction analysis for the proposed rule, EPA included removals of volatile organic compounds associated with biological treatment. However, for the final rule, EPA determined that removals of volatile organic compounds should not be included because the biological and chemical treatment options being considered did not provide treatment for the volatile compounds. Fourth, for the final rule, EPA also revised the long-term averages for several pollutants to reflect more accurately the pollutant removals achieved by the technology options. The Agency based these revisions on re-analysis of the dataset used for proposal.

The effluent limitations EPA is establishing today are based on well-designed, well-operated systems. EPA based the final limitations on treatment achieved by landfill facilities employing the selected technologies. A landfill operator may, however, use any wastewater treatment technology and/or waste management practices to meet the numerical wastewater discharge limitations.

1. Best Practicable Control Technology Currently Available (BPT)

In today's rulemaking, EPA is establishing BPT effluent limitations for the two discharge subcategories for the Landfills Point Source Category. The BPT effluent limitations promulgated today will control identified conventional, priority, and nonconventional pollutants when discharged from landfill facilities. For further discussion of the basis for the limitations, technologies selected, and the factors EPA considered in its decision, see the Technical Development Document and the preamble to the proposed rule at 63 FR 6441.

a. BPT Options Considered and Selected for the RCRA Subtitle D Landfills Subcategory. The BPT options analyzed for today's final rule are identical to those evaluated for the proposal. In the Agency's engineering assessment, EPA first considered three technologies commonly in use by landfills and other industries as options for BPT. These technology options were chemical precipitation, biological treatment, and multimedia filtration.

For its evaluation of chemical precipitation, EPA collected raw wastewater and treated effluent data from several non-hazardous landfills employing this treatment. Based on this data, EPA removed chemical precipitation from further consideration as a BPT treatment option. While chemical precipitation is an effective treatment technology for the removal of metals, non-hazardous landfills typically have low concentrations of metals in treatment system influent wastewater. Observed metals concentrations were typically not found at levels that would inhibit biological treatment or that would be effectively removed by a chemical precipitation unit. Therefore, EPA considered only the following two options for BPT.

- Option I—Biological Treatment. EPA first assessed the pollutant removal performance of biological treatment. EPA selected this as Option I due to its effectiveness in removing the large organic loads commonly associated with leachate. BPT Option I consists of aerated equalization followed by biological treatment. EPA included various types of biological treatment such as activated sludge, aerated lagoons, and anaerobic and aerobic biological towers or fixed film reactors in calculating limits for this option. The Agency based the costs for Option I on the cost of aerated equalization followed by an extended aeration activated sludge system and clarification, including sludge dewatering. Approximately 30 percent of the direct discharging municipal solid waste landfills employed some form of biological treatment, and 13 percent had a combination of equalization and biological treatment.
- Option II—Biological Treatment and Multimedia Filtration. The second technology option considered for BPT treatment of non-hazardous landfill wastewater was aerated equalization and biological treatment as described in Option I, followed by multimedia filtration. Approximately 10 percent of the direct discharging municipal solid waste facilities used the technology described in Option II.

EPA is promulgating BPT effluent limitations for the Non-Hazardous Landfills subcategory based on Option II because of the demonstrated ability of biological treatment systems in controlling organic pollutants and the effectiveness of multimedia filtration in removing TSS. EPA is maintaining its decision at proposal to base BPT on Option II level of control. EPA's decision to base BPT limitations on Option II treatment reflects primarily two factors: (1) The degree of effluent reductions attainable and (2) the total cost of the treatment technologies in relation to the effluent reductions achieved.

No basis could be found for developing different BPT limitations based on age, size, process or other engineering factors. EPA responds to comments regarding the development of separate BPT limitations for monofills and BPT limitations based on the age of the landfill at Section [X].

EPA has selected Option II based on the comparison of the two options in terms of total costs of achieving the effluent reductions, pounds of pollutant removals, economic impacts, and general environmental effects of the reduced pollutant discharges. BPT Option II removed 142,000 more pounds of conventional pollutants than Option I. EPA estimated that Option I would have cost approximately $7.30 million per year (1998$, after-tax) while EPA estimated that Option II will cost only slightly more—$7.64 million per year (1998$, after-tax).

Finally, EPA also looked at the costs of all options to determine the economic impact that today's rule would have on the landfill industry. EPA's assessment showed that under either option there were significant economic impacts on only two facilities. Further discussion on the economic impact analysis can be found in Section [V] of today's notice.

EPA is today promulgating effluent limitations for the following pollutants under BPT for direct discharging non-hazardous landfills: BOD_5, TSS, pH, ammonia, alpha terpineol, benzoic acid, p-cresol, phenol, and zinc (total).

b. BPT Technology Options Considered and Selected for the RCRA Subtitle C Landfill Subcategory. EPA's survey of the hazardous landfills industry identified no in-scope landfill facilities that discharge directly to surface water. All of the hazardous landfills within the scope of today's rule are either indirect or zero/alternative dischargers. EPA consequently could not evaluate any treatment systems in place at direct discharging hazardous landfills for establishing BPT effluent limitations. Therefore, EPA relied on information and data from widely available treatment technologies in use at hazardous landfill facilities discharging indirectly and at non-hazardous landfills discharging directly—so-called ''technology transfer.'' EPA concluded that the technology in place at some indirect hazardous landfills is appropriate to use as the basis for regulation of direct dischargers because the pollutant profile of the leachate generated at hazardous waste landfills discharging directly would be similar in character to that from indirect discharge hazardous waste landfills.

For the final rule, EPA considered the following three potential technology options for establishing BPT effluent

limitations for the Hazardous Landfill subcategory:

- Option I—Aerated equalization followed by chemical precipitation with primary clarification and multimedia filtration.
- Option II—Aerated equalization followed by chemical precipitation with primary clarification, biological treatment with secondary clarification and multimedia filtration.
- Option III—Zero or alternative discharge.

EPA evaluated the same treatment options for establishing limitations that it had evaluated at proposal. As previously noted, in developing the proposed limitations, EPA relied, in part, on data from non-hazardous direct dischargers employing well-operated treatment systems. In the case of the proposed TSS limitations, EPA relied on data from two facilities that followed chemical precipitation and biological treatment with multimedia filtration. While the proposal did not specifically discuss filtration as a final treatment step, the Development Document for the proposal fully explained the treatment system, including multimedia filtration, in place at the two facilities used to develop the proposed TSS limitation.

EPA evaluated chemical precipitation as a treatment technology because of metals concentrations typically found in hazardous landfill leachate and the efficient metals removals achieved through chemical precipitation. EPA also evaluated biological treatment as an appropriate technology because of its ability to remove organic loads present in the leachate. The Agency also considered multimedia filtration to be an appropriate technology for consideration. In the first two options listed above, multimedia filters are effective in removing TSS that might remain after primary or secondary clarification. Finally, EPA considered a zero or alternative discharge option as a potential BPT requirement because a significant segment of the industry is currently not discharging wastewater to surface waters or to POTWs. The zero or alternative disposal option would require facilities to dispose of their wastewater in a manner that would not result in wastewater discharge to a surface water or a POTW.

EPA eliminated Option I from consideration because it did not control organic pollutants effectively. As was the case in the proposal, EPA also decided to eliminate Option III because, for the industry as a whole, zero or alternative discharge options are either not viable or the cost is wholly disproportionate to the pollutant reduction benefits and thus it is not ''practicable.'' Methods of achieving zero or alternative discharge currently in use by hazardous landfills are deep well injection, solidification, and contract hauling of wastewater to a Centralized Waste Treatment (CWT) facility or to a landfill wastewater treatment facility. Thirty seven facilities are estimated to inject landfill wastewater underground on-site; 103 facilities send their wastewater to a CWT or landfill treatment system; and one facility solidifies wastewater.

The commenters' submissions support EPA's decision to reject zero or alternative discharge as the technology basis for BPT (or BAT) limitations for hazardous landfills. While EPA supports the use of zero or alternative discharges particularly where it does not result in media transfer of pollutants, many of the available zero discharge options have identifiable shortcomings such as transfer of waste residuals to another media or the availability of an alternative disposal option only in certain geographic locations.

For example, one demonstrated alternative disposal option for large wastewater flows is underground injection. However, this is not considered a practically available option on a nationwide basis because it is not allowed in many geographic regions of the country where landfills may be located. These restrictions may preclude underground injection at a given landfill. In such circumstances, landfills would need to resort to contract hauling to a Centralized Waste Treatment (CWT) facility. Unless the CWT itself were a zero discharge facility, the ultimate result would be treatment and discharge to surface waters or a POTW following waste treatment that may be no more effective than that which could have been provided on-site. This might result in substantial transportation costs for the landfill and associated non-water quality, environmental impacts (e.g., truck emissions) resulting in no net reduction in the discharge of pollutants. EPA's survey demonstrated that only landfills with relatively low flows (under 500 gallons per day) currently contract haul their wastewater to a CWT. The costs of contract hauling are directly proportional to the volume of wastewater and distance over which it must be transported, generally making it excessively costly to send large wastewater flows to a CWT, particularly if it is not located nearby.

EPA evaluated the cost of requiring all hazardous landfills to achieve zero or alternative discharge status. For the purposes of costing, EPA assumed that a facility would have to contract haul wastewater off-site because it may be impossible to pursue other zero or alternative discharge options. EPA concluded that the cost of contract hauling off-site for high flow facilities was unreasonably high and disproportionate to the removals potentially achieved. In addition, EPA concluded that the wastewater shipped to a CWT will typically receive treatment equivalent to that promulgated today, and that zero/alternative discharge requirements would result in additional costs to discharge without greater removals for hazardous landfill wastewater.

Based on the characteristics of hazardous landfill leachate and on an evaluation of appropriate technology options, the Agency selected Option II (aerated equalization followed by chemical precipitation and biological treatment with secondary clarification followed by multimedia filtration) as BPT technology for the Hazardous subcategory. EPA's decision to base BPT limitations on Option II treatment reflects primarily two factors: (1) the degree of effluent reductions attainable and (2) the total cost of the treatment technologies in relation to the effluent reductions achieved.

Although EPA did not identify any existing hazardous landfill facilities that discharged directly to surface waters, EPA estimated the cost of treatment and pollutant removal for a medium-sized facility. EPA estimates that for a facility with a wastewater flow of 25,000 gallons per day, the selected technology option would result in the removal of over 200,000 pounds of pollutants at an annualized cost of $192,400. EPA has determined that the selected technology option costs are reasonable in light of the projected pollutant removals. Because EPA did not identify any existing hazardous landfill facilities that discharged directly to surface waters, EPA's compliance costs for BPT for this subcategory are zero.

As previously noted, EPA relied on data from both hazardous and non-hazardous facilities to develop the limitations for this subcategory. Because there are currently no hazardous landfills discharging directly, EPA used data from indirectly discharging facilities to develop the limitations.

EPA identified three Subtitle C landfills that discharge to POTWs. The wastewater flow from one of the three facilities was very small (less than 1,000 g.p.d.) and consisted of only gas collection condensate and required only minimal treatment (neutralization using ammonia) prior to discharge to the POTW. Consequently, EPA did not consider this facility as appropriate for

establishing BPT limitations. The two remaining facilities both had treatment systems in place that achieved very good pollutant reductions. The treatment at one facility consisted of equalization and chemical precipitation followed by activated sludge biological treatment with secondary clarification. The second facility utilized equalization followed by three ''sequencing batch reactor'' biological treatment units operated in parallel. The treatment systems in place at these indirect hazardous facilities achieved low effluent concentrations with average removals of 88 to 98 percent of organic toxic pollutants, and 55 to 80 percent of metal pollutants. Thus, EPA concluded that it should use both facilities in the development of the Hazardous subcategory BPT limitations for nonconventional and toxic pollutants.

However, for the ammonia, BOD_5, and TSS limitations, EPA concluded that establishing BPT limits based solely on two indirect discharging treatment systems was not appropriate because indirect dischargers often do not operate their treatment systems to achieve optimal control of these pollutants. In the case of BOD_5 and TSS, POTWs do not often establish local standards because the POTWs install treatment designed specifically to treat these pollutants. In the case of ammonia, some POTWs do not establish standards because they have installed advanced treatment for ammonia control. Other POTWs may establish ammonia standards based on local water quality concerns. EPA supplemented the Hazardous subcategory data for these three pollutants with data from non-hazardous landfill facilities. For BOD_5, EPA used data from both of the Hazardous subcategory BPT facilities and the Non-Hazardous subcategory BPT facilities to calculate the limitations. Because neither of the Hazardous subcategory BPT facilities used a multimedia filter (which is part of the selected BPT Option), EPA based the TSS limitation on the two Non-Hazardous subcategory BPT facilities that employed multimedia filtration.

In the case of ammonia, EPA concluded that it was not appropriate to establish limits using the performance of only indirect discharging facilities because only one of these facilities in the Hazardous subcategory demonstrated good ammonia control. Many POTWs with advanced or tertiary treatment units for nutrient control may not establish stringent local limits for ammonia. Therefore, basing ammonia limits only on indirect discharging landfills may not appropriately reflect the effluent discharge concentration of ammonia achieved by well-operated direct discharging landfills. Since EPA considered only one indirectly discharging hazardous facility to be a good performer for the treatment of ammonia, EPA chose to supplement the hazardous data for this facility with data from two non-hazardous BPT facilities, one of which was a direct discharger.

2. Best Conventional Pollutant Control Technology (BCT)

In today's rule, EPA is establishing BCT effluent limitations guidelines equivalent to the BPT guidelines for the conventional pollutants for both subcategories. (For an explanation of how EPA determines BCT, see the preamble to the proposed rule at 63 FR 6442.) In developing BCT limits, EPA considered whether there are technologies that achieve greater removals of conventional pollutants than selected for BPT, and whether those technologies are cost-reasonable according to EPA's test. In each subcategory, EPA identified no technologies that can achieve greater removals of conventional pollutants than selected for BPT that are also cost-reasonable, and accordingly EPA is promulgating BCT effluent limitations equal to the BPT effluent limitations guidelines.

3. Best Available Technology Economically Achievable (BAT)

EPA today is establishing BAT effluent limitations for both subcategories in the Landfills Category based on the same technologies selected for BPT. The BAT effluent limitations promulgated today would control identified priority and nonconventional pollutants discharged from facilities. EPA finds that the selected technology options are economically achievable. EPA has not identified any more stringent treatment technology option which it considered to represent BAT level of control applicable to facilities in this industry.

a. Rationale for Setting BAT Equivalent to BPT for the Non-Hazardous Landfill Subcategory. EPA evaluated reverse osmosis technology as a potential option for establishing BAT effluent limits more stringent than BPT for the control of toxic pollutants. The Agency selected reverse osmosis for evaluation because of its effective control of a wide variety of toxic pollutants in addition to controlling conventional and nonconventional parameters.

EPA evaluated BAT treatment options as an increment to the baseline treatment technology used to develop BPT limits. Therefore, the BAT Option III consisted of BPT Option II (biological treatment followed by multimedia filtration) followed by a single stage reverse osmosis unit.

After an assessment of costs and pollutant reductions associated with reverse osmosis, EPA has concluded that it should not establish BAT limits based on more stringent treatment technology than the BPT technology. EPA concluded that a biological system followed by multimedia filtration would remove the majority of toxic pollutants, leaving the single-stage reverse osmosis to treat the very low levels of pollutants that remained. In the Agency's analysis, BPT removed 170,000 pounds of toxic pollutants per year whereas BAT Option III (BPT followed by single-stage reverse osmosis) removed 172,000 pounds of toxic pollutants per year. As stated in the proposal, EPA's economic assessment showed that BAT Option III had significantly higher annual compliance costs than the other options evaluated and resulted in six additional facilities experiencing moderate economic impacts. (63 FR 6451).

In addition, establishment of BAT Option III would not result in effluent limitations significantly more stringent than those established under BPT, which is currently achieving very low long-term average (LTA) effluent concentrations. Therefore, the Agency questioned whether the small additional removal of pounds of toxic pollutants achieved by BAT Option III justified the large incremental cost for the reverse osmosis treatment system. It should be noted that reverse osmosis was much more effective at removing the often high quantities of dissolved metals such as iron, manganese and aluminum. These pollutants, however, are added to the wastewater in treatment chemicals to promote more effective precipitation and are not regulated. For this reason, EPA does not include them in the calculation of pounds of toxic pollutants and does not take credit for their subsequent removal .

Several commenters on the proposal supported EPA's decision to reject reverse osmosis as the selected technology option. While EPA rejected reverse osmosis as the basis for BAT limitations because it was very expensive and achieved very little additional removal of pollutant, other technical factors also supported this decision. EPA agrees with the commenters that there may be additional site-specific costs associated with the operation of reverse osmosis systems at landfills that it could not directly factor into its cost analysis. EPA found that it was difficult to evaluate potential operating and concentrate

disposal problems and the associated potential increase in the cost of operating a reverse osmosis system at a landfill. The fact that reverse osmosis is a technology that concentrates rather than destroys pollutants is an important consideration. These concentrates still need to be treated and disposed, and, as noted by one commenter, some states may not allow them to be recycled back into the landfill. Further, recirculation may inhibit rather than stimulate anaerobic decomposition of the landfilled wastes. While the sludges generated by chemical precipitation and biological treatment require minimal treatment prior to disposal, reverse osmosis concentrates may require additional costly treatment steps prior to final disposal.

b. Rationale for Setting BAT Equivalent to BPT for the Hazardous Landfill Subcategory. As stated in the BPT analysis, EPA's survey of the hazardous landfills industry identified no in-scope respondents which were classified as direct dischargers. All of the hazardous landfills in the EPA survey were indirect or zero or alternative dischargers. Therefore, the Agency based BPT limitations on technology transfer and treatment systems in place for indirect dischargers in the Hazardous subcategory and on treatment systems in place for BPT facilities in the Non-Hazardous subcategory. In EPA's engineering assessment of possible BAT technologies for direct discharging hazardous facilities, EPA evaluated the same three potential technology options it had evaluated when it was developing BPT limitations for the Hazardous Landfill subcategory. EPA determined that it should establish BAT limits based on the same technology evaluated for BPT limits. The Agency finds that the selected technology is economically achievable. EPA has identified no other technologies that would represent BAT level of control for this industry.

As explained in the BPT analysis, EPA eliminated Option I (equalization, chemical precipitation, and multimedia filtration) from consideration because it did not control organic pollutants effectively. In addition, EPA concluded that zero or alternative discharge is not an available alternative treatment technology for this industry. As explained above, zero or alternative discharge is not broadly applicable to landfills or may result in the transfer of waste residuals to other media.

4. New Source Performance Standards (NSPS)

a. Introduction. As previously noted, under Section 306 of the Act, new industrial direct dischargers must comply with standards which reflect the greatest degree of effluent reduction achievable through application of the best available demonstrated control technologies. Congress envisioned that new treatment systems could meet tighter controls than existing sources because of the opportunity to incorporate the most efficient processes and treatment systems into plant design. Therefore, Congress directed EPA, in establishing NSPS, to consider the best demonstrated process changes, in-plant controls, operating methods, and end-of-pipe treatment technologies that reduce pollution to the maximum extent feasible.

b. Rationale for Setting NSPS Equivalent to BPT/BCT/BAT for Both Subcategories. Today, EPA is establishing New Source Performance Standards (NSPS) that would control the same conventional, priority, and nonconventional pollutants regulated by the BPT/BCT/BAT effluent limitations guidelines. The conventional treatment technologies used to control pollutants at existing facilities are fully applicable to new facilities. Furthermore, EPA has not identified any other technologies or combinations of technologies that are demonstrated for new sources that are different from those used to establish BPT/BCT/BAT for existing sources. In the proposed rule, EPA solicited comments and data on other technologies that may be appropriate for the treatment of landfill leachate from new sources. One commenter urged EPA to consider reverse osmosis as an appropriate technology for the treatment of leachate. While EPA acknowledges that reverse osmosis can treat landfill leachate to levels equivalent to and even lower than the BAT limitations promulgated today, EPA concluded that the reverse osmosis treatment system and the BAT treatment system achieved essentially the same removals because reverse osmosis did not remove significantly more pounds of toxic pollutants than the treatment option selected as BAT. Moreover, as previously explained, there may be potential operating and disposal problems associated with a reverse osmosis system. Therefore, EPA concluded that it should adopt NSPS limitations that are identical to those in each subcategory for BPT/BCT/BAT.

5. Pretreatment Standards For Existing Sources (PSES)

Section 307(b) of the Act requires EPA to promulgate pretreatment standards for pollutants that are not susceptible to treatment by POTWs or which would interfere with the operation of POTWs. After a thorough analysis of indirect discharging landfills in the EPA database, EPA has decided not to establish PSES for either subcategory in the Landfills Point Source Category. For the proposal, EPA proposed *not* to establish pretreatment standards for indirectly discharging landfills in the Non-Hazardous subcategory. However, for the Hazardous subcategory, EPA proposed effluent limitations and pretreatment standards for six pollutants. In response to its proposal, EPA received a number of comments supporting the decision not to propose pretreatment standards for Subtitle D landfills. In addition, a number of commenters suggested that EPA should also reconsider whether Subtitle C landfills require national categorical pretreatment standards. As a result of these comments, EPA took a second look at its data and determined that pretreatment standards were not necessary for the Landfills Point Source Category.

For both subcategories, EPA looked at a number of factors in deciding whether a pollutant was not susceptible to treatment at a POTW or would interfere with POTW operations—the predicate to establishment of pretreatment standards. First, EPA assessed the pollutant removals achieved at POTWs relative to those achieved by landfills using BAT treatment systems. Second, EPA estimated the quantity of pollutants likely to be discharged to receiving waters after POTW removals. Third, EPA studied whether any of the pollutants introduced to POTWs by landfills interfered with or were otherwise incompatible with POTW operations. EPA, in some cases, also looked at the costs and other economic impacts of pretreatment standards and the effluent reduction benefits in light of treatment systems currently in-place at POTWs. The result of EPA's evaluation showed that POTWs could adequately treat discharges of landfill pollutants. Therefore, EPA is not establishing pretreatment standards for either subcategory in this point source category.

As noted above, among the factors EPA considers before establishing pretreatment standards is whether the pollutants discharged by an industry pass through a POTW or interfere with the POTW operation or sludge disposal practices. One of the tools traditionally used by EPA in evaluating whether pollutants pass through a POTW, is a comparison of the percentage of a pollutant removed by POTWs with the percentage of the pollutant removed by discharging facilities applying BAT. In most cases, EPA has concluded that a

pollutant passes through the POTW when the median percentage removed nationwide by representative POTWs (those meeting secondary treatment requirements) is less than the median percentage removed by facilities complying with BAT effluent limitations guidelines for that pollutant. For a full explanation of how EPA performs its removal analysis, see Chapter 7 of the Technical Development Document.

In developing the final guidelines, EPA has made a number of modifications to its calculations of pollutant removal used to compare POTW operations with BAT treatment. These changes are explained in greater detail in this preamble as well as the Technical Development Document and EPA responses to individual comments received on the proposal. For example, the primary source of POTW percent removal data used for removal comparisons is an EPA document, ''Fate of Priority Pollutants in Publicly Owned Treatment Works'' (EPA 440/1–82/303) commonly referred to as the ''50–POTW Study''. The 50–POTW Study presents data on 50 well-operated POTWs with secondary treatment in removing toxic pollutants. For its removal comparison for this guideline, EPA eliminated influent values that were close to the detection limit, thereby minimizing the possibility that low POTW removals might simply reflect low influent concentrations instead of being a true measure of treatment effectiveness.

After revising the database, EPA calculated POTW-specific percent removals for each pollutant based on its average influent and average effluent values. The POTW percent removal used for each pollutant for the comparison is the median value of all the POTW-specific percent removals for that pollutant. EPA then compared the median POTW percent removal to the median percent removal for the BAT option treatment technology in order to determine pass through.

a. Rationale for Not Promulgating PSES for the Non-Hazardous Landfill Subcategory. The Agency today is not establishing pretreatment standards for existing sources (PSES) for the Non-hazardous Landfill Subcategory. The Agency decided not to establish PSES for this subcategory after an assessment of the effect of landfill leachate on receiving POTWs and the cost of pretreatment standards.

EPA looked at three measures of effects on POTWs: biological inhibition levels, contamination of POTW biosolids and a comparison of BAT and POTW removals. For the proposed rule, following procedures outlined above, the removal comparison suggested that one pollutant, ammonia, would pass through in the Non-Hazardous subcategory. However, EPA concluded that ammonia was susceptible to treatment and did not interfere with POTW operations. Therefore, the Agency did not propose to establish national pretreatment standards for ammonia.

Following the proposal, EPA reviewed the data available in the proposed record for both the POTW percent removal calculations and the BAT percent removal calculations and made a number of adjustments. For the proposal, EPA calculated the BAT percent removals using data from well-operated biological treatment facilities in EPA's database. However, some of these facilities did not pass the editing criteria for selection as a BPT/BAT facility. For the revised removal comparison, EPA calculated percent removals using data from only those seven facilities that passed the BPT/BAT editing criteria. In addition, in the proposal, EPA inadvertently neglected to use selected BAT facilities in the calculation of percent removals for several pollutants even though the data for the facility passed the editing criteria.

The result of this revised comparison of removal for the Non-Hazardous subcategory suggested that BAT removal would be greater than POTW removal for four pollutants: ammonia, benzoic acid, p-cresol, and phenol. However, as explained below, EPA concluded that these pollutants do not pass through or interfere with POTW operations on a national basis and therefore has not established national categorical pretreatment regulations for these pollutants. Moreover, as discussed later in this section, EPA notes that adoption of PSES would result in the removal of only a small quantity of pollutants, approximately 14 toxic pound equivalents per facility per year. Such a reduction is low relative to that seen in other categorical pretreatment standards promulgated by EPA. (See 64 FR 45077).

(i.) Pretreatment Standards for Ammonia. EPA has decided not to establish ammonia pretreatment standards for several reasons. First, while EPA's removal comparison suggests that ammonia in landfill leachate is not as amenable to POTW treatment as to pretreatment, in reality, EPA has concluded that ammonia is susceptible to POTW treatment on a national basis. Further, landfill discharges will not result in POTW upsets or interfere with POTW operations. The record indicates that POTWs are not currently experiencing any difficulty in adequately treating ammonia discharges from Subtitle D landfills. No POTWs commenting on the proposal cited any persistent POTW upsets associated with landfill leachate discharges. Finally, EPA has determined that pretreatment standards for ammonia for landfill indirect dischargers would be extremely costly. In these circumstances, EPA has concluded that ammonia is susceptible to treatment by POTWs and national pretreatment standards are not required.

Ammonia Removals. In the case of ammonia, the median BAT percent removal for the landfills industry is 99 percent compared to the median POTW percent removal which is 39 percent. [4] This comparison suggests that ammonia is not susceptible to treatment at a POTW and passes through. However, as discussed below, most subtitle D landfills discharging to POTWs are discharging small quantities of leachate with an ammonia concentration comparable to that observed in raw sewage.

EPA's data show that over 75 percent of indirectly discharging landfills discharge fewer than 10 pounds of ammonia per day at a concentration similar to that observed in raw sewage. Because many POTWs are designed and operated to treat ammonia (and other pollutants) in raw sewage, a POTW will adequately control landfill discharges of ammonia so long as the ammonia loadings to a POTW did not significantly differ from that typically observed. In those circumstances, ammonia will not pass through such POTWs.

Moreover, some POTWs have installed additional treatment to control ammonia. The data on POTW removal used for EPA's comparison does not reflect this fact. POTWs that have installed additional ammonia treatment (or modified existing treatment) typically achieve removals in excess of 95 percent—much higher than the 39 percent removal observed for the POTWs in the comparison analysis. Thus, ammonia does not pass through POTWs with nitrification even in cases where significant loadings of ammonia are discharged to a POTW.

In these circumstances, EPA has concluded ammonia at levels discharged by Subtitle D landfills is generally susceptible to POTW treatment. Therefore, EPA concluded that ammonia limits are best established

[4] For the proposed rule, EPA calculated the POTW percent removal for ammonia to be 60 percent. However, upon applying the revised data editing procedures to the 50–POTW Study, EPA has now determined that ammonia POTW percent removal is 39 percent.

by local POTWs based on site specific conditions in accordance with the POTW's design treatment capacity and existing mass loadings.

Upset and Interference. EPA also assessed the ammonia concentrations and loads received by POTWs from Subtitle D leachate discharges to evaluate potential upsets or interference with POTW treatment systems. EPA concluded that national pretreatment standards were not required to prevent interference with POTW operations.

In terms of landfill leachate ammonia concentrations discharged to POTWs, only one of the Subtitle D landfill facilities in EPA's database is currently discharging (*i.e.* after treatment, if treatment is in place) wastewater to a POTW which contains more than 105 mg/L of ammonia. The remainder of the indirect discharging Subtitle D landfills discharged an average concentration of 37 mg/L of ammonia to POTWs, with one-half of the facilities discharging less than 32 mg/L. Typical ammonia concentrations in raw domestic sewage range from 12 to 50 mg/L (''Operation of Municipal Wastewater Treatment Plants: Manual of Practice, Volume II,'' Water Pollution Control Federation).

The one facility in EPA's database that was discharging more than 105 mg/L of ammonia to a POTW was discharging 1,018 mg/L of ammonia to a 114 MGD POTW which currently has ammonia control (nitrification) in place. EPA also received influent ammonia data from several POTWs that commented on the proposed rule. The average ammonia influent concentration to POTWs ranged from 14 mg/L to 35 mg/L with an average concentration of 17 mg/L. Therefore, with the exception of the one outlier, the average concentration of ammonia in leachate discharged to POTWs (37 mg/L) noted in EPA's data closely parallels POTW experience (35 mg/L). However, it should be noted that the upper ranges of leachate concentrations were higher than the upper ranges observed in domestic sewage. Nevertheless, in most instances, observed ammonia discharge levels to POTWs fall within a POTW's treatment capabilities. Thus, EPA determined that the vast majority of Subtitle D landfills are discharging ammonia to POTWs at levels comparable to that which POTWs in the ordinary course of operations receive and treat in raw domestic sewage.

No POTWs commenting on the proposal cited any specific incidents where POTW acceptance of landfill leachate containing high levels of ammonia caused persistent upsets at the POTW. The data are consistent with that supplied by commenters and further supported EPA's understanding prior to the proposal of no documented persistent problems at POTWs due to ammonia concentrations in landfill leachate.

EPA also analyzed the effects that ammonia concentrations found in landfill leachate can have on the biological treatment systems at POTWs. In this analysis, EPA compared the concentrations of ammonia found in leachate with the activated sludge biological minimum threshold toxicity value (or inhibition value). With respect to ammonia, the inhibition value for activated sludge systems is 480 mg/L (Guidance Manual on the Development and Implementation of Local Discharge Limitations Under the Pretreatment Program, Volume 1. EPA, November 1987). The average raw wastewater concentration of ammonia found in Subtitle D landfills in EPA's database was 199 mg/L for direct, indirect and zero dischargers. In addition, all of the average and median ammonia concentration values observed in the data submitted to EPA in comments were below the activated sludge inhibition value. EPA has consequently determined that ammonia does not represent a threat to biological treatment systems that would require establishment of pretreatment standards.

Effect on Receiving Streams. Subsequent to the proposal, EPA evaluated total wastewater flows and loads of ammonia to receiving streams associated with non-hazardous landfill indirect dischargers (an estimated 756 facilities). EPA estimated that the non-hazardous landfill industry discharges 2.7 million pounds per year of ammonia to POTWs, which results in 1.6 million pounds per year being discharged to receiving streams, assuming that the POTWs have secondary treatment achieving 39 percent removal but do not have additional treatment for ammonia control. However, as mentioned above, EPA is aware that many POTWs have installed additional treatment specifically for the control of ammonia and typically achieve removals in excess of 95 percent. A review of EPA's 1996 Clean Water Needs Survey and its Permit Compliance System database indicates that approximately 20 percent of the POTWs in the U.S. employ some sort of ammonia control. Over 75 percent of the Subtitle D landfills in EPA's database discharge less than 10 pounds per day to the POTW (3,500 pounds/year), which results in discharging less than six pounds per day (2,100 pounds/year) to receiving streams, again assuming secondary treatment only and no additional POTW ammonia controls. In light of existing ammonia control in place at POTWs, actual discharges to receiving streams are likely to be even smaller.

Cost of Pretreatment Standards. EPA has evaluated the economic costs of ammonia pretreatment standards. EPA's economic assessment of these options demonstrated very high removal costs with low associated pollutant removals. Given the high cost, EPA concluded that it is not appropriate to establish national pretreatment standards to address the limited circumstances in which POTW removal might not match BAT removal performance.

EPA evaluated the costs of pretreatment standards in terms of the toxic pound equivalents. Pounds-equivalent is a term used to describe a pound of pollutant weighted by its toxicity relative to copper. These weights are known as toxic weighting factors. The Agency calculates pounds-equivalents by multiplying the pounds of a pollutant discharged from a landfill by the toxic weighting factor for that pollutant. The use of pounds-equivalent reflects the fact that some pollutants are more toxic than others.

The first treatment option that EPA evaluated for pretreatment of ammonia from non-hazardous landfills is biological treatment. EPA evaluated PSES Option I equivalent to BPT/BAT Option I, which was equalization plus biological treatment. (EPA did not evaluate a multimedia filter for PSES because the levels of TSS in landfill leachate will be adequately controlled by a POTW.) This option had a total annualized cost of $34.6 million (1998 dollars). Biological treatment removed 10,650 pound-equivalents annually, or an average of 14 pound equivalents per facility per year. This represents a cost of removal of $1,900/lb-equivalents (1981 dollars) and represents the cost of removing all of the pound-equivalents removed, not just ammonia. If EPA took credit only for the pound-equivalents of ammonia removed, the annual removal cost for this option is $7,100/lb-equivalents (1981 dollars). Moreover, these calculations are based on the assumption that POTWs will only remove 39 percent of the ammonia discharged to it. If POTWs remove more ammonia than that assumed, then the cost of each pound of pollutant removed by the industrial user raises. Given the installation of additional ammonia controls at many POTWs, actual ammonia removal by POTWs will be greater than assumed.

The second technology option EPA evaluated for the control of ammonia is ammonia stripping with appropriate air pollution controls. However, according

to EPA's survey of the landfills industry, only two percent of survey respondents use this technology for the treatment of landfill leachate. In addition, air or steam stripping is more commonly used for treatment of wastewater containing concentrations of ammonia that are several orders of magnitude greater than those typically found in landfill wastewater. Therefore, EPA concluded that biological treatment systems are more appropriate for the treatment of the ammonia concentrations found in landfill leachate. In addition, air stripping for ammonia removal generally requires warm climates, and therefore this may not be a viable treatment option for all landfills located in the United States. In these circumstances, effluent levels associated with air stripping may not be attainable in all cases and thus not broadly available in the landfill industry. In addition, the air stripping option for the treatment of ammonia has an estimated annualized cost of $15.1 million (1998 dollars, pre-tax costs). The cost-effectiveness for this option is also high, $4,400/lb-equivalents (1981 dollars).

As explained above, EPA concluded that the vast majority of POTWs experience no difficulty in treating the ammonia loads received from landfill indirect dischargers and that as a result there is generally no pass through of ammonia from landfill leachate on a national basis. Moreover, the cost of pretreatment is not warranted by the limited circumstances where pretreatment *would* result in reduced ammonia to surface water. But there are POTWs without additional controls for ammonia that may not be equipped to handle landfill leachate ammonia discharges. Consequently, in the proposal, EPA requested comments on requiring ammonia pretreatment standards for those landfills discharging to POTWs that do not have ammonia controls in place. Several commenters supported no pretreatment standard because of their conclusion that ammonia loads from landfills made up an insignificant amount of the total ammonia loads discharged to POTWs. Others favored pretreatment standards because of smaller POTWs that do not employ nutrient removal systems. EPA, however, is not convinced that national ammonia pretreatment standards are warranted even where landfills are discharging to POTWs without ammonia controls given the high cost of pretreatment and current ammonia concentrations in landfill leachate discharged to POTWs that are generally consistent with values observed in raw sewage. Special ammonia situations are best addressed by the local POTW based on site specific conditions in accordance with the POTW's design treatment capacity and existing mass loadings.

All of these factors discussed above confirm EPA's decision not to establish national ammonia pretreatment standards. EPA has concluded that landfills typically discharge wastewater to POTWs containing ammonia concentrations that can be adequately treated by POTWs. Further, in cases where ammonia loading rates are at levels which may be of concern or where ammonia discharges are a water quality concern, POTWs retain the ability to establish local limits on ammonia.

(ii.) Pretreatment Standards for Benzoic Acid— Benzoic Acid Pass-through Analysis. As stated above, for the proposal, benzoic acid was not one of the pollutants EPA determined would pass through. However, after the proposal, EPA reviewed the BAT facilities and the representative POTW facilities used for the removal comparison and determined that it had not used the appropriate editing rules. As a result of these revisions, the comparison showed that the median percent removal for benzoic acid at the landfills BAT facilities was 99 percent compared to the median POTW percent removal which was determined to be 81 percent. Because the 50–POTW database does not contain information on the percent removal of benzoic acid, EPA used the National Risk Management Research Laboratory database (formerly known as the Risk Reduction Engineering Laboratory (RREL) database) to estimate the percent removal. (For more information on EPA's use of the RREL database, see Chapter 7 of the Technical Development Document.)

Despite the difference in the BAT and POTW percent removals, further analysis of the data showed that both systems were achieving the same level of treatment of benzoic acid. That is, both the RREL database facilities representing POTWs and the landfills BAT facilities were treating benzoic acid down to non-detect levels (50 μg/L). Therefore, the smaller percent removal achieved by facilities in the RREL database (used to represent the POTW percent removal) is a function of lower influent concentrations at those facilities and is not necessarily indicative of inferior treatment at POTWs. EPA concluded that benzoic acid in these circumstances is susceptible to treatment at the POTW and does not pass through.

Benzoic acid loads discharged to POTWs. In addition, EPA also evaluated the total flows and loads of benzoic acid discharged from non-hazardous landfills to POTWs. EPA compared the current discharge loads to the loads that would be anticipated after the implementation of pretreatment standards. As was explained above, EPA evaluated Option I (biological treatment) as the appropriate treatment technology and has analyzed the costs and benefits of pretreatment standards for the Non-Hazardous subcategory for this option. According to EPA's estimates, non-hazardous landfills currently discharge approximately 4,700 pounds of benzoic acid to POTWs per year resulting in an annual discharge of 900 pounds to receiving streams. PSES Option I (biological treatment) would reduce this annual discharge to receiving streams to 400 pounds per year. The average non-hazardous facility discharges only 6.4 pounds of benzoic acid annually (less than 0.02 pounds per day), and the median discharge is only 1.9 pounds per year. Furthermore, benzoic acid has a toxic weighting factor of only 0.0003. Therefore, for the entire indirect discharging non-hazardous landfills population (approximately 756 facilities), Option I would only remove an additional 0.16 pound-equivalents per year.

As a result of the above analysis, EPA determined that national pretreatment standards for benzoic acid are not necessary because benzoic acid is susceptible to treatment by POTWs. POTWs and landfill BAT facilities both treat benzoic acid down to non-detect levels. In addition, EPA determined that the pounds of benzoic acid currently being discharged by landfills are compatible with POTW treatment and that pretreatment standards would result in little further reduction of benzoic acid.

(iii.) Pretreatment Standards for p-cresol—p-Cresol Pass-through Analysis. Like benzoic acid, p-cresol also did not pass-through POTWs according to EPA's pass-through analysis at proposal. However, the result of its revised removal comparison showed some difference in removal. The landfills median BAT percent removal for p-cresol is 99 percent, while the estimated median POTW percent removal is 68 percent. (Again, because the 50–POTW database does not contain percent removal data for p-cresol, EPA used the RREL database to determine POTW removal.)

p-Cresol concentrations and loads discharged to POTWs. EPA also analyzed the flows and loads of p-cresol being discharged from non-hazardous

landfills to POTWs. According to EPA's estimates, non-hazardous landfills currently discharge approximately 2,730 pounds of p-cresol to POTWs per year resulting in an annual discharge of 870 pounds to receiving streams. PSES Option I (biological treatment) would reduce this discharge to receiving streams to 130 pounds/year. Furthermore, p-cresol has a toxic weighting factor of only 0.0024. Therefore, the implementation of Option I results in an additional reduction of only 3.0 pound-equivalents per year across the entire Subtitle D indirect discharge population. On average, non-hazardous landfill facilities discharge only 3.4 pounds of p-cresol annually (or 0.01 pounds per day), and the median discharge load is only 0.7 pounds per year.

Based on the data shown above, EPA concluded that the implementation of pretreatment standards for p-cresol would result in only minimal reductions in the pounds of p-cresol discharged to surface waters. In addition, p-cresol is found in non-hazardous landfill leachate at concentrations which will not cause upsets at POTWs nor should POTWs have difficulty effectively treating such concentrations. The median raw wastewater concentration for p-cresol at municipal landfills is 75 µg/L. This concentration is well below the Universal Treatment Standard (UTS) of 770 µg/L established for F039 wastes (multi-source leachate) in 40 CFR 268.48.[5]

(iv.) Pretreatment Standards for Phenol. Although phenol appeared to pass through, EPA decided not to establish pretreatment standards for phenol based on the fact that phenol is highly biodegradable and is treated by POTWs to the same degree as the landfill direct dischargers. Furthermore, the Agency concluded that the differences in influent concentrations caused the apparent difference in removal performance between landfill direct dischargers and POTWs. As a result, the performance across the landfills direct dischargers showed higher removals than the performance at the POTWs.

In EPA's landfills database, raw wastewater concentrations of phenol at the BAT facilities in the Non-Hazardous subcategory were much higher than the influent concentrations at the POTWs used in the determination of the POTW percent removal. The average influent concentrations for phenol for the three non-hazardous BAT facilities used in the pass-through analysis ranged from 350 µg/L to 5,120 µg/L. All three of the facilities treated phenol down to the analytical minimum level (10 µg/L), corresponding to a median percent removal of 97.5 percent. For POTW performance, EPA used a total of eight POTWs in the analysis for POTW percent removal of phenol. The average influent concentration for phenol at these eight POTWs was 387 µg/L, and six of the eight effluent values were below the analytical minimum level and therefore assigned values of 10 µg/L. Thus, the average percent removal for the POTWs was 95.3 percent. In this case, EPA concluded that the differences in removals for POTWs (95.3 percent) and BAT facilities (97.5 percent) is an artifact of the differing influent concentrations and does not necessarily reflect a real difference in treatment performance. Therefore, EPA concluded that phenol is treated to essentially the same level by direct dischargers and POTWs and, therefore, does not pass through.

c. Technology Options Considered for PSES for Hazardous Landfill Subcategory. In the proposed rule, EPA proposed pretreatment standards for six pollutants that EPA determined to pass through in the Hazardous subcategory. However, after reviewing the comments received and re-evaluating the pollutant loads in the Hazardous subcategory, EPA has decided not to establish national pretreatment standards for Subtitle C landfills.

As previously explained, EPA establishes pretreatment standards for pollutants that are not susceptible to treatment at a POTW or for pollutants that may interfere with POTW operations. As explained at Part 1.b. of this section, for the Hazardous subcategory, EPA identified only three Subtitle C landfills, all of them indirect dischargers. EPA used data from two of these hazardous landfills to develop the BPT/BAT limitations for toxic pollutants because these landfills were using the treatment systems for their leachate that EPA determined was the BPT/BAT treatment technology.

EPA also performed an analysis for this subcategory in order to compare POTW removals with BAT treatment systems. As was the case for the Non-Hazardous subcategory, EPA revised the pass-through analysis data editing procedures after the proposal and as a result EPA's removal results have changed. The result of the revised comparison show BAT removals greater than POTW removals for the following eight pollutants: ammonia, alpha-terpineol, aniline, benzoic acid, naphthalene, p-cresol, phenol, and pyridine. For its removal comparison for ammonia, EPA compared the nation-wide median percentage of ammonia removed by well-operated POTWs to the percentage of ammonia removed by BAT treatment systems from both the Hazardous and Non-Hazardous subcategories. (For the reasons explained at Part 1.b of this section, in the case of ammonia, EPA supplemented the Hazardous subcategory data with data from non-hazardous landfill facilities.) For all other toxic pollutants, in determining whether a pollutant would pass through a POTW, the Agency compared the nation-wide median percentage of a pollutant removed by well-operated POTWs with secondary treatment to the percentage of a pollutant removed by BAT treatment systems from only the Hazardous subcategory. For the proposal, EPA proposed pretreatment standards that were equivalent to the BPT/BAT limitations for the pollutants that passed through. EPA has reconsidered its decision that it should promulgate national pretreatment standards for hazardous landfills. The reasons for this decision are explained in more detail below.

Two of the indirect discharging landfills have treatment technology in place that EPA considers to be BAT, and currently discharge very low concentrations of pollutants to their local POTWs. The third and only other indirectly discharging Subtitle C landfill for which EPA has data discharged less than 1,000 gal/day of landfill gas collection condensate to a POTW. In addition to the low wastewater flow at this landfill, the facility has relatively low raw wastewater pollutant concentrations and employs neutralization with ammonia followed by settling prior to discharge to the POTW.

Several commenters on the proposal questioned EPA's rationale for developing ammonia pretreatment standards for the Hazardous subcategory while not establishing ammonia pretreatment standards for the Non-Hazardous subcategory. EPA's database indicate that the median raw wastewater ammonia concentration for hazardous landfills is 268 mg/L as compared to the raw wastewater ammonia concentration for Subtitle D landfills which is 199 mg/L.[6] EPA has current information on

[5] EPA bases UTS on the Best Demonstrated Available Treatment Technology (BDAT) for each listed hazardous waste. BDAT represents the treatment technology that EPA concludes is the most effective for treating a particular waste that is also readily available to generators and treaters.

(iv.) Pretreatment Standards for Phenol.

[6] In the comments received on the proposal, some commenters referred to the Hazardous subcategory median ammonia raw wastewater concentration

ammonia concentration in wastewater discharges for two of the three Subtitle C landfills in EPA's database. One of the landfills employs biological treatment and discharges an average of 4.9 mg/L of ammonia to the POTW. The other landfill employs chemical precipitation prior to biological treatment and discharges ammonia at an average concentration of 156 mg/L. This discharge level presents no apparent problem to the receiving POTW. According to discussions with this facility and the POTW, the POTW has not set local pretreatment standards for ammonia for this landfill, and the POTW does not perform nitrification nor is there an ammonia limit in the POTW's NPDES permit. Since 1995, the POTW has seen the ammonia concentration at its headworks increase from 13 mg/L to 20 mg/L and has experienced some upsets at the POTW. However, the POTW explained that it was unsure whether the upsets are a result of the increased ammonia concentrations or due to some other constituent in the wastewater. In addition, the POTW is not sure if the landfill leachate discharge is contributing at all to the upsets. As was the case in the Non-hazardous subcategory, EPA concluded that national pretreatment standards for ammonia are not warranted by the small quantity of ammonia being discharged to POTWs from landfills in this subcategory and due to the site specific water quality and POTW nitrification issues associated with ammonia.

Although the removal comparison suggests that phenol may pass through, EPA decided not to establish pretreatment standards for it because it is highly biodegradable and is, in fact, treated by POTWs to the same degree as the landfill direct dischargers. The Agency concluded that any apparent difference in removals in the removal comparison is an artifact of differing influent concentrations rather than any difference in performance between landfill direct dischargers and POTWs.

In EPA's landfills database, raw wastewater concentrations of phenol at the two BAT facilities in the Hazardous subcategory were much higher than the influent concentrations at the POTWs used in the determination of the POTW percent removal. The average influent concentrations for phenol for the two hazardous BAT facilities used in the pass-through analysis ranged from 5,120 μg/L to 98,500 μg/L, and the average effluent concentrations ranged from 10 μg/L to 814 μg/L corresponding to an average percent removal of 99.8 percent. For POTW performance, EPA used a total of eight POTWs in the analysis for POTW percent removal of phenol. The average influent concentration for phenol at these eight POTWs was 387 μg/L, and six of the eight effluent values were below the analytical minimum level and therefore assigned values of 10 μg/L. Thus, the average percent removal for the POTWs was 95.3 percent, and therefore EPA determined that the pollutant passed through. In this case, EPA concluded that the pass-through determination is an artifact of the differing influent concentrations and does not necessarily reflect a real difference in removals. Therefore, EPA concluded that phenol is treated to essentially the same level by direct dischargers and POTWs and, therefore, does not pass through.

Further review of the comparison for alpha-terpineol, aniline, benzoic acid, naphthalene, and pyridine under the revised analysis showed that all of these pollutants were treated down to non-detect levels in both the landfill's BAT treatment option and in the RREL facilities representing POTWs. That is, both BAT facilities and POTWs achieve the same level of treatment for these pollutants, and the differences in removal once again were simply a function of smaller influent concentrations at facilities representing POTWs. (Alpha-terpineol and benzoic acid are compounds for which a high removal efficiency would be expected at a POTW due to their relatively high biodegradability.) Therefore, the Agency determined that, not only are the current pollutant loads not a problem for POTWs, but also all of these pollutants are present in concentrations that are treated down to non-detect levels in a well-operated POTW. Thus, given the small loadings and low concentrations of these pollutants, EPA concluded that these five pollutants are susceptible to treatment at the POTW and do not pass through.

Furthermore, EPA has concluded that while the removal comparison suggests that two pollutants, naphthalene and aniline, may not be susceptible to POTW treatment, in fact, they will receive equivalent treatment. First, the median untreated wastewater concentration observed in EPA's data collection effort for these pollutants is less than the Universal Treatment Standards (UTS) EPA has developed for these pollutants in F039 wastes (multi-source leachate) in 40 CFR 268.48. The UTS for naphthalene is 0.059 mg/L which is slightly greater than the median concentration found in hazardous landfills (0.049 mg/L). The UTS standard for aniline is 0.81 mg/L while the median concentration in hazardous landfills is 0.237 mg/L. Second, aniline and naphthalene (as well as p-cresol and pyridine) will be removed from wastewater through attachment to the biosolids in the POTW's biological treatment system and then undergo subsequent biodegradation while entrained in the biosolids.

In addition, as noted above, the revised comparison shows a lower POTW removal for p-cresol than that achieved by BAT treatment. However, as was the case in the Non-Hazardous subcategory, EPA has concluded that the concentrations of p-cresol and the associated loadings discharged to POTWs from landfills in the Hazardous subcategory would be insignificant compared to the total loads received at the POTW. The median Subtitle C raw wastewater concentration for p-cresol is 144 μg/L (this includes only Subtitle C landfills and not the CERCLA data included in the median on page 6–44 of the Proposed Landfills Development Document) which is less than the UTS developed for p-cresol in F039 wastes which is 770 μg/L (40 CFR 268.48).

Therefore, based on the small quantity of pollutants involved and low pollutant concentrations discharged from landfills in the Hazardous subcategory, EPA concluded that national pretreatment standards for landfills in the Hazardous subcategory are unnecessary. In addition, EPA concluded that local limits are adequately controlling wastewater discharges from Subtitle C landfills.

6. Pretreatment Standards for New Sources (PSNS)

a. Introduction. Section 307 of the Act requires EPA to promulgate both pretreatment standards for new sources (PSNS) and new source performance standards (NSPS). New indirect discharging facilities, like new direct discharging facilities, have the opportunity to incorporate the best available demonstrated technologies including: process changes, in-facility controls, and end-of-pipe treatment technologies.

b. Rationale for Setting PSNS Equivalent to PSES for Both Subcategories. In today's rule, EPA has

referred to in Table 6–8 on page 6–44 of the Proposed Landfills Development Document (EPA–821–R–97–022). This table lists the median ammonia raw wastewater concentration of 8.6 mg/L. However, this median concentration included numerous CERCLA facilities with discharges that consisted primarily of ground water. After proposal, EPA recalculated the median ammonia raw wastewater concentration for the Hazardous subcategory using only data from Subtitle C landfills in EPA's database. This results in a median raw wastewater ammonia concentration of 268 mg/L.

decided not to establish pretreatment standards for new sources for both subcategories for many of the same reasons that EPA did not establish PSES limits. As stated in the PSES discussions above, EPA concluded that the typical concentrations of pollutants in landfill leachate are not at levels that will cause problems for POTWs. In addition, EPA determined that the relatively small wastewater flows from landfills coupled with the concentrations of pollutants typically found results in a small pollutant loading rate discharged to POTWs from landfills. Finally, in site-specific cases where a particular pollutant may be found at concentrations that are of concern to the POTW, EPA concluded that local pretreatment standards are the most appropriate means for controlling such discharges.

F. Development of Effluent Limitations

EPA based the final effluent limitations in today's notice on widely-recognized statistical procedures for calculating long-term averages and variability factors. The following presents a summary of the statistical methodology used in the calculation of effluent limitations.

EPA bases effluent limitations for each subcategory on a combination of long-term average effluent values and variability factors that account for variation in day-to-day treatment performance within a treatment plant. The long-term averages are average effluent concentrations that have been achieved by well-operated treatment systems using the processes described in the following section (Treatment Systems Selected for Basis of Regulation). The variability factors are the results of a calculation of the ratio of a high effluent value that would be expected to occur only rarely relative to long-term average effluent values. The purpose of the variability factor is to allow for normal variation in effluent concentrations. A facility that designs and operates its treatment system to achieve a long-term average on a consistent basis should be able to comply with the daily and monthly limitations in the course of normal operations.

EPA developed the variability factors and long-term averages from a data base composed of individual measurements on treated effluent. The Agency uses a combination of EPA sampling data and industry supplied data. While EPA sampling data reflect the performance of a system over a five day period, industry supplied data (collected through the Detailed Monitoring Questionnaire) reflect up to three years worth of monitoring data. EPA used a combination of EPA and industry supplied data whenever possible in order to better account for the variability of leachate over time. For further information on the calculation of effluent limitations, see Chapter 11 of the Technical Development Document.

G. Treatment Systems Selected for Basis of Regulation

1. Non-Hazardous Subcategory BPT Facility Selection

There were 46 in-scope landfill facilities in the EPA database that employed various forms of biological treatment considered for BPT/BAT for the Non-Hazardous subcategory. EPA evaluated these facilities selected as potential BPT/BAT candidates to determine the performance across the various types of biological treatment systems. In order to determine the best performers for biological treatment EPA established a number of criteria. The first criterion used in the selection of the best facilities was effective treatment of BOD_5. Under this criterion, there were several reasons why a facility might be eliminated from the selection of BPT/BAT facilities. First, EPA required that both influent and effluent BOD_5 data be available so that the Agency could evaluate the effectiveness of the biological treatment system at the facility. In addition, EPA eliminated those facilities whose BOD_5 influent data were less than 100 mg/L because EPA did not consider the wastewater at these facilities to be representative of the landfills population as a whole. Because EPA based BPT/BAT limitations on the effectiveness of biological treatment, the Agency eliminated facilities that used additional forms of treatment (other than biological treatment) for BOD_5 removal. The final requirement for BPT/BAT selection in the Non-Hazardous landfill subcategory was that the biological treatment system at the facility had to achieve a BOD_5 effluent concentration less than 50 mg/L. EPA determined that facilities not able to maintain an effluent concentration below 50 mg/L were not operating their biological systems effectively.

After applying the criteria above, EPA identified seven facilities that met all of the BPT/BAT criteria. These seven facilities employed various types of biological treatment systems including activated sludge, a sequencing batch reactor, aerobic and anaerobic biological towers or fixed film, and aerated ponds or lagoons. Most of the facilities employed equalization tanks in addition to the biological treatment while several facilities also employed chemical precipitation and neutralization in their treatment systems. Clarification or sedimentation stages followed the biological treatment systems. EPA used data from all seven facilities employing well-operated biological treatment systems to calculate the effluent limitations for BOD_5. (For those BPT facilities that employed both chemical precipitation as well as biological treatment, EPA determined that the biological treatment systems, and not the chemical precipitation systems, were removing the BOD_5 from the landfill wastewater. Therefore, EPA used these facilities for the calculation of BOD_5 limitations.) The average influent BOD_5 concentrations to these seven treatment systems ranged from 150 mg/L to 7,600 mg/L, and as mentioned above, all of the average effluent concentrations for these seven facilities were below 50 mg/L.

EPA used the data from the seven facilities identified as having good biological treatment systems to calculate the limits for additional pollutant parameters, including alpha terpineol, ammonia, benzoic acid, p-cresol, phenol, and zinc. Because one facility employed air stripping, EPA did not use its data for determining the limit for ammonia. In addition, EPA did not use facilities that operated chemical precipitation systems in addition to biological treatment for the calculation of the zinc limitation. Many of the facilities selected as BPT/BAT did not provide data for all the pollutants identified for regulation by EPA. In these cases, EPA based the effluent limitations on the BPT/BAT facilities for which data were available.

While the BOD_5 edits discussed above ensure good biological treatment and a basic level of TSS removal, treatment facilities meeting this level may not necessarily be operated for optimal control of TSS. To ensure that the effluent limitation developed for TSS reflects proper control, EPA established additional editing criteria for TSS. The primary factor in addition to achieving the BOD_5 criteria cited above was that the facility had to employ technology sufficient to ensure adequate control of TSS, that is, a sand or multimedia filtration system. The Agency eliminated facilities that used additional forms of treatment (other than a sand or multimedia filter) for TSS removal. The second factor EPA considered was whether the treatment system achieved an effluent TSS concentration less than or equal to 100 mg/L. EPA selected treatment facilities meeting these criteria as the average best existing performers for TSS. Two of the seven

BPT/BAT facilities employed a sand or multimedia filtration system and achieved an effluent TSS concentration far less than 100 mg/L. EPA used the TSS effluent data from these two facilities to calculate the TSS limitation for the Non-Hazardous subcategory.

2. Hazardous Subcategory BPT/BAT Facility Selection

As previously noted, EPA's statistical analysis of the facility identification and survey data suggests that there are no Subtitle C landfill facilities that discharge directly to navigable water and six that discharge to POTWs. However, EPA has specifically identified only three Subtitle C landfills that discharge to POTWs. EPA is transferring data from these facilities to establish BPT/BAT limitations. The wastewater flow from one of the three facilities was very small (less than 1,000 gallons per day) and consisted of only gas collection condensate and required only minimal treatment (neutralization using ammonia) prior to discharge to the POTW. Consequently, EPA did not consider this facility as appropriate for establishing BPT/BAT limitations. The two remaining facilities both had treatment systems in place that achieved very good pollutant reductions. The treatment at one facility consisted of equalization and chemical precipitation followed by activated sludge biological treatment. The second facility utilized equalization followed by three sequencing batch reactor biological treatment units operated in parallel. The treatment systems in place at these indirect hazardous facilities achieved low effluent concentrations with average removals of 88 to 98 percent of organic toxic pollutants, and 55 to 80 percent of metal pollutants. Thus, EPA concluded that it should use both facilities in the development of the Hazardous subcategory BPT/BAT limitations for nonconventional and toxic pollutants.

However, for the ammonia, BOD_5, and TSS limitations, EPA concluded that establishing BPT/BAT limits based solely on two indirect discharging treatment systems was not appropriate because indirect dischargers often do not operate their treatment systems to achieve optimal control of these pollutants. In the case of BOD_5 and TSS, POTWs do not establish local standards because the POTWs install treatment designed specifically to treat these pollutants. In the case of ammonia, some POTWs do not establish standards because they have installed advanced treatment for ammonia control. Other POTWs may establish ammonia standards based on local water quality concerns. EPA supplemented the Hazardous subcategory data for these three pollutants with data from non-hazardous landfill facilities. For BOD_5, EPA used data from both of the Hazardous subcategory BPT/BAT facilities and the Non-Hazardous subcategory BPT/BAT facilities to calculate the limitations. Because neither of the Hazardous subcategory BPT/BAT facilities used a multimedia filter, EPA based the TSS limitation on the two Non-Hazardous subcategory BPT/BAT facilities that employed multimedia filtration.

In the case of ammonia, EPA concluded that it was not appropriate to establish limits using the performance of only indirect discharging facilities because only one of these facilities in the Hazardous subcategory demonstrated good ammonia control. Many POTWs with advanced or tertiary treatment units for nutrient control may not establish stringent local limits for ammonia. Therefore, basing ammonia limits only on indirect discharging landfills may not appropriately reflect the effluent discharge concentration of ammonia achieved by well-operated direct discharging landfills. Since only one indirect discharging hazardous BPT/BAT facility achieved BPT/BAT ammonia removals, EPA chose to supplement the hazardous data with data from two non-hazardous BPT/BAT facilities, one of which was a direct discharger.

IV. Assessment of Costs and Impacts

A. Methodology for Estimating Costs and Pollutant Reductions Achieved by Treatment Technologies

The methodology EPA used for the final rule for estimating costs and pollutant reductions achieved by the various treatment technologies is the same as the methodology used by EPA for the proposal. However, there are differences in the estimated costs and pollutant reductions from the proposed rule. These differences are a result of several revisions EPA made when reviewing the costs and loads reductions after proposal. These changes are explained in detail in the Technical Development Document at Chapter 9.

The Agency calculated pollutant reductions for each of the questionnaire recipients that would potentially be subject to this rule and then modeled the national population by using statistically calculated survey weights. EPA estimated pollutant reductions by taking the difference in the current performance of the landfill industry and the expected performance after installation of the treatment technology. The Agency estimated pollutant reductions for each pollutant of interest at each questionnaire facility. EPA determined the current performance discharge concentrations from data supplied by the facility, or in cases where the facility did not supply current wastewater discharge data for a particular pollutant, the Agency based the current discharge concentration on data supplied from similar treatment systems at similar landfills. EPA determined the discharge concentrations expected to be achieved for a particular technology option from EPA sampling data or from industry supplied data at facilities selected as the best performers.

B. Costs of Compliance

The Agency has estimated the cost for landfill facilities to achieve the effluent limitations promulgated today. Table IV.B–1 summarizes the estimated costs and the Technical Development Document discusses them in more detail. All of the cost estimates in this section are expressed in terms of 1998 dollars.

The only costs associated with this final rule are for direct discharging landfills in the Non-Hazardous subcategory. EPA did not identify any commercial hazardous landfills in the United States that discharged directly to surface waters, and thus, the Agency did not estimate any costs of compliance for direct dischargers from hazardous landfills. In addition, there are no costs associated with PSES for either subcategory because the Agency is not establishing PSES for the Landfills Point Source Category.

TABLE IV. B–1.—CAPITAL AND ANNUAL COSTS OF BPT

[In millions of 1998 dollars]

Subcategory	Number of facilities	Capital costs	Annual O&M costs
Non-Hazardous Direct Dischargers (BPT)	143	18.87	6.50
Hazardous Direct Dischargers (BPT)	0	0	0

C. Pollutant Reductions

The Agency estimated pollutant reductions for landfill facilities achieving each of the effluent limitations promulgated today. Table IV.C–1 summarizes the estimated reductions and the document ''Environmental Assessment of Final Effluent Limitations and Standards for the Landfills Category'' discusses them in more detail.

All of the pollutant reductions realized by this regulation are a result of the effluent limitations promulgated for direct dischargers in the Non-Hazardous subcategory. EPA did not identify any commercial hazardous landfills in the United States that discharged directly to surface waters, and thus, the Agency did not evaluate pollutant reductions for direct dischargers from hazardous landfills.

Furthermore, there are no pollutant reductions associated with PSES for either subcategory because the Agency is not establishing PSES limitations for the Landfills Point Source Category.

TABLE IV.C–1.—POLLUTANT REDUCTIONS ACHIEVED BY IMPLEMENTING BPT

Subbcategory	Number of facilities	Conventional pollutant removals (pounds)	Toxic pollutant removals (pounds)
Non-Hazardous Direct Dischargers (BPT)	143	600,000	323,150
Hazardous Direct Dischargers (BPT)	0	0	0

V. Economic Analysis

A. Introduction and Overview

This section summarizes EPA's analysis of the economic impacts of the final regulation. EPA describes the economic impact assessment in detail in the ''Economic Analysis for the Final Effluent Limitations Guidelines and Standards for the Landfills Category'' (hereafter ''EA''). The EA estimates the economic effect on the industry of compliance with the regulation in terms of facility closures (severe impacts) and financial impacts short of closure (moderate impacts) for privately-owned landfill facilities. For publicly-owned landfill facilities, the report estimates financial impacts short of closure. The report also includes an analysis of the effects of the regulation on new landfill facilities and an assessment of the impacts on small businesses and other small entities.

EPA estimated the economic impacts of final regulatory options in each subcategory for BPT and NSPS. The technical evaluation and description of each option and the rationale for selecting the final option is discussed in Section [III] of today's notice. EPA has based its BPT/BCT/BAT limitations for the Non-Hazardous subcategory on technology Option II, which EPA estimates will have a total annualized cost of $ 7.64 million (1998$). (For privately-owned facilities, EPA evaluated costs in terms of after-tax costs.) Table V. A–1 summarizes the costs associated with the Option II.

TABLE V. A–1.—TOTAL COSTS OF SELECTED REGULATORY OPTION

[In millions of 1998 dollars]

Selected option for the non-hazardous landfill subcategory	Total capital costs	Total O & M costs	Post-tax total annualized costs
Option II	18.87	6.50	7.64

B. Summary of Economic Impacts

1. Cost Reasonableness and Economic Impacts of BPT

As discussed above in Section [II.A], in establishing BPT limitations, EPA considers the cost of the limitations in relation to the effluent reduction benefits achieved. EPA compares these costs and benefits by first calculating pre-tax total annualized costs and total removals of TSS and BOD_5 in pounds. EPA then compares the ratio of the costs to the removals for an option to the range of ratios in previous regulations to gauge the option's relative cost. Table V.B–1 presents the results of the cost and removal comparison. In the Non-Hazardous subcategory, Option II has a ratio of $ 14 per pound. Option II is within the historical bounds of BPT cost comparisons.

TABLE V. B–1.—BPT COST REASONABLENESS ANALYSIS

Selected option for the non-hazardous landfill subcategory	Pre-tax total annualized costs (million 1998$)	Removals (lbs)	Average cost reasonableness (1998 $/lb)
II	8.57	598,579	14

EPA is promulgating BPT limitations based on Option II for both privately- and publicly-owned facilities. The impact analysis for Option II projects two facility closures as a result of compliance. The EA projects no additional economic impacts beyond these two severe impacts. The direct job losses associated with the projected closures are 20 Full Time Equivalent (FTE) positions. Table V.B–2 summarizes the economic impacts for BPT.

TABLE V. B–2.—ECONOMIC IMPACTS OF BPT

Selected option for the non-hazardous landfill subcategory	Post-tax total annualized costs (mil 1998$)	Severe impacts	Moderate impacts	Direct employment losses (FTEs)
Option II	7.64	2	0	20

2. Economic Analysis of Final NSPS limitations

EPA is establishing NSPS limitations equivalent to the limitations that are established for BPT/BCT/BAT for the Non-Hazardous and Hazardous subcategories. In general, EPA believes that new sources will be able to comply at costs that are similar to or less than the costs for existing sources, because new sources can apply control technologies more efficiently than sources that need to retrofit for those technologies. EPA has determined that BPT/BCT/BAT limitations are economically achievable and, therefore, NSPS limitations will not present a barrier to entry for new facilities.

3. Firm Level Impacts

Firms differ from facilities in that firms are business entities or companies, which may operate at several physical locations. Facilities are individual establishments defined by their physical location, whether or not they constitute an independent business entity on their own. Some of the surveyed facilities are single-facility firms. In these cases, the firm-level impact depends only on the facility-level impact. In other cases, though, facilities are owned by multi-facility firms, so that the impact on the parent firm depends not only on that facility, but also on the impacts on and characteristics of other facilities owned by the same firm.

In this analysis, the test for significant adverse impacts on firms is whether firm-level compliance costs exceed five percent of firm revenues. Using this criterion, EPA finds no significant adverse impacts on affected firms and therefore determines that the effluent guideline will not impose unreasonable economic burdens on firms that own in-scope landfills.

4. Community Impacts

EPA assesses community impacts by estimating the expected change in employment in communities with landfills that are affected by the final regulation. Possible community employment effects include the employment losses in the facilities that are expected to close because of the regulation and the related employment losses in other businesses in the affected community. In addition to these estimated employment losses, employment may increase as a result of facilities' operation of treatment systems for regulatory compliance. It should be noted that job gains will mitigate community employment losses only if they occur in the same communities in which facility closures occur.

EPA projects that the final regulation will result in two post-compliance closures, with the direct loss of 20 Full-Time Equivalent (FTE) positions. EPA estimates secondary employment impacts based on multipliers that relate the change in employment in a directly affected industry to aggregate employment effects in linked industries and consumer businesses whose employment is affected by changes in the earnings and expenditures of the employees in the directly and indirectly affected industries.

The EA projects an estimated community impact of between 49 and 89 FTE losses as the result of the final rule. The direct and secondary job losses are not expected to be significant in terms of employment impacts to affected counties. EPA estimates that the regulation will result in employment gains of an additional 79 FTEs as a result of the operation of control equipment associated with treatment systems at landfill facilities.

5. Foreign Trade Impacts

EPA does not project any foreign trade impacts as a result of the effluent limitations guidelines. International trade in landfill services for the disposal of hazardous and nonhazardous wastes is virtually nonexistent.

VI. Water Quality Analysis and Environmental Benefits

A. Introduction

EPA evaluated the environmental benefits of controlling priority and nonconventional pollutant discharges to surface waters and publicly-owned treatment works (POTWs). Pollutant discharges into freshwater and estuarine ecosystems may alter aquatic habitats, adversely affect aquatic biota, and may adversely impact human health through the consumption of contaminated fish and water. Furthermore, pollutant discharges to a POTW may interfere with POTW operations by inhibiting biological treatment or by contaminating POTW biosolids.

Many pollutants commonly found in landfill wastewater have one or more toxic effects (*e.g.,* the pollutant may be a human health carcinogen or toxic to either some human system or to aquatic life). In addition, several of these pollutants bioaccumulate in aquatic organisms and persist in the environment.

The Agency's analysis focused on the effects of toxic pollutants but did not evaluate the effects of two conventional

pollutants and five nonconventional pollutants. The pollutants not assessed included total suspended solids (TSS), five-day biochemical oxygen demand (BOD_5), chemical oxygen demand (COD), total dissolved solids (TDS), total organic carbon (TOC), hexane extractable material, and total phenolic compounds. Although the Agency is not able to monetize the benefits associated with reductions of non-toxic parameters, discharges of these parameters may have adverse effects on human health and the environment. For example, suspended particulate matter may degrade habitat by reducing light penetration and thus primary productivity and can alter benthic spawning grounds and feeding habitats by accumulation in streambeds. High COD and BOD_5 discharges may deplete oxygen levels, which can result in mortality or other adverse effects on fish.

B. Methodology Used for Estimating Water Quality Impacts and Benefits

A report prepared for this rule, ''Environmental Assessment of the Final Effluent Guidelines for the Landfill Category,'' presents the Agency's analyses of these environmental and human health risk concerns and of the water quality-related benefits resulting from the final effluent guidelines. This assessment both qualitatively and quantitatively evaluates the potential: (1) Ecological benefits; (2) human health benefits; and (3) economic productivity benefits of controlling discharges from direct discharging non-hazardous landfills based on site-specific analyses of current conditions and the conditions that would be achieved by compliance with the limitations being established today. EPA estimates in-stream pollutant concentrations from direct discharges using stream dilution modeling, and from these models, EPA estimates the potential impacts and benefits of the final rule.

EPA projects ecological benefits by comparing the steady-state in-stream pollutant concentrations, predicted after complete immediate mixing with no loss from the system, to EPA published water quality criteria guidance. Or, for those chemicals for which EPA has not published water quality criteria, EPA compares the steady-state in-stream pollutant concentrations to documented toxic effect levels (*i.e.,* lowest reported or estimated toxic concentration). In performing these analyses, EPA used guidance documents published by EPA that recommend numeric human health and aquatic life water quality criteria for numerous pollutants. States often consult these guidance documents when adopting water quality criteria as part of their water quality standards. However, because those State-adopted criteria may vary, EPA used the nationwide criteria guidance as the most representative value. EPA used the findings from the analysis of reduced occurrence of pollutant concentrations in excess of both aquatic life and human health criteria or toxic effect levels to assess improvements in recreational fishing habitats and, in turn, to estimate, if applicable, a monetary value for enhanced recreational fishing opportunities. EPA expects such benefits to manifest as increases in the value of the fishing experience per day fished or the number of days anglers subsequently choose to fish the cleaner waterways. These benefits, however, do not include all of the benefits that are associated with improvements in aquatic life, such as increased assimilation capacity of the receiving stream, improvements in taste and odor, or improvements to other recreational activities such as swimming and wildlife observation.

EPA projects human health benefits by: (1) comparing estimated in-stream concentrations to health-based water quality toxic effect levels or EPA published water quality criteria; and (2) estimating the potential reduction of carcinogenic risk and non-carcinogenic hazard from consuming contaminated fish or drinking water. EPA estimates upper-bound individual cancer risks, population risks, and non-cancer hazards (systemic) using modeled in-stream pollutant concentrations and standard EPA assumptions regarding ingestion of fish and drinking water. The Agency then used the modeled pollutant concentrations in fish and drinking water to estimate cancer risk and non-cancer hazards (systemic) among the general population, sport anglers and their families, and subsistence anglers and their families.

Due to the hydrophobic nature of one chlorinated dibenzo-p-dioxin (CDD) congener and one chlorinated dibenzofuran (CDF) congener being evaluated, EPA projected human health benefits for these pollutants by using the Office of Research and Development's Dioxin Reassessment Evaluation (DRE) model to estimate the potential reduction of carcinogenic risk and non-carcinogenic hazard from consuming contaminated fish. The DRE model estimates fish tissue concentrations of the CDD/CDF congeners by calculating the equilibrium between the pollutants in fish tissue and those adsorbed to the organic fraction of sediments suspended in the water column. EPA did not establish effluent limitations for the dioxins and furans that it detected at hazardous and non-hazardous landfills. EPA discusses the reasons for not establishing limitations for these congeners in the preamble to the proposed rule (63 FR 6438–6439) and in Chapter 6 of the Final Technical Development Document.

Of these health benefit measures, the Agency is able to monetize only the reduction in carcinogenic risk using estimated willingness-to-pay values for avoiding premature mortality. The values used in this analysis are based on a range of values from a review of studies quantifying individuals' willingness to pay to avoid increased risks to life. In 1998 dollars, these values range from $2.5 to $13.1 million per statistical life saved.

EPA evaluated the potential aquatic life and human health impacts of direct wastewater discharges on receiving stream water quality at current levels of treatment and at final BAT treatment levels. EPA performed this analysis for a representative sample set of 37 direct non-hazardous landfills discharging 26 pollutants to 35 receiving streams. EPA extrapolated the results to 143 non-hazardous landfills discharging 26 pollutants to 139 receiving streams. EPA based this extrapolation on the same statistical methodology used for estimated costs, loads, and economic impacts.

C. Estimated National Water Quality Impacts and Results

The Agency estimates that the final regulation will reduce loadings of priority and nonconventional pollutants into receiving streams by 39 percent. The model also indicates that excursions of acute aquatic life criteria or toxic effect levels due to one pollutant in two receiving streams will be eliminated at BAT discharge levels. EPA estimates that the final regulation will reduce excursions of chronic aquatic life criteria or toxic effect levels due to the discharge of ammonia in two receiving streams. EPA projects that a total of 36 excursions in 34 receiving streams at current conditions would be reduced to 34 excursions in 34 streams. Since the final rule would not reduce the estimated number of stream reaches with excursions, EPA estimates there would be no increase in value of recreational fishing to anglers based on the baseline value of the fishery and the estimated incremental benefit values associated with freeing the fishery from contaminants.

EPA modeled cancer cases and systemic health effects resulting from the ingestion of fish and drinking water contaminated by non-hazardous landfill

wastewater. EPA estimates that current wastewater discharges from landfills result in far less than one (0.003) annual cancer case per year for all populations evaluated. Final treatment options would reduce this value to 0.002 annual cancer cases per year, which would result in negligible monetized benefits ($2,100 to $11,000 per year). EPA projects systemic health effects from one pollutant (disulfoton) in two receiving streams at both current and final BAT discharge levels affecting a total population of 643 subsistence anglers and their families.

EPA's survey of hazardous landfills in the United States indicated that there were no in-scope respondents which were classified as direct dischargers. Therefore, the Agency did not evaluate potential aquatic life and human health impacts of direct wastewater discharges from hazardous landfills.

VII. Non-Water Quality Environmental Impacts

The elimination or reduction of one form of pollution may create or aggravate other environmental problems. Therefore, Sections 304(b) and 306 of the Act require EPA to consider non-water quality environmental impacts of effluent limitations guidelines and standards. Accordingly, EPA has considered the effect of these regulations on air pollution, solid waste generation, and energy consumption. While it is difficult to balance environmental impacts across all media and energy use, the Agency has determined that the impacts identified below are justified by the benefits associated with compliance with the limitations and standards.

A. Air Pollution

The primary source of air pollution from landfills is due to the microbial breakdown of organic wastes from within the landfill. Landfills are known to be major sources of greenhouse gas emissions such as methane and carbon dioxide. These emissions are now regulated under the Clean Air Act as a result of the ''Standards of Performance for New Stationary Sources and Guidelines for Control of Existing Sources: Municipal Solid Waste Landfills,'' promulgated by EPA on March 12, 1996. (61 FR 9905). Many municipal solid waste landfills are required to collect and combust the gases generated in the landfill. Wastewater collected from within the landfill contains organic compounds which include volatile organic compounds (VOC) and hazardous air pollutants (HAP). This wastewater must be collected, treated and stored in units which are often open to the atmosphere and may result in the volatilization of certain compounds. The regulations promulgated today are based on the performance of an aerated biological system. Wastewater aeration may increase the volatilization of certain organic compounds, a potential environmental concern. However, indications are that the potential increase in air emissions due to this regulation will be minimal. VOCs in hazardous waste landfill leachate are being steadily minimized due to the RCRA land disposal restriction rules, which typically require aggressive destructive treatment of organics in hazardous wastes before the waste can be landfilled (see 40 CFR 268.40 and 268.48).[7] VOC levels in historic landfill leachate (from both hazardous and non-hazardous waste landfills dating from the 1930s to the mid-1990s) are also at levels which are low enough as not to call into question EPA's determination to base these rules on the performance of aerated biological systems. Tables 6–9, 6–10, and 6–13 in Technical Development Document show the concentrations of VOCs found in landfill wastewater.

Furthermore, EPA's Office of Air and Radiation is currently evaluating the air emissions from wastewater generated at municipal solid waste landfills, and intends to take today's rule into account in determining whether further controls under section 112 of the Clean Air Act (which requires technology-based standards for hazardous air pollutants emitted by major sources of emissions of those pollutants) are justified. (Preliminary indications are that hazardous air pollutant emissions from aeration would be a minor fraction of those from other landfill emission sources such as landfill gas emissions.)

In addition, EPA is addressing emissions of VOCs from industrial wastewater through a Control Techniques Guideline (CTG) under Section 110 of the Clean Air Act. In September, 1992, EPA published a draft document entitled ''Control of Volatile Organic Compound Emissions from Industrial Wastewater'' (EPA–453/0–93–056). This document addresses various industries, including the hazardous waste treatment, storage, and disposal industry, and outlines emissions expected from their wastewater treatment systems and methods for controlling them.

B. Solid Waste Generation

Solid waste will be generated due to a number of the treatment technologies selected as BPT/BAT for this regulation. These wastes include sludge from biological treatment systems and chemical precipitation systems. Solids from treatment processes are typically dewatered and disposed in the on-site landfill. Therefore, the increased amount of sludge created due to this regulation will be negligible in comparison with the daily volumes of waste processed and disposed of in a typical landfill.

C. Energy Requirements

EPA estimates that the attainment of these standards will increase energy consumption by a very small increment over present industry use. The selected treatment technologies are not energy-intensive, and the projected increase in energy consumption is primarily due to the incorporation of components such as power pumps, mixers, blowers, power lighting and controls. The costs associated with these energy costs are included in EPA's estimated operating costs for compliance with the final rule.

VIII. Regulatory Implementation

The purpose of this section is to provide assistance and direction to permit writers to aid in their implementation of this regulation. This section also discusses the relationship of upset and bypass provisions, variances and modifications, and analytical methods to the final limitations.

A. Implementation of Limitations and Standards

Upon the promulgation of these regulations, all new and reissued Federal and State NPDES permits issued to direct dischargers in the landfills industry must include the effluent limitations for the appropriate subcategory. Permit writers should be aware that EPA has proposed revisions to 40 CFR Part 122 and is currently addressing public comments on its proposal. One of several aspects of the proposal which could be particularly relevant to the development of NPDES permits for the Landfills Point Source Category is the proposed revisions of Section 122.44(a). In EPA's current thinking, the revisions would require that permits have limitations for all applicable guideline-listed pollutants but allows for the waiver of sampling requirements for guideline-listed pollutants on a case-by-case basis if the

[7] There are certain exceptions to these treatment requirements for hazardous wastewater which is disposed in surface impoundments. RCRA section 3005 (j) (11). However, if this wastewater contains VOCs above a designated concentration level, then the impoundments are subject to rules requiring control of the resulting air emissions. 40 CFR 264.1085 and 263.1086.

discharger can certify that the pollutant is not present in the discharge or present in only background levels from intake water with no increase due to the activities of the discharger. EPA anticipates that new sources and new dischargers will not be eligible for this waiver on their first permit term, and monitoring can be re-established through a minor modification if the discharger expands or changes its process. Further, the permittee will not need to reapply for the waiver each permit term, but only needs to notify the permit writer of any modifications that have taken place over the course of the permit term and, if necessary, monitoring can be reestablished through a minor modification.

B. Upset and Bypass Provisions

A ''bypass'' is an intentional diversion of waste streams from any portion of a treatment facility. An ''upset'' is an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. EPA's regulations concerning bypasses and upsets are set forth at 40 CFR 122.41 (m) and (n).

C. Variances and Modifications

The CWA requires application of the effluent limitations established pursuant to Section 301 or the pretreatment standards of Section 307 to all direct and indirect dischargers. However, the statute provides for the modification of these national requirements in a limited number of circumstances. Moreover, the Agency has established administrative mechanisms to provide an opportunity for relief from the application of national effluent limitations guidelines and pretreatment standards for categories of existing sources for priority, conventional and nonconventional pollutants.

1. Fundamentally Different Factors Variances

EPA will develop effluent limitations or standards different from the otherwise applicable requirements if an individual existing discharging facility is fundamentally different with respect to factors considered in establishing the limitation or standards applicable to the individual facility. Such a modification is known as a ''fundamentally different factors'' (FDF) variance.

Early on, EPA, by regulation, provided for FDF modifications from BPT effluent limitations, BAT limitations for priority and nonconventional pollutants and BCT limitation for conventional pollutants for direct dischargers. For indirect dischargers, EPA provided for FDF modifications from pretreatment standards for existing facilities. FDF variances for priority pollutants were challenged judicially and ultimately sustained by the Supreme Court. (*Chemical Manufacturers Ass'n* v. *NRDC,* 479 U.S. 116 (1985)).

Subsequently, in the Water Quality Act of 1987, Congress added new Section 301(n) of the Act explicitly to authorize modification of the otherwise applicable BAT effluent limitations or categorical pretreatment standards for existing sources if a facility is fundamentally different with respect to the factors specified in Section 304 (other than costs) from those considered by EPA in establishing the effluent limitations or pretreatment standard. Section 301(n) also defined the conditions under which EPA may establish alternative requirements. Under Section 301(n), an application for approval of an FDF variance must be based solely on (1) information submitted during the rulemaking raising the factors that are fundamentally different or (2) information the applicant did not have an opportunity to submit. The alternate limitation or standard must be no less stringent than justified by the difference and not result in markedly more adverse non-water quality environmental impacts than the national limitation or standard.

EPA regulations at 40 CFR 125 Subpart D, authorizing the Regional Administrators to establish alternative limitations and standards, further detail the substantive criteria used to evaluate FDF variance requests for existing direct dischargers. Thus, 40 CFR 125.31(d) identifies six factors (e.g., volume of process wastewater, age and size of a discharger's facility) that may be considered in determining if a facility is fundamentally different. The Agency must determine whether, on the basis of one or more of these factors, the facility in question is fundamentally different from the facilities and factors considered by EPA in developing the nationally applicable effluent guidelines. The regulation also lists four other factors (e.g., infeasibility of installation within the time allowed or a discharger's ability to pay) that may not provide a basis for an FDF variance. In addition, under 40 CFR 125.31(b)(3), a request for limitations less stringent than the national limitation may be approved only if compliance with the national limitations would result in either (a) a removal cost wholly out of proportion to the removal cost considered during development of the national limitations, or (b) a non-water quality environmental impact (including energy requirements) fundamentally more adverse than the impact considered during development of the national limits. EPA regulations provide for an FDF variance for existing indirect dischargers at 40 CFR 403.13. The conditions for approval of a request to modify applicable pretreatment standards and factors considered are the same as those for direct dischargers.

The legislative history of Section 301(n) underscores the necessity for the FDF variance applicant to establish eligibility for the variance. EPA's regulations at 40 CFR 125.32(b)(1) are explicit in imposing this burden upon the applicant. The applicant must show that the factors relating to the discharge controlled by the applicant's permit which are claimed to be fundamentally different are, in fact, fundamentally different from those factors considered by EPA in establishing the applicable guidelines. The pretreatment regulation incorporates a similar requirement at 40 CFR 403.13(h)(9).

An FDF variance is not available to a new source subject to NSPS or PSNS.

2. Permit Modifications

Even after EPA (or an authorized State) has issued a final permit to a direct discharger, the permit may still be modified under certain conditions. (When a permit modification is under consideration, however, all other permit conditions remain in effect.) A permit modification may be triggered in several circumstances. These could include a regulatory inspection or information submitted by the permittee that reveals the need for modification. Any interested person may request modification of a permit be made. There are two classifications of modifications: major and minor. From a procedural standpoint, they differ primarily with respect to the public notice requirements. Major modifications require public notice while minor modifications do not. Virtually any modification that results in less stringent conditions is treated as a major modification, with provisions for public notice and comment. Conditions that would necessitate a major modification of a permit are described in 40 CFR 122.62. Minor modifications are generally non-substantive changes. The conditions for minor modifications are described in 40 CFR 122.63.

D. Relationship of Effluent Limitations to NPDES Permits and Monitoring Requirements

Effluent limitations act as a primary mechanism to control the discharges of pollutants to waters of the United

States. These limitations are applied to individual facilities through NPDES permits issued by EPA or authorized States under Section 402 of the Act.

The Agency has developed the limitations for this regulation to cover the discharge of pollutants for this industrial category. In specific cases, the NPDES permitting authority may elect to establish technology-based permit limits for pollutants not covered by this regulation. In addition, if State water quality standards or other provisions of State or Federal Law require limits on pollutants not covered by this regulation (or require more stringent limits on covered pollutants) the permitting authority must apply those limitations.

Working in conjunction with the effluent limitations are the monitoring conditions set out in a NPDES permit. An integral part of the monitoring conditions is the point at which a facility must monitor to demonstrate compliance. The point at which a sample is collected can have a dramatic effect on the monitoring results for that facility. Therefore, it may be necessary to require internal monitoring points in order to ensure compliance. Authority to address internal waste streams is provided in 40 CFR 122.44(i)(1)(iii) and 122.45(h). Permit writers may establish additional internal monitoring points to the extent consistent with EPA's regulations.

E. Implementation for Facilities With Landfills in Multiple Subcategories

According to the ''1992 Waste Treatment Industry: Landfills Questionnaire,'' there are several facilities which operate both Subtitle C hazardous landfills and Subtitle D non-hazardous landfills on-site. Generally, for determination of effluent limits where there are multiple categories and subcategories, the effluent guidelines are applied using a flow-weighted combination of the appropriate guideline for each category or subcategory. Thus, the normal practice would be to develop flow-weighted limitations for the combined Subtitle C and Subtitle D wastestreams, a flow-weighted combination of the BAT limits for the Landfills Category. However, EPA's RCRA regulations require management of mixtures of hazardous and non-hazardous waste under RCRA hazardous waste regulations. Consequently, a commingled flow of hazardous and nonhazardous waste is a hazardous waste. Therefore, if a facility commingles wastewater from a Subtitle C hazardous landfill and a Subtitle D non-hazardous landfill for treatment, then the effluent from that facility is subject to the limitations promulgated today for the Hazardous subcategory.

F. Implementation for Contaminated Ground Water Flows and Wastewater From Recovering Pumping Wells

As discussed in Section [III], ground water flows and wastewater flows from recovering pumping wells (which have very similar characteristics to contaminated ground water) are not subject to the effluent limits established in today's rule. These terms are defined in Section [III] of this preamble. According to the ''1992 Waste Treatment Industry: Landfills Questionnaire,'' there are a number of facilities which collect contaminated ground water in addition to flows regulated under this rule, and many facilities commingle these flows for treatment. In the Agency's analysis of contaminated ground water at landfills, EPA found that contaminated ground water may be very dilute or may have characteristics similar in nature to leachate. Due to this site-to-site variability, the Agency is not able to determine how the guidelines should be implemented for commingled flows of ground water and regulated wastewater.

In the case of such facilities, EPA believes that decisions regarding the appropriate discharge limits should be left to the judgment of the permit writer. As indicated by data collected through the questionnaires and EPA sampling, ground water characteristics are often site-specific and may contain very few contaminants or may, conversely, exhibit characteristics similar in nature to leachate.

In cases where the ground water is very dilute the Agency is concerned that contaminated ground water may be used as a dilution flow. In these cases, the permit writer should develop BPJ permit limits based on separate treatment of the flows, or develop BPJ limits based on a flow-weighted building block approach, in order to prevent dilution of the regulated leachate flows. However, in cases where the ground water may exhibit characteristics similar to leachate, commingled treatment may be appropriate, cost effective and environmentally beneficial. EPA recommends that the permit writer consider the characteristics of the contaminated ground water before making a determination if commingling ground water and leachate for treatment is appropriate. EPA recommends that the permit writer refer to the leachate characteristics data in Chapter 6 of the Technical Development Document in order to determine whether contaminated ground water at a landfill has characteristics similar to leachate.

G. Implementation for Subtitle D Landfills Which Received Newly Listed Hazardous Wastes in the Past

There are situations where a Subtitle D landfill received wastes that, at the time, were not classified as hazardous, but since disposal of the waste, EPA now classifies that type of waste as hazardous. In these situations, leachate that is derived from the treatment, storage, or disposal of listed hazardous wastes is classified as a hazardous waste by virtue of the ''derived-from'' rule in 40 CFR 261.3(c)(2). The Agency has been very clear in the past on the applicability of hazardous waste listings to wastes disposed of prior to the effective date of a listing, even if the landfill ceases disposal of the waste when the waste becomes hazardous. 53 FR 31147 (August 17, 1988). EPA also has a well-established interpretation that listings likewise apply to leachate derived from the disposal of listed hazardous wastes, including leachate derived from wastes (which meet the listing description) disposed before a listing effective date. *Id.* EPA's interpretations were upheld by the Court of Appeals for the District of Columbia Circuit in *Chemical Waste Management, Inc.* v. *EPA,* 869 F.2d 1526, 1536–37 (D.C. Cir. 1989). (These points are restated here to provide context. EPA is not reconsidering or in any other way reopening these principles for comment or review.)

This does not mean that landfills holding wastes which are now listed as hazardous become subject to Subtitle C regulation. However, previously disposed wastes now meeting the listing description, including residues such as leachate and gas collection condensate which are derived from such wastes and are actively managed (*i.e.,* collected for discharge), do become subject to Subtitle C regulation. 53 FR 31149. Thus, in these types of situations, a non-hazardous Subtitle D landfill will produce a leachate that is subject to Subtitle C regulation. In many cases, however, as discussed at 64 FR 6807, no significant regulatory consequences under RCRA result from leachate management.

As discussed at Section [III] above, EPA established two different sets of effluent limitations for the landfills point source category based on the RCRA classification of the landfill, and not the RCRA classification of the leachate. Therefore, according to the subcategorization scheme adopted by EPA in today's rule, a hazardous, Subtitle C leachate generated from a

non-hazardous, Subtitle D landfill is subject to the effluent limitations for the Non-Hazardous subcategory. EPA concluded that such an approach was appropriate because EPA's Non-Hazardous subcategory landfill database reflects those facilities that may, as a result of future RCRA hazardous waste listings, generate a hazardous leachate in the future. However, due to both pollutant-specific and site-specific factors in these types of situations, EPA determined that the local permit writer may need to require monitoring of pollutants in addition to those required by this rule for the Non-Hazardous subcategory in order to ensure appropriate treatment of the hazardous, Subtitle C leachate.

EPA does not believe that these types of situations are very common, and therefore EPA concluded that the determination of effluent limitations for additional pollutant parameters will have only a minimal impact on the permit writer. Since the majority of Subtitle D landfills discharge indirectly to POTWs, and since EPA did not establish pretreatment standards for either non-hazardous or hazardous landfills, the local control authority will not need to make the determination in these cases.

EPA recommends that the permit writer refer to the leachate characteristics data in Chapter 6 of the Technical Development Document in order to determine whether the leachate resembles Subtitle C or Subtitle D leachate and whether monitoring requirements in addition to those for the Non-Hazardous subcategory are necessary.

H. Implementation for Superfund Response Actions at Landfills

This section addresses compliance with the landfills effluent limitations promulgated today when CERCLA response action is taken at a landfill. In cases where a Subtitle C or Subtitle D landfill is also subject to response action under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, also known as Superfund, it is possible that the landfills effluent guideline may be an applicable or relevant and appropriate requirement (ARAR) for the Superfund site.

CERCLA directed EPA to identify abandoned or uncontrolled hazardous waste sites and to clean up the worst of these sites. The Agency carries out these responsibilities through the Superfund response process, according to procedures outlined in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). Section 121(d)(1) of CERCLA as amended by the 1986 Superfund Amendments and Reauthorization Act (SARA) requires that on-site remedial actions must attain (or waive), at completion of the action, federal or more stringent state applicable or relevant and appropriate (ARARs) environmental law. The 1990 National Contingency Plan (NCP) requires compliance with ARARs during remedial actions as well as at completion and compels attainment of ARARs during removal actions whenever practicable. See 40 CFR 300.415(j) and 300.435(b)(2). Therefore, CWA limitations, such as those promulgated today, may be applicable or relevant and appropriate to hazardous substances discharged on-site into surface water from a Superfund site.

CWA requirements are intimately connected to CERCLA as all 126 CWA priority toxic pollutants are CERCLA hazardous substances (CERCLA Section 101(14)). EPA thus has the authority under Superfund to respond to releases of priority toxic pollutants. EPA also must adhere to or waive ''applicable'' or ''relevant and appropriate'' CWA standards during on-site response actions.

''Applicable'' requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or timely identified state law that specifically address a hazardous substance, pollutant, or contaminant, remedial action, location, or other circumstance at a Superfund site (40 CFR 300.5). Basically, to be applicable, a requirement must directly and fully address a CERCLA activity. For example, the Hazardous subcategory landfill effluent limitations could be considered applicable for a CERCLA landfill that collects and discharges landfill leachate (or other wastewater regulated by the landfills guideline) on-site to a surface water. Because the landfill effluent guidelines did not establish pretreatment standards, today's rule would not be ''applicable'' for a CERCLA landfill discharging indirectly to a POTW. Determining which standards will be applicable to a Superfund response is similar to determining the applicability of any law or regulation to any chemical, action, or location. The lead or support agency must examine federal and state statutes and regulations to identify those which directly govern response activities.

CERCLA, in addition to incorporating ''applicable'' environmental laws and regulations into the response process, requires compliance with (or waiver of) other ''relevant and appropriate'' standards. A requirement which is not applicable may be relevant and appropriate if it addresses problems or pertains to circumstances similar to those encountered at a Superfund site. ''Relevant and Appropriate'' requirements are those cleanup standards, standards of control, or other substantive environmental provisions that while not applicable address sufficiently similar situations or problems to those encountered at a Superfund site such that their use is well-suited to the particular site. 40 CFR 300.5 and 300.400(g)(2). A requirement may be ''relevant'' in that it covers situations similar to that at the site, but may not be ''appropriate'' to apply for various reasons and, therefore, not well-suited to the site.

The types of legal requirements applying to Superfund responses will differ to some extent depending upon whether the activity in question takes place on site or off site. In the case of CERCLA actions, a direct discharge of Superfund wastewater would be considered on site if the receiving water body is in the area of contamination or is in very close proximity to the site and necessary for implementation of the response action (even if the water body flows off site). ''CERCLA Compliance with Other Laws Manual'' Chapter 3, ''Guidance for Compliance with Clean Water Act Requirements,'' (EPA, August 8, 1988).

For response actions that are on-site, the site must comply with or waive both ''applicable'' as well as ''relevant and appropriate requirements.'' However, EPA does not need to comply with procedural environmental requirements on site. In addition, CERCLA Section 121(e)(2) states that no Federal, State or local permit (*e.g.,* a permit for a direct discharge to surface waters) is required for the portion of any removal or remedial action conducted entirely on-site. Therefore, Superfund sites are not required to obtain permits for on-site actions. For off site actions, a CERCLA response generally must comply only with all applicable law.

Therefore, administrative NPDES standards, such as the permit and certification requirements required by today's rule, are applicable to CERCLA discharges to off-site surface water. Because only surface water that is within or in very close proximity to an area of contamination is considered on site, most CERCLA response actions will trigger administrative NPDES standards.

Also see ''CERCLA Compliance with Other Laws Manual'' at p. 1–65 (EPA,

August 8, 1988); Final NCP, 59 FR 47416 (Sept. 15, 1994).

I. Implementation for TSCA Landfills

Concern over the toxicity and persistence in the environment of Polychlorinated Biphenyls (PCBs) led Congress in 1976 to enact § 6(e) of the Toxic Substances Control Act (TSCA) that included among other things, prohibitions on the manufacture, processing, and distribution in commerce of PCBs. Thus, TSCA legislated true ''cradle to grave'' (*i.e.,* from manufacture to disposal) management of PCBs in the United States. Today's guidelines do not apply to landfills that are only permitted under TSCA as Chemical Waste Landfills. Rather, it applies only to those landfills subject to the requirements under Subtitle C or Subtitle D of RCRA. However, landfills that are subject to Subtitle C or D of RCRA and are also permitted under TSCA will be subject to the landfills effluent limitations guidelines promulgated today. In fact, at least one of the landfills sampled by EPA (and selected as BAT) for the Hazardous subcategory, is a Chemical Waste Landfill permitted under TSCA and is also a Subtitle C landfill under RCRA.

J. Implementation for Landfills Located at Centralized Waste Treatment Facilities

EPA is in the process of developing guidelines for Centralized Waste Treatment (CWT) facilities which will be promulgated next year. As previously explained at Section [III], this part does not apply to landfills operated in conjunction with CWT facilities that will be subject to 40 CFR Part 437 (when issued) so long as the CWT facility commingles the landfill wastewater with other non-landfill wastewater for discharge. A landfill directly associated with a CWT facility is subject to this part if the CWT facility discharges landfill wastewater separately from other CWT wastewater or commingles the wastewater from its landfill only with wastewater from other landfills.

For example, under current thinking, following promulgation of the CWT guidelines, a landfill treatment system that accepts wastewater from a non-landfill source for treatment would be a CWT and subject to the CWT guidelines and standards to be codified at 40 CFR Part 437. However, a landfill treatment system that only accepted wastewater for treatment generated off-site from off-site landfills would be subject to the landfill guidelines.

K. Determination of Similar Wastes for Captive Landfill Facilities

As discussed at Section [III] above, the Agency concluded that discharges from captive landfills should not be subject to the guidelines if the captive landfills only accepted waste for disposal from another facility that was similar to the waste generated by the industrial or commercial operation directly associated with the landfill. This section offers guidance to permit writers for determining whether a solid waste received for disposal in a captive landfill is similar to those wastes generated by the facility directly associated with the landfill.

According to EPA's database, many of the industrial or commercial facilities that operate captive landfills are subject to effluent limitations guidelines in 40 CFR Subchapter N. For the most part, facilities subject to a particular industrial category effluent guideline produce similar types of wastes. Therefore, EPA decided that this rule does not apply to landfills operated in conjunction with other industrial or commercial operations when the landfill receives wastes generated by the industrial or commercial operation directly associated with the landfill and also receives other wastes generated by a facility that is subject to the same provisions in 40 CFR Subchapter N as the waste-receiving facility.

However, there are cases where a captive landfill is directly associated with an industrial or commercial operation that is not subject to an effluent guideline. Or, a facility, subject to an effluent guideline, may operate a landfill in conjunction with industrial or commercial operations, but may also accept other wastes from facilities that are not subject to the same effluent guideline or not subject to an effluent guideline at all. In these cases, the permit writer must determine whether the other wastes received for disposal are of similar nature to the wastes generated by the industrial or commercial operation directly associated with the landfill. In cases where the permit writer determines that the other waste accepted by the captive landfill is not similar to the waste generated by the industrial or commercial activity directly associated with the landfill, then the landfill wastewater will be subject to the landfills effluent limitations. However, if the permit writer determines that the wastes are similar, then the wastewater from the captive landfill should be subject to the same categorical effluent guideline (or BPJ limitations) as the industrial or commercial facility.

A permit writer should consider the following factors in deciding whether other wastes received by a captive landfill are similar to those wastes generated by the industrial or commercial operation directly associated with the landfill:

1. Are the other wastes received from facilities that are subject to the same provisions in 40 CFR Subchapter N as the facility directly associated with the captive landfill?

If so, then the landfills effluent guidelines do not apply to this captive landfill. If not, then the permit writer should consider the other factors listed below.

2. Are the other wastes received from facilities that are part of the same effluent guidelines ''grouping'' as described in Chapter 2 of the Landfills Technical Development Document?

If so, it is likely that the wastes are similar and the landfills effluent guidelines do not apply. In the Landfills Technical Development Document, EPA grouped the industrial categories under Subchapter N into six groups: Organics, Metals, Inorganics and Non-metals, Pesticides, Explosives, and Asbestos. It is likely that industries within the same industrial effluent guideline ''grouping'' will generate similar types of constituents in the solid wastes, and the leachate resulting from the disposal of these wastes will be controlled adequately by the effluent limitation for the industrial or commercial facility directly associated with the captive landfill. However, this may not always be the case, and therefore EPA left to the local control authority the determination of whether the landfills effluent guideline should apply to a captive landfill that accepts wastes from other facilities that are not subject to the same provisions in 40 CFR Subchapter N. The local permitting authority will determine whether a captive landfill which accepts wastes from other industrial activities apart from those directly associated with the landfill is subject to today's guidelines based on the similarity of the other wastes and the likelihood that these wastes will result in leachate that is compatible with the wastewater treatment technology used to treat the landfill leachate.

3. In the case of hazardous captive landfills, do the other wastes being received have the same hazardous waste codes as those generated at the facility directly associated with the landfill?

If so, it is possible that the wastes are similar. However, this may not always be the case, and therefore EPA left to the local control authority the determination of whether the landfills effluent guideline should apply to a captive landfill that accepts wastes from other facilities that are not subject to the same provisions in 40 CFR Subchapter N.

4. Is a significant portion of the waste deposited in the landfill from the industrial or commercial operation that

is directly associated with the captive landfill?

The control authority should analyze the number of customers and the amount of the off-site or inter-company waste deposited relative to the quantity of on-site or intracompany waste placed in the captive landfill. Again, the main reason for the exclusion for captive landfills is that their leachate should resemble the industrial wastewater of the operation directly associated with the landfill, and therefore, the landfill leachate will be adequately controlled by the applicable industrial effluent guidelines. However, this logic is only applicable when the bulk of the waste placed in the landfill is of similar content to that being produced by the industrial facility directly associated with the landfill. Therefore, when applying the captive exclusion, the control authority should analyze the volume and characteristics of waste received from inter-company waste transfers in determining whether the leachate generated by the captive landfill will have similar characteristics to the industrial wastewater generated by the company owning the landfill.

5. Is the facility that is directly associated with the captive landfill deriving revenues from waste disposal at the landfill?

In developing the exclusion for captive landfills, EPA's intent was to exclude those non-commercial landfills that are directly associated with an industrial or commercial operation and whose leachate is currently being adequately addressed by the facility's categorical or BPJ limitations. EPA believes that where revenues are being derived from the collection of fees for solid waste disposal at a captive landfill, the facility is accepting wastes on a commercial basis—wastes that may well be dissimilar to that being disposed of at the landfill. The captive exception is premised on the fact that in most cases leachate from a landfill associated with an industrial operation will resemble the industrial process wastewater generated by the industrial operation, and therefore, the landfill leachate will be adequately controlled by the applicable industrial effluent guidelines or BPJ limitations. However, this is a reasonable assumption only in circumstances where the waste placed in the landfill is of similar content to that being produced by the industrial operation directly associated with the landfill. It is likely that a commercial landfill may accept significant volumes of waste that are not similar to the wastes generated by the industrial operation directly associated with the landfill.

6. Is the industrial or commercial facility directly associated with the captive landfill accepting wastes for disposal as part of public service activities?

If so, and the facility does not receive a fee or other remuneration for the disposal service, the captive landfill is not subject to this rule. EPA defines public service activities in Appendix A of this preamble.

L. Analytical Methods

Section 304(h) of the Clean Water Act directs EPA to promulgate guidelines establishing test methods for the analysis of pollutants. These methods are used to determine the presence and concentration of pollutants in wastewater, and are used for compliance monitoring and for filing applications for the NPDES program under 40 CFR 122.21, 122.41, 122.44 and 123.25, and for the implementation of the pretreatment standards under 40 CFR 403.10 and 403.12. To date, EPA has promulgated methods for conventional pollutants, toxic pollutants, and for some nonconventional pollutants. The five conventional pollutants are defined at 40 CFR 401.16. Table I–B at 40 CFR 136 lists the analytical methods approved for these pollutants. The 65 toxic metals and organic pollutants and classes of pollutants are defined at 40 CFR 401.15. From the list of 65 classes of toxic pollutants EPA identified a list of 126 ''Priority Pollutants.'' This list of Priority Pollutants is shown, for example, at 40 CFR Part 423, Appendix A. The list includes non-pesticide organic pollutants, metal pollutants, cyanide, asbestos, and pesticide pollutants. Currently approved methods for metals and cyanide are included in the table of approved inorganic test procedures at 40 CFR 136.3, Table I–B. Table I–C at 40 CFR 136.3 lists approved methods for measurement of non-pesticide organic pollutants, and Table I–D lists approved methods for the toxic pesticide pollutants and for other pesticide pollutants. Dischargers must use the test methods promulgated at 40 CFR 136.3 or incorporated by reference in the tables, when available, to monitor pollutant discharges from Landfills, unless specified otherwise by the permitting authority.

The final rule establishes limitations for BOD_5, TSS, pH, ammonia, arsenic (total), chromium (total), zinc (total), alpha terpineol, aniline, benzoic acid, p-cresol, phenol, naphthalene, and pyridine. Except for aniline, benzoic acid, p-cresol, and pyridine, there are methods specified for these pollutants at 40 CFR 136.3. Although these four pollutants are not directly covered in the list of approved methods, EPA has successfully used Methods 625 and 1625 to measure these semivolatile pollutants. EPA has collected analytical data for these four pollutants and for other pollutants of interest in the wastewater program using Methods 625 and 1625. One of the pollutants, alpha terpineol, is currently an analyte in Method 1625 but not in Method 625. EPA has also collected data for alpha terpineol using Method 625 to provide greater flexibility in the selection of an analytical method for monitoring discharges. As part of today's final rule, EPA is amending 40 CFR Part 136.3, Appendix A, to add attachments to EPA Methods 625 and 1625 with method performance criteria for additional pollutants, including the pollutants of concern for Landfills. The modified versions of Methods 625 and 1625 will allow the analysis of all semivolatile organic pollutants in today's final rule.

EPA proposed to amend Methods 625 and 1625 to include additional pollutants as part of the Centralized Waste Treatment proposal last year (64 FR 2345). Since then, EPA has gathered data on additional analytes. The attachments to Methods 625 and 1625 consist of text, performance data, and quality control (QC) acceptance criteria for the additional analytes. This information will allow a laboratory to practice the methods with the additional analytes as an integral part. The QC acceptance criteria for the additional analytes were determined in single-laboratory studies. The collected data are summarized in a report in the docket for today's rulemaking.

IX. Regulatory Requirements

A. Executive Order 12866

Under Executive Order 12866 [58 FR 51735 (October 4, 1993)], the Agency must determine whether the regulatory action is ''significant'' and therefore subject to OMB review and the requirements of the Executive Order. The Order defines ''significant regulatory action'' as one that is likely to result in a rule that may:

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

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

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

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

It has been determined that this rule is a not a ''significant regulatory action'' under the terms of Executive Order 12866 and is therefore not subject to OMB review.

B. Regulatory Flexibility Act (RFA), as Amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), 5 U.S.C. 601 et seq.

The RFA generally requires an agency to prepare a regulatory flexibility analysis of any rule subject to notice and comment rulemaking requirements under the Administrative Procedure Act or any other statute unless the agency certifies that the rule will not have a significant economic impact on a substantial number of small entities.

For purposes of assessing the impacts of today's rule on small entities, small entity is defined as: (1) a small business that has annual revenues less than $6 million (*i.e.,* the definition for SIC 4953, Refuse Systems); (2) a small governmental jurisdiction that is a government of a city, county, town, school district or special district with a population of less than 50,000; and (3) a small organization that is any not-for-profit enterprise which is independently owned and operated and is not dominant in its field.

After considering the economic impacts of today's final rule on small entities, I certify that this action will not have a significant economic impact on a substantial number of small entities. EPA prepared a detailed assessment of the impacts of today's rule on small entities. This assessment is included in the ''Economic Analysis of Effluent Limitations Guidelines and Standards for the Landfill Category,'' which is summarized in Section [V], above, and is part of the Record for today's rule. Today's rule establishes requirements applicable to landfill facilities owned by both small businesses and small governmental jurisdictions. We determined that, of the 138 facilities expected to incur costs, only 39 facilities are small entities. Of these two are privately owned and 37 are government owned. The projected costs for these entities are low—in all cases less than one percent of revenues. Further, EPA projects that only two facilities owned by small entities will incur economic impacts such as facility closure. Further, EPA's assessment project no economic impacts, such as plant closure, for these small entities, Although this final rule will not have a significant economic impact on a substantial number of small entities, EPA nonetheless has tried to reduce the impact of this rule on small entities. The Agency considered various technology options in establishing a basis for today's effluent limitations. The Agency's analysis specifically included economic impacts to the regulated community. While complying with the statute, EPA also reduced regulatory impacts by selecting economically achievable and cost-reasonable options.

C. Submission to Congress and the General Accounting Office

The Congressional Review Act, 5 U.S.C. 801 et seq., as added by the Small Business Regulatory Enforcement Fairness Act of 1996, generally provides that before a rule may take effect, the agency promulgating the rule must submit a rule report, which includes a copy of the rule, to each House of the Congress and to the Comptroller General of the United States. EPA will submit a report containing this rule and other required information to the U.S. Senate, the U.S. House of Representatives, and the Comptroller General of the United States prior to publication of the rule in the **Federal Register**. A major rule cannot take effect until 60 days after it is published in the **Federal Register**. This action is not a ''major rule'' as defined by 5 U.S.C. 804(2). This rule will be effective February 18, 2000.

D. Paperwork Reduction Act

This rule contains no information collection requirements. Therefore, this rule is not subject to the Paperwork Reduction Act.

E. Unfunded Mandates Reform Act

Title II of the Unfunded Mandates Reform Act of 1995 (UMRA), Public Law 104–4, establishes requirements for Federal agencies to assess the effects of their regulatory actions on State, local, and tribal governments and the private sector. Under section 202 of the UMRA, EPA generally must prepare a written statement, including a cost-benefit analysis, for proposed and final rules with ''Federal mandates'' that may result in expenditures to State, local, and tribal governments, in the aggregate, or to the private sector, of $100 million or more in any one year. Before promulgating an EPA rule for which a written statement is needed, section 205 of the UMRA generally requires EPA to identify and consider a reasonable number of regulatory alternatives and adopt the least costly, most cost-effective or least burdensome alternative that achieves the objectives of the rule. The provisions of section 205 do not apply when they are inconsistent with applicable law. Moreover, section 205 allows EPA to adopt an alternative other than the least costly, most cost-effective or least burdensome alternative if the Administrator publishes with the final rule an explanation why that alternative was not adopted. Before EPA establishes any regulatory requirements that may significantly or uniquely affect small governments, including tribal governments, it must have developed under section 203 of the UMRA a small government agency plan. The plan must provide for notifying potentially affected small governments, enabling officials of affected small governments to have meaningful and timely input in the development of EPA regulatory proposals with significant Federal intergovernmental mandates, and informing, educating, and advising small governments on compliance with the regulatory requirements.

EPA has determined that this rule does not contain a Federal mandate that may result in expenditures of $100 million or more for State, local, and tribal governments, in the aggregate, or the private sector in any one year. EPA has estimated total annualized costs of the rule as $ 7.64 million (1998$, post-tax). Thus, today's rule is not subject to the requirements of Sections 202 and 205 of the UMRA.

EPA has determined that this rule contains no regulatory requirements that might significantly or uniquely affect small governments. EPA determined that no small governments are significantly affected by this rule as discussed in Part B. of this section. Thus, today's rule is not subject to the requirements of Section 203 of the UMRA.

F. Executive Order 13084: Consultation and Coordination With Indian Tribal Governments

Under Executive Order 13084, EPA may not issue a regulation that is not required by statute, that significantly or uniquely affects the communities of Indian Tribal governments, and that imposes substantial direct compliance costs on those communities, unless the Federal government provides the funds necessary to pay the direct compliance costs incurred by the tribal governments, or EPA consults with those governments. If EPA complies by consulting, Executive Order 13084 requires EPA to provide to the Office of Management and Budget, in a separately identified section of the preamble to the rule, a description of the extent of EPA's prior consultation with representatives of affected tribal governments, a summary of the nature of their concerns, and a statement supporting the need to issue the regulation. In addition, Executive Order 13084 requires EPA to develop an effective process permitting elected officials and other representatives of Indian tribal governments ''to provide meaningful and timely input in the development of regulatory policies on matters that

significantly or uniquely affect their communities.''

Today's Rule does not significantly or uniquely affect the communities of Indian tribal governments because EPA determined that no communities of Indian tribal governments are affected by this rule. Accordingly, the requirements of section 3(b) of Executive Order 13084 do not apply to this rule.

G. Executive Order 13132 (Federalism)

Executive Order 13132, entitled ''Federalism'' (64 FR 43255, August 10, 1999), requires EPA to develop an accountable process to ensure ''meaningful and timely input by State and local officials in the development of regulatory policies that have federalism implications.'' ''Policies that have federalism implications'' is defined in the Executive Order to include regulations that have ''substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.''

Under Executive Order 13132, EPA may not issue a regulation that has federalism implications, that imposes substantial direct compliance costs, and that is not required by statute, unless the Federal government provides the funds necessary to pay the direct compliance costs incurred by State and local governments, or EPA consults with State and local officials early in the process of developing the proposed regulation. EPA also may not issue a regulation that has federalism implications and that preempts State law unless the Agency consults with State and local officials early in the process of developing the proposed regulation.

This final rule does not have federalism implications. It will not have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government, as specified in Executive Order 13132. The rule will not impose substantial costs on States and localities. The rule establishes effluent limitations imposing requirements that apply to landfills when they discharge wastewater. The rule does not apply directly to States and applies to localities only when they operate a municipal landfill that discharges wastewater. The rule will only affect States when they are administering CWA permitting programs. The final rule, at most, imposes minimal administrative costs on States if the States have an authorized NPDES programs. (These States must incorporate the new limitations in new and reissued NPDES permits). Similarly, local governments operating directly discharging landfills will not experience substantial cost. The cost of complying with this guideline will not be significantly greater than current costs of meeting existing NPDES permit limits. Thus, the requirements of section 6 of the Executive Order do not apply to this rule.

H. National Technology Transfer and Advancement Act

As noted in the proposed rule, under Section 12(d) of the National Technology Transfer and Advancement Act (NTTAA) of 1995, (Pub L. No. 104–113 Sec. 12(d) 15 U.S.C. 272 note) directs EPA to use voluntary consensus standards in its regulatory activities unless to do so would be inconsistent with applicable law or otherwise impractical. Voluntary consensus standards are technical standards (e.g., materials specifications, test methods, sampling procedures, business practices, etc.) that are developed or adopted by voluntary consensus standard bodies. The NTTAA directs EPA to provide Congress, through the Office of Management and Budget (OMB), explanations when the Agency decided not to use available and applicable voluntary consensus standards.

Today's final rule requires dischargers to monitor for 3 metals, 7 organic pollutants, BOD_5, TSS, ammonia and pH. EPA performed a search of the technical literature to identify any applicable analytical test methods from industry, academia, voluntary consensus standard bodies and other parties that could be used to measure the analytes in today's final guideline. EPA's search revealed that there are consensus standards for many of the analytes already specified in 40 CFR Part 136.3. Pollutants in today's rule with consensus methods already specified in 40 CFR Part 136.3 include the metals, BOD_5, TSS, ammonia, pH, phenol, and naphthalene. Pollutants without consensus methods include alpha terpineol, aniline, pyridine, p-cresol, and benzoic acid. EPA did not identify applicable consensus methods for these five pollutants. EPA may promulgate consensus methods for these pollutants in a future rulemaking if such methods become available.

I. Executive Order 13045 and Protecting Children's Health

The Executive Order ''Protection of Children from Environmental Health Risks and Safety Risks'' (62 FR 19885, April 23, 1997) applies to any rule that is determined to be (1) ''economically significant'' as defined under Executive Order 12866, and (2) concerns an environmental health or safety risk that EPA has reason to believe may have a disproportionate effect on children. If the regulatory action meets both criteria, the Agency must evaluate the environmental health or safety effects of the planned rule on children; and explain why the planned regulation is preferable to other potentially effective and reasonably feasible alternatives considered by the Agency. This rule is not subject to E.O. 13045 because it is not ''economically significant'' as defined under Executive Order 12866.

X. Summary of Proposal Comments and Responses

The following section describes the major comments on the proposed rule, and EPA's responses. The public record includes a full comment summary and response document for this rulemaking.

Forty-eight commenters provided detailed comments on the February 6, 1998 proposal. In all, the comments dealt with 32 separate aspects of the proposal. The following responds to the most significant of the comments.

Comment: EPA's selection of biological treatment as BPT/BAT for all non-hazardous landfills is inappropriate because the technology is not effective at utility ash monofills whose leachate does not contain sufficient biologically degradable organic material to sustain a biological treatment system.

Response: EPA agrees that there are certain landfill facilities in the Non-Hazardous subcategory, such as utility ash monofills, that would have difficulty operating biological treatment systems due to the low organic content of the wastewater. In these circumstances, such facilities may need to install different treatment systems to ensure compliance with the promulgated limits. However, one of the several ash monofill facilities sampled by EPA currently meets these limitations and therefore will not need to install any additional treatment technologies in order to comply with the landfills rule.

For the final rule, EPA re-evaluated available technology for reducing pollutant discharges from landfills with low organic content wastewater. EPA's data on ash monofills showed that two regulated pollutants (ammonia and phenol) could be found at concentrations which do not meet the BPT/BAT limitations. In addition, because various metals may be expected to be present in ash monofill

wastewater, EPA also considered the treatment of zinc (the only metal for which EPA promulgated a limitation for the Non-Hazardous subcategory) in evaluating the treatment technologies for monofills with low organic content.

EPA concluded that breakpoint chlorination would likely be the most practicable and economic alternative technology for the removal of ammonia at non-hazardous facilities that cannot sustain or chose not to install biological treatment. For landfill facilities that require removal of both phenol and zinc, EPA evaluated granular activated carbon as a non-biological alternative treatment technology. EPA also looked at the cost of these alternate treatment technologies to meet the final limits. For the final rule, EPA costed two ash monofill facilities for treatment of ammonia, phenol, and zinc using a combination of breakpoint chlorination and granular activated carbon. Based on this assessment, EPA has concluded that there are viable alternative technologies available to facilities with low BOD_5, such as ash monofills, to treat ammonia, phenol, and zinc that are comparable to those biological treatment systems found to be economically achievable for the landfill industry generally. These treatment systems may be installed at costs comparable to those for biological treatment. In these circumstances, EPA has concluded that it should not develop separate limitations for utility ash monofills.

Comment: Several commenters suggested that EPA further develop its database to assess adequately the influence of age-related changes on the concentrations and quality of pollutants in Subtitle D landfill leachate.

Response: EPA considered whether age-related changes in leachate concentrations of pollutants necessitate different discharge limits for different age classes of landfills. Several considerations lead to the conclusion that age-related limits are not appropriate.

First, a facility's wastewater treatment system typically receives and commingles leachate from several landfills or cells of different ages. The Agency has not observed any facility which has found it advantageous or necessary to treat age-related leachates separately. The Agency did, however, sample two landfill facilities that had only one cell. One of the facilities had been receiving wastes for nine years in its landfill cell, while the other facility had only been receiving waste for one year. EPA compared the raw wastewater concentrations of the constituents in these two cells and found the concentrations to be very similar. In addition, most of the constituents in both cells were close to the median raw wastewater concentration for the Non-Hazardous subcategory. Second, based on responses to the questionnaire, discussions with landfill operators and historical data, EPA understands that leachate pollutant concentrations appear to change substantially over the first two to five years of operation but then change only slowly thereafter.

These two observations imply that treatment systems must be designed to accommodate the full range of concentrations expected in influent wastewater. EPA concluded that the BPT/BAT/NSPS treatment technologies are able to treat the variations in landfill wastewater likely to occur due to age-related changes. EPA has taken into account the ability of treatment systems to accommodate age-related changes in leachate concentrations, as well as short-term fluctuations by promulgating effluent limitations which reflect the variability observed in monitoring data spanning up to three years.

Additionally, EPA addressed age-related effects on treatment technologies, costs, and pollutant loads by utilizing data collected from a variety of landfills in various stages of age and operation (e.g., closed, inactive, active). EPA sampled landfills of various ages and stages of operation (active, inactive, closed), lined and unlined, and concluded that the landfill database used to develop the effluent limitations represents leachate typically found at Subtitle D landfills. In addition, EPA received comments from several commenters stating that the leachate characterization data presented in the proposal was consistent with their own monitoring data.

In response to comments, EPA evaluated the data from non-hazardous landfill facilities of different ages to compare general raw leachate characteristics. When EPA compared landfills of various ages from EPA's landfill effluent guidelines database, it was difficult to pinpoint any particular trends (i.e. organic pollutant concentrations decrease significantly with age). The absence of any particular trend associated with pollutant concentrations across landfill facilities of various ages may be due to the fact that most of the older landfill facilities in EPA's database have newer landfill cells whose leachate is commingled for treatment with the leachate from the older landfill cells. For example, a landfill facility that may have opened prior to 1980 may have landfill cells that opened since 1991 which contribute a large portion of the leachate flow. EPA acknowledges that age-related changes in landfill leachate characteristics would be expected from individual landfill cells. Most of the older landfill cells have lower concentrations of BOD_5, COD, and most organic pollutants indicating a smaller amount of degradable compounds from the aged waste.[8] In addition, aged leachates contain high levels of chemically reduced compounds, such as ammonia, and high chlorides because of the anaerobic environment of the landfill. These trends tend to be true for individual landfill cells. However, when looking at a landfill facility as a whole (where a facility commingles leachates from several cells of various ages for treatment), the landfills effluent guidelines database does not fully support such a trend. In EPA's data collection efforts, EPA did not identify any landfill facilities that treated leachate from different aged cells separately. Based on the fact that landfill facilities commingle leachate from cells of various ages for treatment, EPA concluded that its leachate effluent database appropriately represents the landfills industry covered by this guideline, and that the pollutant concentrations found at landfill facilities of various ages did not vary significantly as to warrant different treatment technologies for landfills of different ages. As mentioned above, the Agency sampled raw wastewater at two landfill cells of different ages and found the concentrations of constituents to be very similar. EPA concluded that neither the age nor the size of the landfill facility will directly affect the treatability of the landfill wastewater. For the non-hazardous landfills, the most pertinent factors for establishing the limitations are costs of treatment and the level of effluent reductions obtainable.

Comment: EPA's sampling data may not be a true reflection of Subtitle D leachates as a result of the time at which EPA collected its sampling data. Between the years of 1992 and 1995, when most of EPA's data collection activities were underway, most of the lined Subtitle D landfills had only recently begun accepting waste. As a result, EPA's data reflect relatively new landfills that tend to have less concentrated leachate since it usually takes 9–15 months after opening a new cell before the leachate begins to strengthen. In addition, EPA's sampling included leachate being collected from unlined landfills that could be diluted by the influence of ground water and, therefore, was not representative of

[8] Eckenfelder, Welsey. *Industrial Pollution Control,* New York: McGraw-Hill, 1989.

more concentrated leachates found in lined Subtitle D landfills.

Response: EPA disagrees with the commenters' conclusions. EPA sampled landfills of various ages and stages of operation (active, inactive, closed), lined and unlined, and is confident that the landfill database represents leachate typically found at Subtitle D landfills. A number of commenters also share this view. These commenters stated that the leachate characterization data presented in the proposal was consistent with the results of their own monitoring.

EPA characterized wastewater from non-hazardous landfills based on data from several different sources including industry responses to EPA's detailed questionnaires, monitoring reports, industry supplied data, and data from landfills sampled by EPA. Several non-hazardous landfill facilities responding to the ''Waste Treatment Industry Questionnaire Phase II: Landfills, Part I, Technical Information, 1994'' (Detailed Questionnaire) began accepting waste prior to 1931. The majority of the landfill facilities responding to the questionnaire, however, began receiving wastes after 1971. Only sixteen of the 204 non-hazardous landfills in EPA's Detailed Questionnaire database began accepting waste as recently as 1992. Therefore, EPA has concluded that landfill facilities of all ages were well represented in EPA's Detailed Questionnaire database.

In addition, EPA sampling episodes comprised a large portion of the wastewater characterization data for Subtitle D landfills. EPA sampled twelve different non-hazardous landfill facilities during a two year period from 1993 to 1995. The period of years in which the landfills sampled by EPA began accepting wastes ranged from 1962 to 1994.

Grouping the sampled facilities according to the year the facility began accepting waste and by regulatory history, there are four pre-1980 landfill facilities (before 1980 Section 3001 of RCRA); one landfill facility that falls in the 1980 to 1983 range (before the 1984 Hazardous and Solid Waste Amendment to RCRA); five landfill facilities that fall in the 1984 to 1988 range (before Land Disposal Restrictions (LDR)); and three landfill facilities that are post-1988 (after LDR). EPA sampled only one ''new'' landfill facility. It opened in 1994 and EPA sampled the following year. All other landfill facilities sampled by EPA were between four years and 32 years of age at the time of sampling. EPA agrees with the commenter that relatively new landfill facilities tend to have less concentrated leachates. However, EPA combined the data from the one new facility sampled with characterization data from 12 other landfill facilities that have an average age of 13 years. In addition, for the most part, these other landfill facilities commingled leachates from cells of differing ages and stages of operation. The Agency did not identify any landfill facilities which found it advantageous or necessary to treat leachates from landfill cells of different ages separately. Most landfill leachates sampled by EPA were composite samples of several cells. Therefore, EPA concluded that the landfills sampled and the resulting data in the EPA database adequately represent Subtitle D leachates.

The commenters also claim that during the years EPA collected data, most lined landfill cells were just being constructed or had just begun operating. Although this may be true, all of the landfills (and cells) chosen by EPA for sampling were lined, with the exception of one facility and one landfill at another facility. EPA specifically selected lined landfills with leachate collection systems for sampling visits because these facilities would be more likely to employ advanced leachate treatment, and facilities with advanced treatment were under consideration as BAT. Even though federal regulations for Subtitle D landfills are fairly recent, several states were already implementing requirements similar to the current Subtitle D regulations prior to the enactment of the federal regulations. Therefore landfills in many states (e.g., CA, NY, NJ, and PA) incorporated lining and leachate collection systems in advance of federal requirements.

Another commenter also stated that leachate from unlined landfills may be diluted by ground water, and therefore, would not be representative of more concentrated leachates found in lined Subtitle D landfills. EPA collected leachate data from only two unlined landfills out of the 13 sampled. EPA has determined that the leachate from one of the unlined landfills sampled by EPA was unlikely to be diluted by ground water because the leachate is collected by two gravity flow sumps located well above the water table. The other unlined landfill sampled by EPA is also unlikely to be diluted by ground water since the collection system is located 12 feet above the water table. In addition, this facility commingled the leachate collected from the unlined landfill with the leachate from the lined landfill at the facility. In these circumstances, EPA determined that these data adequately represent the concentrations of leachate found at Subtitle D landfills.

Comment: EPA should further subcategorize the Subtitle D landfills because it is not appropriate to have the same effluent limitations for both municipal solid waste landfills and non-municipal solid waste landfills (or monofills).

Response: EPA decided to include non-municipal solid waste landfills (including monofills) in the same Non-Hazardous subcategory as municipal solid waste landfills and concluded that, based on the available raw wastewater data, such facilities can meet the BPT/BAT limitations using available technologies. EPA did consider subcategorizing the Non-Hazardous subcategory further but chose not to be based on several factors.

EPA did not choose to further subcategorize Subtitle D landfill facilities because the leachate characteristics from monofills, ashfills, construction and demolition landfills, sludge landfills, and non-municipal solid waste co-disposal sites were comparable to the leachate characteristics from municipal solid waste landfills. EPA found that the pollutants present in dedicated monofills were a subset of those pollutants found at municipal solid waste landfills, at comparable concentrations, with many parameters found at lower concentrations than typically found at municipal solid waste landfills, as shown in Table 5–3 in the Technical Development Document.

EPA evaluated data from monofills in the EPA database and from commenters submitting monofill data, as presented in Chapter 5 in the Development Document, and determined that there are differences in wastewater characteristics between different types of monofills. Most of these differences result from the fact that not all monofills accept the same types of waste. The greatest difference observed was between monofills that accept organic wastes and those that do not. EPA concluded that monofills that accepted wastes containing organic material could meet the promulgated limitations using biological treatment and, therefore, were similar enough to other landfills in the subcategory to warrant inclusion. For those monofills that do not accept organic wastes, EPA found that many of the facilities could meet the subcategory limitations without treatment, and for those that could not, alternative technologies were available at cost no greater than those technologies EPA evaluated (and determined) to be economically achievable for the subcategory as a whole. EPA included the costs associated with these alternate

technologies in the final cost impact analysis.

As a result of its study of the various types of monofills, EPA determined that a single subcategory for all monofills would still not address the situation where a certain class of constituents is regulated even though not all types of monofills contain those constituents (e.g., a utility ash monofill with low raw wastewater BOD_5 concentrations would still be in the same subcategory as a sludge monofill which may contain moderate levels of BOD_5). Therefore, EPA would need to establish a separate subcategory for each type of monofill to address the differences among monofills. Rather than develop multiple monofill subcategories, EPA decided that because the types of pollutants and concentrations of pollutants found at monofills were, for the most part, equivalent to or less than those found at municipal solid waste landfills, a single subcategory would be appropriate for Subtitle D landfills.

Comment: One commenter, a wastewater treatment technology vendor, submitted two sets of comments concerning EPA's evaluation of BAT Option III (reverse osmosis following biological treatment). The commenter disagreed with the BAT Option III stating that the Pall Rochem Disc Tube™ technology does not require biological pretreatment.

Response: EPA agrees that the Pall Rochem Disc Tube™ technology may effectively treat landfill leachate without prior biological treatment. EPA sampled the Rochem unit at a landfill that did not employ biological treatment and the Rochem unit was very effective at treating the landfill leachate. The data from EPA sampling is contained in the regulatory record for this rule.

However, EPA disagrees with the commenter that the methodology used to evaluate BAT was incorrect. As discussed in the preamble to the proposed rule (63 FR 6443), EPA evaluated BAT treatment options as an increment to the baseline treatment technology used to develop BPT limits. Therefore, the BAT Option III consisted of BPT Option II (biological treatment followed by multimedia filtration) followed by a single stage reverse osmosis unit. For the analysis, EPA concluded that a biological system followed by multimedia filtration would already remove the majority of toxic pollutants, leaving the single-stage reverse osmosis to treat the very low levels of pollutants that remained. Additionally, EPA concluded that the limits under BAT would not be significantly more stringent than BPT because the BPT technology was already treating most pollutants to very low levels.

Additionally, the selection of the BAT treatment options took into consideration the fact that many of the existing direct discharging landfills already employed some sort of biological treatment system. While EPA acknowledges that the referenced Disc Tube™ reverse osmosis technology does not require pretreatment using biological treatment, EPA concluded that it was more cost effective to upgrade existing biological treatment systems than to add on a reverse osmosis system (or to replace the existing biological system with a reverse osmosis system). EPA determined it has reasonably evaluated and rejected reverse osmosis treatment as a BAT option. However, the regulation, of course, does not require the installation of a particular technology, only that the discharger comply with the limitations. Therefore, if a discharger determines that reverse osmosis will achieve the effluent limitations established in this rule, then the discharger is free to install a reverse osmosis treatment system to treat its landfill wastewater.

Comment: One commenter questioned how a facility will achieve such low zinc limits using biological treatment without employing a metals removal technology. The commenter also stated that zinc levels in landfills typically tend to be in the range of 2 to 7 mg/L.

Response: EPA disagrees with the commenter's claim. The record supports EPA's determination that the promulgated zinc limitations levels can be achieved through well-operated biological treatment systems without metals removal technology. In establishing zinc limits for the Non-Hazardous subcategory, EPA used zinc data from three of the seven BPT/BAT facilities for the Non-Hazardous subcategory. EPA did not use the data from the other four BPT/BAT facilities because all four employed chemical precipitation in addition to biological treatment, and chemical precipitation was not part of the selected BPT/BAT option. All three of the facilities used to calculate the zinc limitations operated a biological treatment system. Because one of these three facilities supplied two separate sets of data, EPA used four data sources from the three BPT/BAT facilities to calculate the limitations for zinc. The average raw wastewater zinc concentrations for these four data sets ranged from 0.31 mg/L to 0.995 mg/L with average effluent concentrations ranging from 0.05 mg/L to 0.21 mg/L. The percent removals of zinc for these BPT/BAT facilities ranged from 58 percent to 94 percent.

Since the proposed rule, EPA has recalculated the final zinc effluent limitations for the Non-Hazardous subcategory using the effluent data discussed above from the four data sources along with variability factors developed for zinc discharges from these landfills. EPA calculated a zinc monthly average limit of 0.11 mg/L and a daily maximum limit of 0.20 mg/L. (EPA explains the statistical methods used to develop these limitations more thoroughly in the Statistical Support Document for Final Effluent Limitations Guidelines and Standards for the Landfills Point Source Category and in Chapter 11 of the final Technical Development Document.)

The commenter expressed concern about the ability of biological treatment systems to achieve the zinc removals EPA had proposed for landfills without metals removal technology. The commenter stated that landfill concentrations of zinc are normally in the 2 mg/L to 7 mg/L range. However, the raw wastewater data submitted by the commenter did not support that claim. The commenter submitted zinc raw wastewater data from three Subtitle D landfills with concentrations of 0.065 mg/L and 0.569 mg/L for one landfill, and 0.165 mg/L and 0.59 mg/L for the other two landfills. These concentrations are consistent with the raw wastewater zinc concentrations at the BPT/BAT facilities that EPA used for the calculation of the effluent limitations for zinc. EPA has concluded that concentrations such as those submitted by the commenter are representative of concentrations typically found in Subtitle D landfill leachate. According to EPA's database, EPA determined that the mean raw wastewater concentration of zinc in Non-Hazardous subcategory was 1.2 mg/L and 75 percent of Subtitle D facilities in the database had zinc concentrations below 0.27 mg/L. Therefore, the EPA Landfills database does not reflect the commenter's claim that zinc levels at non-hazardous landfills typically range from 2 mg/L to 7 mg/L.

In addition, all of the influent zinc concentrations at the BPT/BAT facilities used to develop the non-hazardous BAT limitations for zinc were above the 75th percentile concentration of 0.27 mg/L, and one influent zinc concentration is above the 90th percentile concentration of 0.93 mg/L. Therefore, since the BPT/BAT facilities used in the calculation of the zinc limitations had zinc raw wastewater concentrations above 75 percent of other landfills in the Non-Hazardous subcategory, EPA concluded that the BPT/BAT technology will adequately treat zinc concentrations

found in raw waste loads at Subtitle D landfills. Additional information supporting EPA's determination is provided in the Comment Response Document and in Chapter 11 of the Technical Development Document.

While EPA acknowledges that if an individual non-hazardous landfill has higher zinc raw leachate concentrations than observed for virtually all of the landfills EPA sampled that the facility may not achieve the BPT/BAT discharge limitations for zinc using biological treatment and multi-media filtration alone. EPA's data show, however, that virtually all of non-hazardous landfills have raw leachate zinc concentrations that would be amenable to these two technologies. In fact, the one facility in EPA's database that had an average raw wastewater zinc concentration of 32 mg/L already has chemical precipitation in place. EPA determined that all other facilities in the database had raw wastewater zinc concentrations that could be treated adequately by a biological treatment system. While they are not designed to remove zinc, EPA has found that biological treatment systems achieve incidental removals of zinc through sorption into the biomass. It should be noted, that although EPA developed the non-hazardous landfills effluent limitations based on the performance of biological treatment followed by filtration, EPA does not require the use of the BPT/BAT technology to treat landfill wastewater. Landfill facilities have the freedom to choose any technology available to meet the promulgated effluent limitations.

Comment: One commenter, a manufacturer of insulation and fiberglass products, stated that monofills do not have the same leachate characteristics as municipal solid waste landfills. The commenter points out that parameters such as alpha terpineol, benzoic acid, p-cresol, and toluene would not normally be anticipated in the leachate from their monofill wastes and, therefore, should be excluded from the monitoring protocol.

Response: EPA agrees with the commenter that there will be cases where a monofill (*i.e.,* lime, construction and demolition, fly ash, etc.) will not have the same leachate characteristics as municipal solid waste landfills. EPA concluded there was sufficient similarity across these landfills so that subcategorization (and development of separate limitations) was not warranted as explained earlier in this section. EPA's permitting regulations require permit applications to supply the permit writer with information on a wide variety of pollutants which the permit writer must evaluate for possible limits in addition to guideline limitations. However, all federally regulated pollutants are required to be monitored, and the permitting authority may not alter the list of pollutants regulated as established under federal guidelines, except to require the monitoring of additional pollutants in specified circumstances. At a minimum, the final list of pollutants to be monitored must include all pollutants listed in the effluent limitations guidelines. The permit authority, however, can vary the monitoring frequency of the regulated pollutants, but must require no fewer than once per year for direct discharging facilities.

In addition, as explained in Section [III], EPA has decided not to set limitations for toluene. See Section [VIII] for information regarding proposed changes to the monitoring requirements under NPDES permits.

Appendix A: Definitions, Acronyms, and Abbreviations

Agency: The U.S. Environmental Protection Agency.

BAT: The best available technology economically achievable, applicable to effluent limitations to be achieved by July 1, 1984, for industrial discharges to surface waters, as defined by Sec. 304(b)(2)(B) of the CWA.

BCT: The best conventional pollutant control technology, applicable to discharges of conventional pollutants from existing industrial point sources, as defined by Sec. 304(b)(4) of the CWA.

BPT: The best practicable control technology currently available, applicable to effluent limitations to be achieved by July 1, 1977, for industrial discharges to surface waters, as defined by Sec. 304(b)(1) of the CWA.

Clean Water Act (CWA): The Federal Water Pollution Control Act Amendments of 1972 (33 U.S.C. Section 1251 *et seq.*), as amended by the Clean Water Act of 1977 (Pub. L. 95–217), and the Water Quality Act of 1987 (Pub. L. 100–4).

Clean Water Act (CWA) Section 308 Questionnaire: A questionnaire sent to facilities under the authority of Section 308 of the CWA, which requests information to be used in the development of national effluent guidelines and standards.

Closed: A facility or portion thereof that is currently not receiving or accepting wastes and has undergone final closure.

Commercial Facility: A facility that treats, disposes, or recycles/recovers the wastes of other facilities not under the same ownership as this facility. Commercial operations are usually made available for a fee or other remuneration. Commercial waste treatment, disposal, or recycling/recovery does not have to be the primary activity at a facility for an operation or unit to be considered ''commercial''.

Contaminated Ground Water: Water below the land surface in the zone of saturation which has been contaminated by landfill leachate. Contaminated ground water occurs at landfills without liners or at facilities that have released contaminants from a liner system. Ground water may also become contaminated if the water table rises to a point where it infiltrates the landfill or the leachate collection system.

Contaminated Storm Water: Storm water which comes in direct contact with landfill wastes, the waste handling and treatment areas, or wastewater that is subject to the limitations and standards. Some specific areas of a landfill that may produce contaminated storm water include (but are not limited to): the open face of an active landfill with exposed waste (no cover added); the areas around wastewater treatment operations; trucks, equipment or machinery that has been in direct contact with the waste; and waste dumping areas.

Conventional Pollutants: Constituents of wastewater as determined by Sec. 304(a)(4) of the CWA, including pollutants classified as biochemical oxygen demand, total suspended solids, oil and grease, fecal coliform, and pH.

Deep Well Injection: Disposal of wastewater into a deep well such that a porous, permeable formation of a larger area and thickness is available at sufficient depth to ensure continued, permanent storage.

Detailed Monitoring Questionnaire (DMQ): Questionnaires sent to collect monitoring data from 27 selected landfill facilities based on responses to the Section 308 Questionnaire.

Direct Discharger: A facility that discharges or may discharge treated or untreated wastewater into waters of the United States.

Drained Free Liquids: Aqueous wastes drained from waste containers (e.g., drums, etc.) prior to landfilling. Landfills which accept containerized waste may generate this type of wastewater.

Effluent Limitation: Any restriction, including schedules of compliance, established by a State or the Administrator on quantities, rates, and concentrations of chemical, physical, biological, and other constituents which are discharged from point sources into navigable waters, the waters of the contiguous zone, or the ocean. (CWA Sections 301(b) and 304(b).)

Existing Source: Any facility from which there is or may be a discharge of pollutants, the construction of which is commenced before the publication of the proposed regulations prescribing a standard of performance under Sec. 306 of the CWA.

Facility: All contiguous property owned, operated, leased or under the control of the same person or entity.

Gas Condensate: A liquid which has condensed in the landfill gas collection system during the extraction of gas from within the landfill. Gases such as methane and carbon dioxide are generated due to microbial activity within the landfill, and must be removed to avoid hazardous conditions.

Ground Water: The body of water that is retained in the saturated zone which tends to move by hydraulic gradient to lower levels.

Hazardous Waste: Any waste, including wastewater, defined as hazardous under RCRA (40 CFR 261.3).

Inactive: A facility or portion thereof that is currently not treating, disposing, or recycling/recovering wastes.

Indirect Discharger: A facility that discharges or may discharge wastewater into a publicly-owned treatment works (POTW).

Landfill: An area of land or an excavation in which wastes are placed for permanent disposal, that is not a land application or land treatment unit, surface impoundment, underground injection well, waste pile, salt dome formation, a salt bed formation, an underground mine or a cave.

Landfill Generated Wastewater: Wastewater generated by landfill activities and collected for treatment, discharge or reuse, include: leachate, contaminated ground water, storm water runoff, landfill gas condensate, truck/equipment washwater, drained free liquids, floor washings, and wastewater from recovering pumping wells.

Leachate: Leachate is a liquid that has passed through or emerged from solid waste and contains soluble, suspended, or miscible materials removed from such waste. Leachate is typically collected from a liner system above which waste is placed for disposal. Leachate may also be collected through the use of slurry walls, trenches or other containment systems.

Leachate Collection System: The purpose of a leachate collection system is to collect leachate for treatment or alternative disposal and to reduce the depths of leachate buildup or level of saturation over the low permeability liner.

Liner: The liner is a low permeability material or combination of materials placed at the base of a landfill to reduce the discharge to the underlying or surrounding hydrogeologic environment. The liner is designed as a barrier to intercept leachate and to direct it to a leachate collection.

Long-Term Average (LTA): For purposes of the effluent guidelines, average pollutant levels achieved over a period of time by a facility, subcategory, or technology option. LTAs are used in developing the limitations and standards in the landfill regulation.

National Pollutant Discharge Elimination System (NPDES) Permit: A permit to discharge wastewater into waters of the United States issued under the National Pollutant Discharge Elimination system, authorized by Section 402 of the CWA.

New Source: As defined in 40 CFR 122.2, 122.29, and 403.3(k), a new source is any building, structure, facility, or installation from which there is or may be a discharge of pollutants, the construction of which commenced (1) for purposes of compliance with New Source Performance Standards (NSPS) established under CWA section 306, after the promulgation of today's standards; or (2) for the purposes of compliance with Pretreatment Standards for New Sources (PSNS), after the publication of proposed standards under CWA section 307(c), if such standards are thereafter promulgated in accordance with that section.

Nonconventional Pollutants: Pollutants that are neither conventional pollutants listed at 40 CFR Part 401.16 nor priority pollutants listed in Appendix A of 40 CFR Part 423.

Non-Contaminated Storm Water: Storm water which does not come in direct contact with landfill wastes, the waste handling and treatment areas, or wastewater that is subject to the limitations and standards. Non-contaminated storm water includes storm water which flows off the cap, cover, intermediate cover, daily cover, and/or final cover of the landfill.

Non-Hazardous Subcategory: For the purposes of this report, Non-Hazardous Subcategory refers to all landfills regulated under Subtitle D of RCRA.

Non-Water Quality Environmental Impact: Deleterious aspects of control and treatment technologies applicable to point source category wastes, including, but not limited to air pollution, noise, radiation, sludge and solid waste generation, and energy usage.

NSPS: New Sources Performance Standards, applicable to new sources of direct dischargers whose construction is begun after the promulgation of effluent standards under CWA section 306.

OCPSF: Organic chemicals, plastics, and synthetic fibers manufacturing point source category. (40 CFR Part 414).

Off-Site: Outside the boundaries of a facility.

On-Site: The same or geographically contiguous property, which may be divided by a public or private right-of-way, provided the entrance and exit between the properties is at a crossroads intersection, and access is by crossing as opposed to going along the right-of-way. Non-contiguous properties owned by the same company or locality but connected by a right-of-way, which it controls, and to which the public does not have access, is also considered on-site property.

Pass Through: A pollutant is determined to ''pass through'' POTWs when the nationwide median percentage removed by well-operated POTWs achieving secondary treatment is less than the percentage removed by the industry's direct dischargers that are using the BAT technology.

Point Source: Any discernable, confined, and discrete conveyance from which pollutants are or may be discharged.

Pollutants of Interest (POIs): Pollutants commonly found in landfill generated wastewater. For the purposes of this rulemaking, a POI is a pollutant that is detected three or more times above a treatable level at a landfill, and must be present at more than one facility.

Priority Pollutant: One hundred twenty-six compounds that are a subset of the 65 toxic pollutants and classes of pollutants outlined in Section 307 of the CWA and listed in Appendix A of 40 CFR Part 423. The priority pollutants are specified in the NRDC settlement agreement (Natural Resources *Defense Council et al.* v. *Train,* 8 E.R.C. 2120 [D.D.C. 1976], modified 12 E.R.C. 1833 [D.D.C. 1979]).

PSES: Pretreatment standards for existing sources of indirect discharges, under Sec. 307(b) of the CWA.

PSNS: Pretreatment standards for new sources of indirect discharges, applicable to new sources whose construction has begun after the publication of proposed standards under CWA section 307(c), if such standards are thereafter promulgated in accordance with that section.

Public Service: The provision of landfill waste disposal services to individual members of the general public, publicly-owned organizations (schools, universities, government agencies, municipalities) and not-for-profit organizations for which the landfill does not receive a fee or other remuneration.

Publicly Owned Treatment Works (POTW): Any device or system, owned by a state or municipality, used in the treatment (including recycling and reclamation) of municipal sewage or industrial wastes of a liquid nature that is owned by a state or municipality. This includes sewers, pipes, or other conveyances only if they convey wastewater to a POTW providing treatment (40 CFR 122.2).

RCRA: The Resource Conservation and Recovery Act of 1976 (RCRA) (42 U.S.C. Section 6901 *et seq.*), which regulates the generation, treatment, storage, disposal, or recycling of solid and hazardous wastes.

Subtitle C Landfill: A landfill permitted to accept hazardous wastes under Sections 3001 and 3019 of RCRA and the regulations promulgated pursuant to these sections, including 40 CFR Parts 260 through 272.

Subtitle D Landfill: A landfill permitted to accept only non-hazardous wastes under Sections 4001 through 4010 of RCRA and the regulations promulgated pursuant to these sections, including 40 CFR Parts 257 and 258.

Surface Impoundment: A natural topographic depression, man-made excavation, or diked area formed primarily of earthen materials (although it may be lined with man-made materials), used to temporarily or permanently treat, store, or dispose of waste, usually in the liquid form. Surface impoundments do not include areas constructed to hold containers of wastes. Other common names for surface impoundments include ponds, pits, lagoons, finishing ponds, settling ponds, surge ponds, seepage ponds, and clarification ponds.

Toxic Pollutants: Pollutants declared ''toxic'' under Section 307(a)(1) of the Clean Water Act.

Truck/Equipment Washwater: Wastewater generated during either truck or equipment washes at the landfill. During routine maintenance or repair operations, trucks and/or equipment used within the landfill (e.g., loaders, compactors, or dump trucks) are washed and the resultant washwaters are collected for treatment.

Variability Factor: The daily variability factor is the ratio of the estimated 99th percentile of the distribution of daily values divided by the expected value, median or mean, of the distribution of the daily data. The monthly variability factor is the estimated 95th percentile of the distribution of the monthly averages of the data divided by the expected value of the monthly averages.

Zero Discharge: No discharge of pollutants to waters of the United States or to a POTW. Also included in this definition are alternative discharge or disposal of pollutants by way of evaporation, deep-well injection, off-site transfer, and land application.

List of Subjects

40 CFR Part 136

Environmental protection, Reporting and recordkeeping requirements, Water pollution control.

40 CFR Part 445

Environmental protection, Waste treatment and disposal, Water pollution control.

November 30, 1999.

Carol M. Browner,

Administrator.

For the reasons set out in the preamble, title 40, chapter I of the Code of Federal Regulations is amended as follows:

PART 136—TEST PROCEDURES FOR THE ANALYSIS OF POLLUTANTS

1. The authority citation for Part 136 continues to read as follows:

Authority: Secs. 301, 304(h), 307, and 501(a) Pub. L. 95–217, 91 Stat. 1566, *et seq.* (33 U.S.C. 1251, *et seq.*) (The Federal Water Pollution Control Act Amendments of 1972 as amended by the Clean Water Act of 1977).

Appendix A [Amended]

2. Appendix A to Part 136 is amended to add text at the end of Method 625 as an attachment and to add text at the end of Method 1625 as an attachment, reading as follows:

Appendix A To Part 136—Methods For Organic Chemical Analysis of Municipal and Industrial Wastewater

* * * * *

Method 625—Base/Neutrals and Acids

* * * * *

Attachment 1 to Method 625

Introduction

To support measurement of several semivolatile pollutants, EPA has developed this attachment to EPA Method 625 [1]. EPA Method 625 (the Method) involves sample extraction with methylene chloride followed by analysis of the extract using either packed or capillary column gas chromatography/mass spectrometry (GC/MS). This attachment addresses the addition of the semivolatile pollutants listed in Tables 1 and 2, to all applicable standard, stock, and spiking solutions utilized for the determination of semivolatile organic compounds by EPA Method 625.

1.0 EPA METHOD 625 MODIFICATION SUMMARY

The additional semivolatile organic compounds listed in Tables 1 and 2 are added to all applicable calibration, spiking, and other solutions utilized in the determination of base/neutral and acid compounds by EPA Method 625. The instrument is to be calibrated with these compounds, using a capillary column, and all procedures and quality control tests stated in the Method must be performed.

2.0 SECTION MODIFICATIONS

Note: All section and figure numbers in this Attachment reference section and figure numbers in EPA Method 625 unless noted otherwise. Sections not listed here remain unchanged.

Section 6.7 The stock standard solutions described in this section are modified such that the analytes in Tables 1 and 2 of this attachment are required in addition to those specified in the Method.

Section 7.2 The calibration standards described in this section are modified to include the analytes in Tables 1 and 2 of this attachment.

Section 8.2 The precision and accuracy requirements are modified to include the analytes listed in Tables 1 and 2 of this attachment. Additional performance criteria are supplied in Table 5 of this attachment.

Section 8.3 The matrix spike is modified to include the analytes listed in Tables 1 and 2 of this attachment.

Section 8.4 The QC check standard is modified to include the analytes listed in Tables 1 and 2 of this attachment. Additional performance criteria are supplied in Table 5 of this attachment.

Section 16.0 Additional method performance information is supplied with this attachment.

TABLE 1.—BASE/NEUTRAL EXTRACTABLES

Parameter	CAS No.
Acetophenone	98–86–2
Alpha-terpineol	98–55–5
Aniline	62–53–3
Carbazole	86–74–8
2,3-Dichloroaniline	608–27–5
o-Cresol	95–48–7
n-Decane	124–18–5
n-Docosane	629–97–0
n-Dodecane	112–40–3
n-Eicosane	112–95–8
n-Hexadecane	544–76–3
n-Octadecane	593–45–36
n-Tetradecane	629–59–4
Pyridine	110–86–1
1-Methylphenanthrene	832–69–9

CAS = Chemical Abstracts Registry

TABLE 2.—ACID EXTRACTABLES

Parameter	CAS No.
benzoic acid	65–85–0
p-cresol	106–44–5

CAS = Chemical Abstracts Registry

TABLE 3.—CHROMATOGRAPHIC CONDITIONS,[1] METHOD DETECTION LIMITS (MDLS), AND CHARACTERISTIC M/Z'S FOR BASE/NEUTRAL EXTRACTABLES

Analyte	Retention time (min) [2]	MDL (µg/L)	Characteristic m/z's electron impact		
			Primary	Secondary	Secondary
Pyridine	4.93	4.6	79	52	51
N-Nitrosodimethylamine	4.95	.....	42	74	44
Aniline	10.82	3.3	93	66	65
Bis(2-chloroethyl)ether	10.94	.....	93	63	95
n-Decane	11.11	5.0	57	.....	.....
1,3-Dichlorobenzene	11.47	.....	146	148	113
1,4-Dichlorobenzene	11.62	.....	146	148	113
1,2-Dichlorobenzene	12.17	.....	146	148	113
o-Cresol	12.48	4.7	108	107	79
Bis(2-chloroisopropyl)ether	12.51	.....	45	77	79
Acetophenone	12.88	3.4	105	77	51
N-Nitrosodi-n-propylamine	12.97	.....	130	42	101
Hexachloroethane	13.08	.....	117	201	199
Nitrobenzene	13.40	.....	77	123	65
Isophorone	14.11	.....	82	95	138

[1] EPA Method 625: Base/Neutrals and Acids, 40 CFR Part 136, Appendix A.

TABLE 3.—CHROMATOGRAPHIC CONDITIONS,[1] METHOD DETECTION LIMITS (MDLS), AND CHARACTERISTIC M/Z'S FOR BASE/NEUTRAL EXTRACTABLES—Continued

Analyte	Retention time (min)[2]	MDL (μg/L)	Characteristic m/z's electron impact		
			Primary	Secondary	Secondary
Bis(2-chloroethoxy)methane	14.82	.....	93	95	123
1,2,4-Trichlorobenzene	15.37	.....	180	182	145
n-Dodecane	15.45	3.0	57	.....	.....
Alpha-terpineol	15.55	5.0	59	.....	.....
Naphthalene	15.56	.....	128	129	127
Hexachlorobutadiene	16.12	.....	225	223	227
Hexachlorocyclopentadiene	18.47	.....	237	235	272
2,3-dichloroaniline	18.82	2.5	161	163	90
n-tetradecane	19.21	1.7	57	.....	.....
2-Chloronaphthalene	19.35	.....	162	164	127
Dimethyl phthalate	20.48	.....	163	194	164
Acenaphthylene	20.69	.....	152	151	153
2,6-Dinitrotoluene	20.73	.....	165	89	121
Acenaphthene	21.30	.....	154	153	152
2,4-Dinitrotoluene	22.00	.....	165	63	182
n-hexadecane	22.49	3.0	55	.....	.....
Diethylphthalate	22.74	.....	149	177	150
4-Chlorophenyl phenyl ether	22.90	.....	204	206	141
Fluorene	22.92	.....	166	165	167
N-Nitrosodiphenylamine	23.35	.....	169	168	167
4-Bromophenyl phenyl ether	24.44	.....	248	250	141
Hexachlorobenzene	24.93	.....	284	142	249
n-octadecane	25.39	2.0	57	.....	.....
Phenanthrene	25.98	.....	178	179	176
Anthracene	26.12	.....	178	179	176
Carbazole	26.66	4.0	167	.....	.....
Dibutyl phthalate	27.84	.....	149	150	104
1-methylphenanthrene	27.94	2.7	192	191	165
n-eicosane	27.99	3.0	55	.....	.....
Fluoranthene	29.82	.....	202	101	100
Benzidine	30.26	.....	184	92	185
n-docosane	30.43	2.0	57	.....	.....
Pyrene	30.56	.....	202	101	100
Butyl benzyl phthalate	32.63	.....	149	91	206
3,3′-Dichlorobenzidine	34.28	.....	252	254	126
Benzo(a)anthracene	34.33	.....	228	229	226
Bis(2-ethylhexyl)phthalate	34.36	.....	149	167	279
Chrysene	34.44	.....	228	226	229
Di-n-octyl-phthalate	36.17	.....	149	.....	.....
Benzo(b)fluoranthene	37.90	.....	252	253	125
Benzo(k)fluoranthene	37.97	.....	252	253	125
Benzo(a)pyrene	39.17	.....	252	253	125
Dibenzo(a,h)anthracene	44.91	.....	278	139	279
Indeno(1,2,3-c,d)pyrene	45.01	.....	276	138	277
Benzo(ghi)perylene	46.56	.....	276	138	277

[1] The data presented in this table were obtained under the following conditions:
Column—30+/−5 meters×0.25+/−.02 mm i.d., 94% methyl, 5% phenyl, 1% vinyl, bonded phase fused silica capillary column (DB–5).
Temperature program—Five minutes at 30 °C; 30–280 °C at 8 °C per minute; isothermal at 280 °C until benzo(ghi)perylene elutes.
Gas velocity—30+/−5 cm/sec at 30 °C.
[2] Retention times are from Method 1625, Revision C, using a capillary column, and are intended to be consistent for all analytes in Tables 4 and 5 of this attachment.

TABLE 4.—CHROMATOGRAPHIC CONDITIONS, [1] METHOD DETECTION LIMITS (MDLS), AND CHARACTERISTIC M/Z'S FOR ACID EXTRACTABLES

Analyte	Retention time[2] (min)	MDL (μg/L)	Characteristic m/z's electron impact		
			Primary	Secondary	Secondary
Phenol	10.76	.....	94	65	66
2-Chlorophenol	11.08	.....	128	64	130
p-Cresol	12.92	7.8	108	107	77
2-Nitrophenol	14.38	.....	139	65	109
2,4-Dimethylphenol	14.54	.....	122	107	121
Benzoic acid	14.85	3.0	105	122	77
2,4-Dichlorophenol	15.12	.....	162	164	98
4-Chloro-3-methylphenol	16.83	.....	142	107	144

TABLE 4.—CHROMATOGRAPHIC CONDITIONS, [1] METHOD DETECTION LIMITS (MDLS), AND CHARACTERISTIC M/Z'S FOR ACID EXTRACTABLES—Continued

Analyte	Retention time [2] (min)	MDL (µg/L)	Characteristic m/z's electron impact		
			Primary	Secondary	Secondary
2,4,6-Trichlorophenol	18.80	.....	196	198	200
2,4-Dinitrophenol	21.51	.....	184	63	154
4-Nitrophenol	21.77	.....	65	139	109
2-Methyl-4,6-dinitrophenol	22.83	.....	198	182	77
Pentachlorophenol	25.52	.....	266	264	268

[1] The data presented in this table were obtained under the following conditions:
Column—30 +/−5 meters × 0.25 +/−.02 mm i.d., 94% methyl, 5% phenyl, 1% vinyl silicone bonded phase fused silica capillary column (DB–5).
Temperature program—Five minutes at 30 °C; 30–280 °C at 8 °C per minute; isothermal at 280 °C until benzo(ghi)perylene elutes.
Gas velocity—30+/−5 cm/sec at 30 °C.
[2] Retention times are from EPA Method 1625, Revision C, using a capillary column, and are intended to be consistent for all analytes in Tables 3 and 4 of this attachment.

TABLE 5.—QC ACCEPTANCE CRITERIA

Analyte	Test conclusion (µg/L)	Limits for s (µg/L)	Range for X (µg/L)	Range for P, P_s (%)
Acetophenone	100	51	23–254	61–144
Alpha-terpineol	100	47	46–163	58–156
Aniline	100	71	15–278	46–134
Carbazole	100	17	79–111	73–131
2,3-Dichloroaniline	100	13	40–160	68–134
o-Cresol	100	23	30–146	55–126
Benzoic acid	100	24	ns-ns	ns-ns
p-Cresol	100	22	11–617	76–107
n-Decane	100	70	D–651	D-ns
n-Docosane	100	10	52–155	49–163
n-Dodecane	100	36	13–103	10–359
n-Eicosane	100	28	57–133	72–117
n-Hexadecane	100	37	44–135	69–105
n-Octadecane	100	10	52–147	65–123
n-Tetradecane	100	8	75–100	47–113
Pyridine	100	ns	7–392	33–158
1-Methylphenanthrene	100	16	39–240	60–161

s=Standard deviation for four recovery measurements, in µg/L (Section 8.2)
X=Average recovery for four recovery measurements in µg/L (Section 8.2)
P,P_s=Percent recovery measured (Section 8.3, Section 8.4)
D=Detected; result must be greater than zero.
ns=no specification; limit is outside the range that can be measured reliably.

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Method 1625—Revision B—Semivolatile Organic Compounds by Isotope Dilution GC/MS

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Attachment 1 to Method 1625

Introduction

To support measurement of several semivolatile pollutants, EPA has developed this attachment to EPA Method 1625B.[1] EPA Method 1625B (the Method) employs sample extraction with methylene chloride followed by analysis of the extract using capillary column gas chromatography-mass spectrometry (GC/MS). This attachment addresses the addition of the semivolatile pollutants listed in Tables 1 and 2 to all applicable standard, stock, and spiking solutions utilized for the determination of semivolatile organic compounds by EPA Method 1625B.

1.0 EPA METHOD 1625 REVISION B MODIFICATION SUMMARY

The additional semivolatile organic compounds listed in Tables 1 and 2 are added to all applicable calibration, spiking, and other solutions utilized in the determination of semivolatile compounds by EPA Method 1625. The instrument is to be calibrated with these compounds, and all procedures and quality control tests described in the Method must be performed.

2.0 SECTION MODIFICATIONS

Note: All section and figure numbers in this Attachment reference section and figure numbers in EPA Method 1625 Revision B unless noted otherwise. Sections not listed here remain unchanged.

Section 6.7 The stock standard solutions described in this section are modified such that the analytes in Tables 1 and 2 of this attachment are required in addition to those specified in the Method.

Section 6.8 The labeled compound spiking solution in this section is modified to include the labeled compounds listed in Tables 5 and 6 of this attachment.

Section 6.9 The secondary standard is modified to include the additional analytes listed in Tables 1 and 2 of this attachment.

Section 6.12 The solutions for obtaining authentic mass spectra are to include all additional analytes listed in Tables 1 and 2 of this attachment.

Section 6.13 The calibration solutions are modified to include the analytes listed in Tables 1 and 2 and the labeled compounds listed in Tables 5 and 6 of this attachment.

Section 6.14 The precision and recovery standard is modified to include the analytes listed in Tables 1 and 2 and the

[1] EPA Method 1625 Revision B, Semivolatile Organic Compounds by Isotope Dilution GC/MS, 40 CFR Part 136, Appendix A.

labeled compounds listed in Tables 5 and 6 of this attachment.

Section 6.15 The solutions containing the additional analytes listed in Tables 1 and 2 of this attachment are to be analyzed for stability.

Section 7.2.1 This section is modified to include the analytes listed in Tables 1 and 2 and the labeled compounds listed in Tables 5 and 6 of this attachment.

Section 7.4.5 This section is modified to include the analytes listed in Tables 1 and 2 and the labeled compounds listed in Tables 5 and 6 in the calibration.

Section 8.2 The initial precision and recovery (IPR) requirements are modified to include the analytes listed in Tables 1 and 2 and the labeled compounds listed in Tables 5 and 6 of this attachment. Additional IPR performance criteria are supplied in Table 7 of this attachment.

Section 8.3 The labeled compounds listed in Tables 3 and 4 of this attachment are to be included in the method performance tests. Additional method performance criteria are supplied in Table 7 of this attachment.

Section 8.5.2 The acceptance criteria for blanks includes the analytes listed in Tables 1 and 2 of this attachment.

Section 10.1.2 The labeled compound solution must include the labeled compounds listed in Tables 5 and 6 of this attachment.

Section 10.1.3 The precision and recovery standard must include the analytes listed in Tables 1 and 2 and the labeled compounds listed in Tables 5 and 6 of this attachment.

Section 12.5 Additional QC requirements for calibration verification are supplied in Table 7 of this attachment.

Section 12.7 Additional QC requirements for ongoing precision and recovery are supplied in Table 7 of this attachment.

TABLE 1.—BASE/NEUTRAL EXTRACTABLE COMPOUNDS

Compound	Pollutant	
	CAS registry	EPA–EGD
Acetophenone	98–86–2	758
Aniline	62–53–3	757
2,3-Dichloroaniline	608–27–5	578
o-Cresol	95–48–7	771
Pyridine	110–86–1	1330
1-Methylphenanthrene	832–69–9	905

CAS=Chemical Abstracts Registry
EGD=Effluent Guidelines Division

TABLE 2.—ACID EXTRACTABLE COMPOUNDS

Compound	Pollutant	
	CAS registry	EPA–EGD
Benzoic acid	65–85–0	700
p-Cresol	106–44–5	1744

CAS=Chemical Abstracts Registry
EGD=Effluent Guidelines Division

TABLE 3.—GAS CHROMATOGRAPHY [1] OF BASE/NEUTRAL EXTRACTABLE COMPOUNDS

EGD No.	Compound	Retention time [2]			Minimum Level [3] (µg/L)
		Mean (sec)	EGD Ref	Relative	
758	Acetophenone	818	658	1.003–1.005	10
757	Aniline	694	657	0.994–1.023	10
578	2,3-Dichloroaniline	1160	164	1.003–1.007	10
771	o-Cresol	814	671	1.005–1.009	10
1330	Pyridine	930	1230	1.005–1.011	10
905	1-Methylphenanthrene	1697	164	1.449–1.537	10

EGD=Effluent Guidelines Division
[1] The data presented in this table were obtained under the chromatographic conditions given in the footnote to Table 3 of EPA Method 1625B.
[2] Retention times are approximate and are intended to be consistent with the retention times for the analytes in EPA Method 1625B.
[3] See the definition in footnote 2 to Table 3 of EPA Method 1625B.

TABLE 4.—GAS CHROMATOGRAPHY [1] OF ACID EXTRACTABLE COMPOUNDS

EGD No.	Compound	Retention time [2]			Minimum level (µg/L) [3]
		Mean (sec)	EGD Ref	Relative	
1744	p-Cresol	834	1644	1.004–1.008	20
700	Benzoic acid	971	600	0.992–1.008	10

EGD=Effluent Guidelines Division
[1] The data presented in this table were obtained under the chromatographic conditions given in the footnote to Table 4 of EPA Method 1625B.
[2] Retention times are approximate and are intended to be consistent with the retention times for the analytes in EPA Method 1625B.

[3] See the definition in footnote 2 to Table 4 of EPA Method 1625B.

TABLE 5.—BASE/NEUTRAL EXTRACTABLE COMPOUND CHARACTERISTIC M/Z'S

Compound	Labeled analog	Primary m/z [1]
Acetophenone	d_5	105/110
Aniline	d_7	93/100
2,3-Dichloroaniline	n/a	161
Pyridine	d_5	79/84
o-Cresol	d_7	108/116
1-Methylphenanthrene	n/a	192

m/z=mass to charge ratio
[1] native/labeled

TABLE 6.—ACID EXTRACTABLE COMPOUND CHARACTERISTIC M/Z'S

Compound	Labeled analog	Primary m/z [1]
p-Cresol	d_7	108/116
Benzoic acid	d_5	105/110

m/z=mass to charge ratio
[1] native/labeled

TABLE 7.—ACCEPTANCE CRITERIA FOR PERFORMANCE TESTS

EGD No.	Compound	Acceptance criteria				
		Initial precision and accuracy section 8.2 (µg/L)		Labeled compound recovery sec. 8.3 and 14.2 P (percent)	Calibration verification sec. 12.5 (µg/mL)	On-going accuracy sec. 12.7 R (µg/L)
		s (µg/L)	X			
758	Acetophenone	34	44–167	.....	85–115	45–162
658	Acetophenone-d_5	51	23–254	45–162	85–115	22–264
757	Aniline	32	30–171	.....	85–115	33–154
657	Aniline-d_7	71	15–278	33–154	85–115	12–344
700	Benzoic acid	ns	ns-ns	.....	ns-322	ns-ns
600	Benzoic acid-d_5	24	ns-ns	ns-ns	66–134	ns-648
578	2,3-dichloroaniline	13	40–160	.....	85–115	44–144
771	o-Cresol	40	31–226	.....	85–115	35–196
671	o-Cresol-d_7	23	30–146	35–196	85–115	31–142
1744	p-Cresol	59	54–140	.....	85–115	37–203
1644	p-Cresol-d_7	22	11–618	37–203	85–115	16–415
1330	Pyridine	28	10–421	.....	83–117	18–238
1230	Pyridine-d_5	ns	7–392	19–238	85–115	4–621
905	1-Methylphenanthrene	16	39–240	.....	78–122	46–204

s=Standard deviation of four recovery measurements.
X=Average recovery for four recovery measurements.
EGD=Effluent Guidelines Division.
ns=no specification; limit is outside the range that can be measured reliably.

Part 445 is added to read as follows:

PART 445—LANDFILLS POINT SOURCE CATEGORY

Authority: Secs. 301, 304, 306, 307, 308, 402 and 501 of the Clean Water Act, as amended (33 U.S.C. 1311, 1314, 1316, 1317, 1318, 1342 and 1361)

§ 445.1 General applicability.

(a) As defined more specifically in each subpart and except as provided in paragraphs (b) through (h) of this section, this part applies to discharges of wastewater from landfill units.

(b) The provisions of this part do not apply to wastewater discharges from land application or land treatment units, surface impoundments, underground injection wells, waste piles, salt dome formations, salt bed formations, underground mines or caves as these terms are defined in 40 CFR 257.2 and 260.10.

(c) The provisions of this part do not apply to wastewater generated off-site of a landfill facility, including wastewater generated off-site from washing vehicles or from waste transfer stations.

(d) The provisions of this part do not apply to discharges of contaminated ground water or wastewater from recovery pumping wells.

(e) This part does not apply to discharges of landfill wastewater from landfills operated in conjunction with other industrial or commercial operations when the landfill only receives wastes generated by the industrial or commercial operation directly associated with the landfill.

(f) This part does not apply to discharges of landfill wastewater from landfills operated in conjunction with other industrial or commercial operations when the landfill receives wastes generated by the industrial or commercial operation directly associated with the landfill and also receives other wastes provided the other wastes received for disposal are generated by a facility that is subject to the same provisions in 40 CFR subchapter N as the industrial or commercial operation or the other wastes received are of similar nature to the wastes generated by the industrial or commercial operation.

(g) This part does not apply to landfills operated in conjunction with Centralized Waste Treatment (CWT) facilities subject to 40 CFR Part 437 so long as the CWT facility commingles the landfill wastewater with other non-landfill wastewater for discharge. A landfill directly associated with a CWT facility is subject to this part if the CWT facility discharges landfill wastewater separately from other CWT wastewater or commingles the wastewater from its landfill only with wastewater from other landfills.

(h) This part does not apply to landfills operated in conjunction with other industrial or commercial operations when the landfill receives wastes from public service activities so long as the company owning the landfill does not receive a fee or other remuneration for the disposal service.

§ 445.2 General definitions.

In addition to the definitions set forth in 40 CFR 122.2, 257.2, 258.2, 264.10, 265.10, 401.11, and 403.3 the following definitions apply to this part:

(a) *Contaminated ground water* means water below the land surface in the zone of saturation which has been contaminated by activities associated with waste disposal.

(b) *Contaminated storm water* means storm water which comes in direct contact with landfill wastes, the waste handling and treatment areas, or landfill wastewater as defined in paragraph (f) of this section. Some specific areas of a landfill that may produce contaminated storm water include (but are not limited to): the open face of an active landfill with exposed waste (no cover added); the areas around wastewater treatment operations; trucks, equipment or machinery that has been in direct contact with the waste; and waste dumping areas.

(c) *Landfill* directly associated with an industrial or commercial operation means:

(1) A landfill located on the same site as industrial or commercial operations; and

(2) A landfill not located on the same site as the industrial or commercial operations (off-site), but ''wholly-owned'' by the industrial or commercial facility and primarily dedicated to receiving waste from the related industrial or commercial facility.

(d) *Facility* means all contiguous property owned, operated, leased or under the control of the same person or entity.

(e) *Landfill unit* means an area of land or an excavation in which wastes are placed for permanent disposal, that is not a land application or land treatment unit, surface impoundment, underground injection well, waste pile, salt dome formation, a salt bed formation, an underground mine or a cave as these terms are defined in 40 CFR 257.2, 258.2 and 264.10.

(f) *Landfill wastewater* means all wastewater associated with, or produced by, landfilling activities except for sanitary wastewater, non-contaminated storm water, contaminated ground water, and wastewater from recovery pumping wells. Landfill wastewater includes, but is not limited to, leachate, gas collection condensate, drained free liquids, laboratory derived wastewater, contaminated storm water and contact washwater from washing truck, equipment, and railcar exteriors and surface areas which have come in direct contact with solid waste at the landfill facility.

(g) *Non-contaminated storm water* means storm water which does not come in direct contact with landfill wastes, the waste handling and treatment areas, or landfill wastewater that is defined in paragraph (f) of this section. Non-contaminated storm water includes storm water which flows off the cap, cover, intermediate cover, daily cover, and/or final cover of the landfill.

(h) *Off-site* means outside the boundaries of a facility.

(i) *On-site* means within the boundaries of a facility.

(j) *Public service* means the provision of landfill waste disposal services to individual members of the general public, publicly-owned organizations (schools, universities, government agencies, municipalities) and not-for-profit organizations for which the landfill does not receive a fee or other remuneration.

(k) The regulated parameters for this part, numbered (P) and listed with approved methods of analysis in Table 1B at 40 CFR 136.3, are defined as follows:

(1) *Ammonia (as N)* means ammonia reported as nitrogen. P4.

(2) BOD_5 means 5-day biochemical oxygen demand. P9.

(3) *Arsenic* means total arsenic. P6.

(4) *Chromium* means total chromium. P19.

(5) *Zinc* means total zinc. P75.

(l) The regulated parameters for this part, numbered (P) and listed with approved methods of analysis in Table 1C at 40 CFR 136.3, are as follows:

(1) Naphthalene. P68.

(2) Phenol. P85.

(m) The regulated parameters for this part listed with approved methods of analysis in the attachments to Methods 625 and 1625B in Appendix A at 40 CFR Part 136 are as follows:

(1) Aniline.

(2) Benzoic acid.

(3) p-Cresol.

(4) Pyridine.

(5) a-Terpineol.

§ 445.3 General pretreatment standards.

Any source subject to this part that introduces wastewater pollutants into a publicly owned treatment works (POTW) must comply with 40 CFR part 403.

Subpart A—RCRA Subtitle C Hazardous Waste Landfill

§ 445.10 Applicability.

Except as provided in § 445.1, this subpart applies to discharges of

wastewater from landfills subject to the provisions of 40 CFR Part 264, *Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities, Subpart N–(Landfills);* and 40 CFR Part 265, *Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities, Subpart N–(Landfills).*

§ 445.11 Effluent limitations attainable by the application of the best practicable control technology currently available (BPT).

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve the following effluent limitations which represent the application of BPT:

EFFLUENT LIMITATIONS

Maximum daily [1]	Regulated parameter	Maximum monthly avg.[1]
BOD_5	220	56
TSS	88	27
Ammonia (as N)	10	4.9
α-Terpineol	0.042	0.019
Aniline	0.024	0.015
Benzoic acid	0.119	0.073
Naphthalene	0.059	0.022
p-Cresol	0.024	0.015
Phenol	0.048	0.029
Pyridine	0.072	0.025
Arsenic	1.1	0.54
Chromium	1.1	0.46
Zinc	0.535	0.296
pH	([2])	([2])

[1] Milligrams per liter (mg/L, ppm).
[2] Within the range 6 to 9.

§ 445.12 Effluent limitations attainable by the application of the best conventional pollutant control technology (BCT).

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve the following effluent limitations which represent the application of BCT: Limitations for BOD_5, TSS and pH are the same as the corresponding limitations specified in § 445.11.

§ 445.13 Effluent limitations representing the degree of effluent reduction attainable by the application of best available technology economically achievable (BAT).

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve the following effluent limitations which represent the application of BAT: Limitations for ammonia (as N), a-terpineol, aniline, benzoic acid, naphthalene, p-cresol, phenol, pyridine, arsenic, chromium and zinc are the same as the corresponding limitations specified in § 445.11.

§ 445.14 New source performance standards (NSPS).

Any new source subject to this subpart must achieve the following performance standards: Standards are the same as those specified in § 445.11.

Subpart B—RCRA Subtitle D Non-Hazardous Waste Landfill

§ 445.20 Applicability.

Except as provided in § 445.1, this subpart applies to discharges of wastewater from landfills subject to the provisions of 40 CFR part 258, *Criteria for Municipal Solid Waste Landfills;* and 40 CFR part 257, *Criteria for Classification of Solid Waste Disposal Facilities and Practices.*

§ 445.21 Effluent limitations attainable by the application of the best practicable control technology currently available (BPT).

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve the following effluent limitations which represent the application of BPT:

EFFLUENT LIMITATIONS

Regulated parameter	Maximum daily [1]	Maximum monthly avg. [1]
BOD	140	37
TSS	88	27
Ammonia (as N)	10	4.9
a-Terpineol	0.033	0.016
Benzoic acid	0.12	0.071
p-Cresol	0.025	0.014
Phenol	0.026	0.015
Zinc	0.20	0.11
pH	2)	(2)

[1] Milligrams per liter (mg/L, ppm)
[2] Within the range 6 to 9.

§ 445.22 Effluent limitations attainable by the application of the best conventional pollutant control technology (BCT).

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve the following effluent limitations which represent the application of BCT: Limitations for BOD_5, TSS and pH are the same as the corresponding limitations specified in § 445.21.

§ 445.23 Effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT).

Except as provided in 40 CFR 125.30—125.32, any existing point source subject to this subpart must achieve the following effluent limitations which represent the application of BAT: Limitations for ammonia (as N), a-terpineol, benzoic acid, p-cresol, phenol and zinc are the same as the corresponding limitations specified in § 445.21.

§ 445.24 New source performance standards (NSPS).

Any new source subject to this subpart must achieve the following performance standards: Standards are the same as those specified in § 445.21.

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