ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 148, 260, 261, 268 and 271

[EPA #530–7–93–011, FRL–4725–5]

RIN 2050–AD37

Land Disposal Restrictions for Newly Identified and Listed Hazardous Wastes and Hazardous Soil

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule.

SUMMARY: EPA is proposing treatment standards for the newly identified organic toxicity characteristic wastes (except those managed in Clean Water Act (CWA) systems, CWA-equivalent systems, or Class I Safe Drinking Water Act (SDWA) injection wells), and treatment standards for all newly listed coke by-product and chlorotoluene production wastes that must be met before these wastes are land disposed. EPA is also proposing to require ignitable characteristic wastes with a high total organic carbon (TOC) content and toxic characteristic pesticide wastes, that are being disposed in Class I nonhazardous waste injection wells, to either be injected into a well that is subject to a no-migration determination, or be treated to meet the LDR treatment standards prior to injection. These treatment standards and the dilution prohibitions for high TOC ignitables and pesticides are being proposed in order to comply with a proposed consent decree with the Environmental Defense Fund. This proposal also contains alternative standards for soil contaminated with prohibited hazardous wastes that will encourage use of noncombustion treatment technologies in treating hazardous soil. In addition, EPA is proposing several revisions to previously promulgated treatment standards and requirements in order to simplify the implementation of the land disposal restriction rules, including setting "universal treatment standards". Finally, EPA is proposing to modify the hazardous waste recycling regulations which will allow streamlined regulatory decisions to be made regarding the regulation of certain types of recycling activities.

DATES: Comments and data must be submitted on or before November 15, 1993.

ADDRESSES: The public must send an original and two copies of their written comments to EPA RCRA Docket (OS–305), U.S. Environmental Protection Agency, 401 M St., SW, Washington, DC 20460. Place the Docket Number F–92–CS2P–FFFFF on your comments. The RCRA Docket is located in room 2616 at the above address, and is open from 9 am to 4 pm Monday through Friday, except for Federal holidays. The public must make an appointment to review docket materials by calling (202) 260–9327. The public may copy a maximum of 100 pages from any regulatory document at no cost. Additional copies cost $.15 per page.

FOR FURTHER INFORMATION CONTACT: For general information, contact the RCRA Hotline at (800) 424–9346 (toll-free) or (703) 412–9810 locally. For technical information on treatment standards, contact the Waste Treatment Branch, Office of Solid Waste (OS–322W), U.S. Environmental Protection Agency, 401 M Street, SW., Washington, DC. 20460, (703)308–8434. For technical information on capacity analyses, contact the Capacity Branch, Office of Solid Waste (OS–321W), (703)308–8440. For technical information on Hazardous Waste Recycling, contact the Regulation Development Branch, Office of Solid Waste (OS–332), (202)260–8551.

I. Background

A. Summary of the Statutory Requirements of the 1984 Hazardous and Solid Waste Amendments

The Hazardous and Solid Waste Amendments (HSWA) to the Resource Conservation and Recovery Act (RCRA), enacted on November 8, 1984, largely prohibit the land disposal of untreated hazardous wastes. Once a hazardous waste is prohibited from land disposal, the statute provides only two options: Meet the treatment standard for the waste prior to land disposal, or dispose of the waste in a land disposal unit that has been found to satisfy the statutory no migration test. The treatment standards EPA establishes may be expressed as either levels or methods, and must substantially diminish the toxicity of the waste or substantially reduce the likelihood of migration of hazardous constituents from the waste so that short-term and long-term threats to human health and the environment are minimized. RCRA section 3004(m)(1). A no migration unit is one from which there will be no migration of hazardous constituents for as long as the waste remains hazardous. RCRA sections 3004(d), (e), (g)(5). For purposes of the restrictions, land disposal includes any placement of hazardous waste in a landfill, surface impoundment, waste pile, injection well, land treatment facility, salt dome formation, salt bed formation, or underground mine or cave. RCRA section 3004(k).

The land disposal restrictions are effective upon promulgation. RCRA section 3004(h)(1). However, the Administrator may grant a national capacity variance from the immediate effective date and establish a later effective date (not to exceed two years) based on the earliest date on which adequate alternative treatment, recovery, or disposal capacity which protects human health and the environment will be available. RCRA section 3004(h)(2). The Administrator may also grant a case-by-case extension of the effective date for up to one year, renewable once for up to one additional year, when an applicant successfully makes certain demonstrations. RCRA section 3004(h)(3). See 55 FR 22526 (June 1, 1990) for a more detailed discussion on national capacity variances and case-by-case extensions.

In addition, Congress prohibited storage of any waste which is prohibited from land disposal unless such storage is solely for the purpose of the accumulation of such quantities of hazardous waste as are necessary to facilitate proper recovery, treatment or disposal. RCRA section 3004(j). For storage up to one year, EPA bears the burden of proving that such storage was not solely for the purpose of accumulation of quantities necessary to facilitate proper recovery, treatment or disposal. 40 CFR 268.50(b). For storage beyond one year, the burden of proof shifts to the generator or owner/operator of a treatment, storage or disposal facility to demonstrate that such storage was solely for the purpose of accumulation of quantities necessary to facilitate proper recovery, treatment or disposal. 40 CFR 268.50(c). The provision applies, of course, only to storage which is not also defined in section 3004(k) as land disposal.

EPA was required to promulgate land disposal prohibitions and treatment standards by May 8, 1990 for all wastes that were either listed or identified as hazardous at the time of the 1984 amendments, a task EPA completed within the statutory timeframes. RCRA sections 3004(d), (e), and (g). EPA is also required to promulgate prohibitions and treatment standards for wastes identified or listed as hazardous after the date of the 1984 amendments within six months after the listing or identification takes effect. RCRA section 3004(g)(4). The Agency did not meet this latter statutory deadline. As a result, a suit was filed by the Environmental Defense Fund (EDF) to compel agency action. In response to the suit, EPA filed with the District Court a proposed consent decree (not yet ratified by the Court) that would establish a schedule for adopting prohibitions and treatment standards for newly identified and listed wastes. (*EDF v. Reilly*, Civ. No. 89–0598, D.D.C.) Treatment standards proposed for the TC wastes (including TC soils) managed in non-CWA/non-CWA-equivalent/non-Class I SDWA well systems, and newly listed coke by-product and chlorotoluene production wastes are covered by this consent decree. The final treatment standards must be promulgated by July 1994.

None of the modifications to the existing land disposal restrictions rules proposed today are required by the EDF settlement. However, the Agency believes it important to review its regulations on a periodic basis and make changes, as appropriate, where such will improve or update our technical knowledge or improve or simplify the implementation of the program. In today's notice, EPA is proposing to modify the existing treatment standards for soil contaminated with prohibited hazardous waste(s), is proposing to develop a set of treatment standards (called universal standards) that would apply to most hazardous wastes, is proposing changes to the requirements for land disposal of lab packs containing prohibited hazardous wastes, and is proposing to modify the paperwork requirements so as to simplify the implementation of the regulations.

B. Pollution Prevention Benefits

EPA's progress over the years in improving environmental quality through its media-specific pollution control programs has been substantial. Over the past two decades, standard industrial practice for pollution control concentrated to a large extent on "end of pipe" treatment or land disposal of hazardous and non-hazardous wastes. However, EPA realizes that there are limits to how much environmental improvement can be achieved under these programs which emphasize management after pollutants have been generated. EPA believes that eliminating or reducing discharges and/or emissions to the environment through the implementation of cost-effective source reduction and environmentally sound recycling practices can provide additional environmental improvements. Examples of treatment standards proposed today that are based on the performance of a recovery technology are the universal standards for metals, which are based on the performance of high temperature metal recovery (HTMR). The Agency is requesting comment on whether other recovery technologies or source reduction activities are appropriate as the Best Demonstrated Available Technology (BDAT) for the wastes included in today's proposed rule.

The Agency has previously outlined the legal basis for waste minimization and source reduction as a potential type of LDR treatment standard, to be available as an optional choice for persons managing prohibited wastes. (See 56 FR 55162 (Oct. 24, 1991) and Supplemental Information Report pp. 30–31 prepared for the Notice of Data Availability (January 19, 1993).) Briefly, RCRA section 3004(m) requires the Agency to establish treatment standards so that short-term and long-term threats to human health and the environment are minimized. Waste minimization and source reduction potentially meet these criteria. They are a type of treatment, namely "a method, technique, or process * * * designed to change the physical, chemical, or biological character or composition of any hazardous waste so as to neutralize such waste or so as to render such waste nonhazardous, safer for transport, amenable for recovery, amenable for storage, or reduced in volume." RCRA section 1004(34). Put another way, wastes ultimately generated will be less hazardous or reduced in volume by a process designed to change the composition of the hazardous waste being generated. Arguably, these process changes could apply to activities prior to the generation of the hazardous waste. Waste minimization and source reduction techniques also potentially further the ultimate statutory criteria of minimizing threats to human health and the environment. The endorsement of waste minimization and source reduction in the statute (see RCRA section 1003(6)) is a direct indication that these techniques further the statute's protectiveness objectives. See S. Rep. No. 284, 98th Cong. 1st Sess. 17 setting out the concept of a preferred waste management hierarchy in describing LDR requirements. It should also be noted that the D.C. Circuit has recently stated that one of the objectives of the section 3004 (m) treatment standards is to reduce the mass loading of hazardous constituents, *Chemical Waste Management v. EPA*, 976 F. 2d at 23–6, and this goal is perhaps best served by waste minimization and source reduction techniques.

This is not to say that there are no drawbacks to including these techniques as a type of section 3004(m) standard. The Agency would need to assess such factors as how these techniques affect: Production decisions; waste management costs and other market efficiencies; development of new

technologies; concentrations of hazardous constituents in the remaining residues; and, implementation difficulties noted in the Supplemental Information Report in making a decision to specify source reduction and waste minimization as a treatment standard. In addition, the Agency may also need to consider the applicability of the techniques to facilities which differ in processes used, size, age, and other factors.

To better understand these tradeoffs, the Agency solicited comments in the Supplemental Information Report (pp. 30–31) on allowing source reduction/waste minimization as an optional site-specific means of satisfying the LDR treatment standard. EPA is continuing to evaluate those comments, and requests further comment on this issue.

On May 18, 1993, the EPA Administrator announced new steps to protect public health and the environment by encouraging reduction in the amount of hazardous wastes generated in this country and strengthening federal controls governing hazardous waste incinerators and other combustion devices. One of those steps involved calling for a national review of the relative roles of waste combustion and waste reduction in hazardous waste management. The Agency is using today's proposed rule to solicit comment on the role of combustion and waste reduction in establishing BDAT. In particular, today's proposed rule specifies a series of new treatment standards that must be met before hazardous wastes are land disposed. These standards, which in many cases are based on combustion performance, specify numerical limits which allow the use of any treatment technology, and thereby recognizes the appropriateness of alternatives to combustion. The Agency specifically solicits comment and data on whether other treatment technologies, especially recycling technologies, can achieve these limits. If not, the Agency seeks comment and data on whether the levels should be modified so as to allow and encourage the use of non-combustion treatment technologies. As an example, the proposed standards for hazardous soils identify options which allow slightly higher levels of contaminants to remain in the treated soil so that innovative, non-combustion technologies may be used. In keeping with the call for a national review of the relative role of combustion, the Agency is soliciting comment on whether there are other actions that should be taken to achieve a reduction in waste generation, an increase in recycle/reuse, or greater use of non-combustion technologies. For example, land disposal restrictions have previously identified highly concentrated wastes that must be treated by recovery technologies. Are there contaminant levels for TC organics above which recovery should be required? With regard to non-combustion technologies, the Agency will attempt to encourage their use in the LDR program, to the extent that performance of such technologies satisfy the requirements of section 3004(m).

C. Relationship of Developing LDR Treatment Standards to Levels Being Considered in Hazardous Waste Identification Rule

A recurring debate throughout EPA's development of the land disposal restrictions has been whether the RCRA section 3004(m) treatment standards should be technology-based (i.e. based on performance of a treatment technology) or risk-based (i.e. based on assessment of risks to human health and the environment posed by the waste). By law, the treatment standards are to result in destruction, removal, or immobilization of hazardous constituents in the waste "so that short-term and long-term threats to human health and the environment are minimized." Section 3004(m). In making this determination, the Agency is directed to take into account the "long-term uncertainties associated with land disposal." Sections 3004 (d)(1)(A), (e)(1)(A) and (g)(5)(A). Technology-based standards achieve the objective of minimizing threats by eliminating as much of the uncertainty associated with disposal of hazardous waste as possible, and were upheld as legally permissible for this reason. *Hazardous Waste Treatment Council* v. *EPA*, 886 F. 2d 355, 361–64 (D.C. Cir. 1989), cert. denied 111 S. Ct. 139 (1990); see also 55 FR at 6642 (February 26, 1990). However, the court also held that treatment standards cannot be established "beyond the point at which there is no 'threat' to man or nature," *id.* at 362.

EPA has indicated that its ultimate policy preference is to establish risk-based levels that represent minimize threat levels and so cap the extent of hazardous waste treatment. 55 FR at 6641. The difficulties involved in this task, however, are formidable and very controversial. The technical issues include assessing exposure pathways other than migration to ground water, taking environmental risk into account, and developing adequate toxicological information for the hazardous constituents controlled by the hazardous waste program. 55 FR at 6642.

EPA is currently working on a rulemaking that will define hazardous constituent concentration levels below which a waste is no longer considered "hazardous." Discussions concerning these levels are taking place in the context of the recently chartered Federal Advisory Committee on the Hazardous Waste Identification Rule (HWIR). The Committee chose to initially discuss how to provide greater flexibility for the remediation of contamination at hazardous waste sites. It has also begun discussions by focusing on concentrations below which waste mixtures and treatment residuals would no longer be subject to the hazardous waste regulations ("exit" criteria), while also discussing whether there is a regulatory approach to relatively quickly bring under regulation clearly hazardous waste not now controlled by the hazardous waste regulations (an "entry" rule). To help address the uncertainties of assessing multiple exposure pathways, the Agency also has initiated research to examine exposure of humans and the environment to hazardous constituents through a large number and variety of pathways.

Because current technology-based standards (like those in today's proposal) impose substantial costs, EPA has asked the Committee to consider ways to reduce the costs of managing wastes and remediating sites under RCRA. In addition, EPA will specifically ask the Committee to consider by the end of December, whether risk-based exit criteria could also serve as minimize threat levels to potentially cap treatment standards for the land disposal restrictions. If the Committee recommends that the risk-based exit criteria approach being developed could serve as caps on BDAT treatment standards, EPA will prepare a supplemental notice to the current proposal or otherwise expeditiously propose such an approach as a complement to the current technology-based standards.

II. Summary of Proposed Rule

On October 24, 1991, EPA published an advance notice of proposed rulemaking (ANPRM) to solicit comment on many aspects of what is included in today's proposed rule. Comments and data received in response to the ANPRM have been incorporated into this package.

A. Improvements to Existing LDR Program

The land disposal restrictions (LDR) program has been in place for over seven years. Because the Agency was involved with promulgating treatment

standards in time to meet statutory deadlines, the program was not developed under optimum conditions. As a result, implementation of the LDR program may be quite complex. The Agency is considering a number of changes that could be made to the LDR program to simplify its implementation, without sacrificing protection of human health and the environment. In particular, the Agency is proposing in this notice to replace the existing constituent-specific/waste-specific standards for many hazardous wastes with a common set of treatment standards, referred to throughout this proposal as universal standards. Today's notice also proposes to simplify the requirements for lab packs containing hazardous wastes, and to eliminate some of the data items required on LDR notifications. Additionally, a clarifying chart of paperwork requirements and a discussion of what constitutes "acceptable knowledge of the waste" are included.

B. Treatment Standards for Toxic Characteristic Wastes

On March 29, 1990, EPA promulgated additional organic constituents and levels at which a waste is considered hazardous based on the characteristic of toxicity (55 FR 11798). Because these wastes were identified as hazardous after the enactment date of HSWA in 1984, they are referred to under the LDR program as "newly identified wastes". Included are wastes identified with the codes D018 through D043 based on the toxicity characteristic leaching procedure (TCLP), i.e., TC wastes. EPA is proposing treatment standards for each of these constituents as part of today's rule. In addition, because wastes exhibiting the toxicity characteristic can also contain treatable levels of other hazardous constituents, EPA is also proposing treatment standards for such constituents, as well as rules on testing and monitoring such constituents. These treatment standards and rules are necessary to implement the court's opinion in *Chemical Waste Management* v. *EPA*, 976 F. 2d 2, 17–8 (D.C. Cir. 1992), cert denied U.S. (April 26, 1993).

C. Prohibition of Dilution of High TOC Ignitable and of TC Pesticide Wastes Injected into Class I Deep Wells

In its September 25, 1992 ruling on the Third Third LDR Rule, the D.C. Circuit Court remanded the Agency's determination in that rule that allowed dilution to remove characteristics of hazardous waste that are injected into Class I nonhazardous deep injection wells regulated by the Safe Drinking Water Act. The Agency is continuing to develop a response to the court ruling. As part of that response, EPA is today proposing to prohibit dilution of two types of characteristic wastes disposed in Class I wells: High TOC ignitable liquids (D001) and halogenated pesticide wastes that exhibit the toxicity characteristic (D012–D017). The Agency is proposing this prohibition because in each of the two cases, treatment is the preferred management option; the organics in D001 high TOC liquids can be reused, and D012–D017 pesticide wastes contain particularly toxic constituents. The Agency is therefore proposing to require that these wastes be treated before injection in a Class I well, or that they be injected into a no-migration well.

D. Treatment Standards for Newly Listed Wastes

EPA has promulgated a number of hazardous waste listings since the enactment of HSWA in 1984, referred to as "newly listed wastes" under the LDR program. This proposed rule describes the treatment and/or recycling technologies identified as BDAT for several of these newly listed wastes, and proposes treatment standards based on these BDATs. Newly listed wastes included in today's proposal are K141–K145, K147–K148, and K149–K151 (coke by-product production wastes and chlorotoluene wastes) (see 40 CFR 261.32.)

E. Soil Contaminated with Hazardous Waste

This notice also proposes new alternative treatment standards for hazardous constituents when they are contaminating soil (i.e., hazardous soil). The Agency is proposing these alternatives in order to consider a full range of innovative technologies that are available to treat such hazardous soil. In particular, under the current regulations and the "contained-in" policy, soil contaminated with hazardous waste is regulated to the same degree as the contaminating hazardous waste itself, until such contamination can be separated from the soil matrix so that it no longer "contains" hazardous constituents. The numerical treatment standards for many of these hazardous wastes when they are not found in the soil matrix is based on the performance of incineration, a technology not uniformly appropriate for hazardous soil, because of the low concentrations of hazardous constituents often found in soil. Rather, other technologies may be more appropriate for the treatment of lightly contaminated hazardous soils. The Agency, therefore, is proposing these alternative treatment standards for hazardous soil based on performance of technologies more appropriate for soil treatment. In order to comply with the LDR's, hazardous soil would have to be treated either to meet the standards for the hazardous waste contaminating the soil, or the alternative treatment standards proposed in this notice.

The Agency is proposing three different approaches to develop alternative technology-based treatment standards for soils. Under these approaches, the universal treatment standards (discussed in section III.A of this preamble) are proposed for soil as "base" standards. Each approach allows for treatment to levels above the universal standards and differ primarily in the extent of treatment required.

Under the first approach, the Agency is proposing a range of standards with a "ceiling" one order of magnitude above the universal standard, provided 90% treatment of each constituent subject to treatment is achieved. The second approach is a variation of the first, in that the Agency is proposing a range of standards with a "ceiling" one order of magnitude above the universal standard; however, there is no requirement that 90% reduction occur. The third approach proposes an unlimited range of values above the universal standard provided 90% treatment is attained (i.e., there would be no "ceiling" value) unless 90% treatment would treat the waste to a level below the universal treatment standards. If such a level would be achieved through 90% treatment, the universal treatment standards would be met.

The Agency is proposing that these approaches would apply to all hazardous soils regardless of the type of contaminating hazardous waste. That is to say, the proposed approaches would apply to soils contaminated with listed hazardous wastes, soils displaying the toxicity characteristic, and soils displaying the characteristic of ignitability, corrosivity, or reactivity.

F. Compliance Monitoring and Notification

In the May 24, 1993 interim final rule (58 FR 29872), the Agency adopted an approach that allowed facilities handling ignitable or corrosive waste to monitor for additional hazardous constituents "reasonably expected to be present". The determination of "reasonably expected to be present" could be based on knowledge of the raw materials, process, and potential reaction products, or the results of a one-time analysis for the entire list of constituents subject to treatment. The

Agency noted that this approach would not necessarily be taken in the future when the remanded rules were addressed. The Agency is therefore taking comments in today's proposed rule on options for modifying this approach.

EPA is also soliciting comment on how to limit monitoring for those constituents subject to treatment in TC wastes and hazardous soil in subtitle C regulated facilities, in subtitle D facilities, and at CERCLA or RCRA remediation sites.

G. Solicitation of Comments Regarding Exclusion of Hazardous Debris

In this proposal, the Agency is soliciting data to demonstrate whether immobilized hazardous debris (if treated properly) should be excluded from subtitle C control. This proposal describes a number of activities related to this issue which the Agency undertook after the promulgation of the land disposal restrictions for hazardous debris on August 18, 1992.

H. Modifications to Hazardous Waste Recycling Regulations

The Agency is also proposing modifications to the current regulatory framework to the definition of solid waste that, if promulgated, would modify the regulation of hazardous waste recycling by providing streamlined mechanisms that would encourage environmentally protective recycling of specific wastestreams. The Agency is looking at the definition of solid waste in a broader sense, and plans to consider broader changes at a later date. Today's modifications will, however, allow environmentally beneficial recycling operations to continue without the regulatory impediments imposed by full RCRA subtitle C requirements. In turn, this will allow EPA and the states to streamline their efforts and better focus on operations that are part of the nation's waste disposal problem, rather than on those that are not, while the Agency continues to look at the overall definition.

These modifications will broaden the § 261.2(e)(1)(iii) "closed-loop" recycling exclusion from the definition of solid waste such that the residues of a secondary process (in addition to residues of a primary process, as currently allowed) are excluded from being a solid waste if they are reinserted into the process without prior reclamation (and also similarly broaden the related § 260.30(b) variance for materials that are reclaimed prior to reinsertion).

The proposed modifications are based, in part, on two relatively recent Court opinions (*American Petroleum Institute* v. *EPA*, 906 F. 2d 726 (D.C. Cir. 1990) (API) and *American Mining Congress* v. *EPA*, 907 F. 2d 1179 (D.C. Cir. 1990) (AMC II)) which indicate that the Agency has some discretion to consider the manner in which a secondary material is managed in determining RCRA jurisdiction (i.e., RCRA jurisdiction may be determined, at least in part, by consideration of whether the material is part of the waste management problem, as indicated by the potential for the material to pose a hazard to human health and the environment when recycled).

III. Improvements to the Existing Land Disposal Restrictions Program

A. Proposed Universal Treatment Standards

Facilities that treat and land dispose hazardous wastes typically must comply with the LDR treatment standards that have been established for many different listed and characteristic hazardous waste codes. In some cases, a constituent regulated under the treatment standard for one waste may also be a constituent regulated under the treatment standard for another waste. These two treatment standards may be different concentration levels. Such differences in concentration limits for the same constituent may cause confusion to the regulated community and to enforcement personnel.

In an effort to simplify and streamline the LDR program, the Agency investigated the possibility of establishing a concentration limit for each constituent that would be its treatment standard, regardless of the hazardous waste in which it was present. This concept of establishing consistent concentration limits on a constituent-by-constituent basis is being referred to as establishing "universal" treatment standards.

Universal treatment standards are being proposed in this notice for organic and metal constituents—one set for wastewaters and a different set for nonwastewaters—that would replace most existing limits in previously promulgated treatment standards for listed hazardous wastes. These proposed universal standards would not apply, however, to wastes for which the Agency has previously promulgated treatment standards expressed as a required method of treatment (see 40 CFR 268.42).

EPA is also proposing that the universal treatment standards *would not* apply to F024, for reasons that are discussed later in this section of the preamble. EPA requests comment on whether the universal treatment standards should also apply to F024. EPA also requests comment on whether there are other wastes or groups of waste for which the universal treatment standards should not apply.

The primary goal of establishing universal standards is to provide technically consistent and equitable standards that simplify owner/operator compliance, as well as enforcement and compliance monitoring efforts. Another potential advantage is that the universal standards would provide the regulated community with consistent constituent-by-constituent concentration goals for which the facility can direct waste minimization investigations. Furthermore, universal standards could serve as a performance benchmark for developing alternative treatment technologies.

The universal standards will be particularly helpful in treating and measuring compliance when several listed wastes have been mixed together that contain the same constituent of concern, but under the present system have different concentration limits. Wastes that are amenable to treatment by the same technologies are often appropriately commingled prior to treatment and recovery. Since under universal standards the constituent of concern would have the same concentration limit no matter what listed waste code it is in, the need to determine and achieve different concentration limits would be eliminated. The development of universal standards is not intended, however, to modify current restrictions on the commingling of incompatible wastes, impermissible switching of treatability groups, or impermissible dilution. The Agency is not reopening these issues for comment.

Universal treatment standards would also provide EPA with a mechanism to streamline the development of treatment standards for future hazardous waste listings. In most cases, it could be assumed that the constituents in newly listed wastes would be subject to the universal standards. Facilities could then challenge these assumptions (if warranted) during the rulemaking for the waste listing. EPA solicits comment on the advantages and disadvantages of developing universal treatment standards.

EPA is proposing universal standards for over 200 constituents. This accounts for all of the organics and metals that can be analyzed consistently in treatment residuals and that have been regulated in previously-promulgated

treatment standards. The Agency is proposing that the generator or owner/operator would not have to analyze for all constituents in the BDAT list (See the BDAT list at "Guidebook for Quality Assurance/Quality Control Procedures for Submission of Data for the Land Disposal Restrictions Program," July 3, 1991, p. 8–15 in the docket for this rule.) Rather, it would only be necessary to analyze for those regulated constituents in the listed wastes that are being treated.

1. Universal Standards for Organic Hazardous Constituents

a. Nonwastewaters. The majority of the existing nonwastewater treatment standards for organics have been established based on data from some form of thermal destruction, typically incineration. This is due to the Agency's decision to establish methods of treatment instead of risk-based levels and the ability of thermal devices to destroy organics to levels at or near the detection limit (as measured in the ash). In fact, incineration has been determined to be BDAT for most of the wastes containing organics (i.e., most of the treatment standards for organic hazardous constituents are based on the performance of incineration.) Nevertheless, the Agency believes that other treatment technologies, including lower cost innovative technologies, can also meet these standards. In fact, the Agency has data on the treatment of these constituents by innovative technologies (technologies other than incineration, such as solvent extraction, thermal desorption) that support the levels being proposed today. However, the Agency specifically solicits comment as to what extent innovative technologies can meet the standards proposed today.

In establishing treatment standards in the First, Second and Third Third rulemakings, the Agency had varying amounts of treatment data; many of the existing nonwastewater treatment standards were established based on the transfer of thermal treatment data from similar waste. Because the number of organic constituents in existing treatment standards is so large, EPA arranged them into thirteen treatability groups based on similarities in chemistry, structure, usage, ease of treatability, detection limits, and waste generation patterns (many of these groups are based on treatability groups used to establish treatment standards in previous rulemakings.) These treatability groups are Chlorinated Volatiles, Organo-Bromines, Chlorobenzenes, PCBs and Dioxins, Chlorinated Pesticides, Chlorinated Phenolics and Derivatives, Nonchlorinated Phenolics, Phthalates, Oxygenated Hydrocarbons, Polynuclear Aromatic Hydrocarbons, Aromatic Hydrocarbons, Organo-Sulfur Pesticides, and Organo-Nitrogen Compounds.

The Agency examined all treatment data available for each treatability group. Because the constituents within each treatability group are generally treated by the same technology, patterns of similar treatment levels exist within each group. In some cases, however, there are constituents in the group that are either hard to treat or hard to detect. These are the constituents that tend to have higher treatment standards. The data used to establish the treatment levels were reviewed and the process refined, to ensure that the data that was used was the most appropriate for each constituent. Treatment performance data for wastes for which universal standards will not apply were removed from consideration. (See later section on waste codes for which universal standards will not apply.)

The treatment performance data were further examined to determine trends within each treatability group. These trends might have included transfers of data from specific constituents, similar treatment standards, and use of performance data from the same treatment test. In general, the treatment standards for the constituents within a treatability group were comparable in magnitude. Numbers higher than the majority of treatment standards normally indicated a waste harder to treat or analyze.

Universal standards were chosen on a constituent-by-constituent basis and are included in a table later in this section. The derivation of these standards is based on a number of factors. The Agency first considered performance data (i.e., the matrix spike recovery data and detection limit) transferred from the same constituent. If this was not possible, the Agency considered performance data (i.e., the matrix spike recovery data) from a constituent in the same treatability group. The Agency also preferred to use a matrix spike recovery value based on actual recovery rather than an average value. In addition, the detection limit data for the constituent were reviewed to see if the detection limit was reasonable and if it could be reasonably expected to be achieved—that is, after the universal standard was determined for a constituent, the value was compared to the detection limits used in the development of the existing treatment standards to see if other waste codes could be treated to meet the universal standard. (See the background document for universal standards for more information on the development of these standards.)

In the Third Third rulemaking, the Agency received comment that some of the treatment standards being promulgated at that time were too low to detect. In response, after reviewing the submitted data, the Agency decided as an interim measure that if incineration (the technology on which the standards in question were based) was used to achieve a "non-detect" level, and if that "non-detect" level was within an order of magnitude of the promulgated standard, it was considered to be in compliance with the treatment standard (see 40 CFR 268.43(c).) Because EPA is proposing that those treatment standards promulgated in the Third Third rule be revised based on the universal standards, the Agency is soliciting comment on the continued need for such a policy. An alternative would be if the facility measures compliance with the universal standards and detects at least one constituent at or below the universal standard within each treatability group, then any non-detects above the universal standards within that treatability group would be considered to be in compliance. In such cases, waste analysis plans could be modified to reflect monitoring for certain constituents within each treatability group that do not have detection level problems.

b. Wastewaters. The proposed universal standards for wastewaters are taken primarily from the treatment standards promulgated for F039—multi-source leachate, and are included in a table later in this section. These existing treatment standards for organic constituents in wastewaters were based on a variety of conventional wastewater treatment technologies. Information about these treatment standards can be found in the background document in the RCRA docket.

c. Comments on the Advance Notice of Proposed Rulemaking. Most commenters to the Advance Notice of Proposed Rulemaking supported the establishment of universal standards for organic wastes. However, several disagreed with the approach. In particular, several commenters were concerned that they would have to analyze the entire BDAT list for each waste to measure compliance with the universal standards. As indicated earlier in this section, a treater would only have to analyze for those constituents regulated in the listed wastes being treated.

Several commenters supported the idea of universal treatment standards for simplicity, but thought that these numbers should be health-based and not below the TC levels. EPA's historic position, echoed by the D.C. Circuit in *HWTC* v. *EPA*, 886 F.2d 355, 362 (D.C. Cir. 1989) cert. denied 111 S. Ct. 139 (1990), is that characteristic levels for toxic wastes do not minimize the threats these wastes may pose. EPA is considering whether to establish risk-based levels as part of the Hazardous Waste Identification Rule (HWIR) currently being developed. Depending on how this effort evolves and based on available data, these levels may be equal, lower, or higher than LDR treatment levels.

A few commenters argued that they did not like the idea of universal treatment standards for organics. One commenter stated that in order for EPA to establish universal standards, the Agency would have to adopt the highest treatment standard for any constituent to ensure that all wastes can be treated to conform with the standard. The commenter argued that there is a range of variation among specific standards for identical organic constituents in different wastes. The commenter indicated that the main reasons for these differences are the wide variety of matrices treated.

The Agency does not believe that the variety in organic treatment standards is the result of treating different matrices. The variety results chiefly from different detection limits used in developing the standards. For example, analytical laboratories have different levels of accuracy for reporting detection limits, and most of the organic treatment standards are based on detection limits. Furthermore, when developing universal standards, the Agency reviewed all treatment data to assure that the standard could be met by well-operated, well-designed treatment units appropriate for these types of wastes.

Several commenters stated that universal treatment standards were not supported by available treatment data for organics. The Agency disagrees with this comment. In fact, the organic universal standards were developed using only available treatment data.

In summary, EPA believes it is appropriate to develop universal treatment standards and that for nonwastewaters to base the standards on incineration because it is a matrix-independent technology that reduces the amount of material ultimately sent to land disposal and it destroys the organic hazardous constituents. However, the proposed levels would not be technology forcing since available data indicate that, depending on the concentration of the constituent, other technologies, including innovative technologies (i.e., solvent extraction, thermal desorption) can achieve the proposed universal treatment standards in the wide variety of nonwastewater matrices. The Agency specifically solicits comment on this point.

d. Other Revisions to Existing Treatment Standards. The Agency is today soliciting comment on whether we should regulate individual aroclors, or total PCBs. EPA is proposing as alternatives two different sets of standards for both wastewater and nonwastewater forms of PCBs. In one set, the treatment standard is a single number representing the sum of all individual aroclor concentrations. In the other set, each aroclor has its individual treatment standard. Total PCBs, which include seven aroclors, represent hundreds of isomers of polychlorinated biphenyls. This approach would be consistent with the regulations of other EPA offices, such as those promulgated pursuant to the Toxic Substance Control Act (TSCA). This approach would also eliminate any analytical difficulties in quantifying each of the individual aroclors. The current regulations addressing individual aroclors require a pattern recognition of the gas chromatograph, which is often difficult to differentiate. Furthermore, regulation of individual aroclors may be difficult for wastes subject to degradation or treatment. EPA would recommend SW-846 methods 8080 or 8081 (which use a gas chromatograph/electron capture detector) for measurement of total PCBs.

The Agency is proposing to regulate the sum of several constituents for xylenes in both wastewaters and nonwastewaters. The three xylenes included on the BDAT list of hazardous constituents are ortho-, meta-, and para-xylene. These constituents are proposed to be regulated as a sum in the universal standards because meta- and para-isomers co-elute in gas chromatograph analysis. Two methods exist in SW-846 for the measurement of total xylenes: 8020 and 8240. Method 8020 detects xylenes using a photoionization detector and 8240 uses a mass spectrometer. Total xylenes concentration is determined from the addition of the ortho-xylene concentration and the meta-para-xylene concentration.

Additionally, EPA is proposing to regulate two pairs of analytically problematic constituents, benzo(b)fluoranthene/benzo(k)fluoranthene and diphenylamine/diphenylnitrosamine with a single wastewater and nonwastewater number for each pair

PROPOSED UNIVERSAL TREATMENT STANDARDS FOR ORGANICS

[Nonwastewaters]

Regulated constituent	Maximum for any grab sample total composition (mg/kg)
Acetone	160
Acetophenone	9.7
Acenaphthalene	3.4
Acenapthene	3.4
2-Acetylaminofluorene	140
Aldrin	0.066
Aniline	14
Anthracene	3.4
Aroclor 1016	0.92
Aroclor 1221	0.92
Aroclor 1232	0.92
Aroclor 1242	0.92
Aroclor 1248	0.92
Aroclor 1254	1.8
Aroclor 1260	1.8
Acrylonitrile	84
alpha-BHC	0.066
beta-BHC	0.066
delta-BHC	0.066
gamma-BHC	0.066
Benzal chloride	6.0
Benzene	10
Benz(a)anthracene	3.4
Benzo(a)pyrene	3.4
Benzo(b)fluoranthene	16.8
Benzo(k)fluoranthene	16.8
Benzo(g,h,i)perylene	1.8
Bis-(2-ethylhexyl) phthalate	28
Bromodichloromethane	15
Bromomethane (methyl bromide)	15
4-Bromophenyl phenyl ether	15
n-Butanol	2.6
Butyl benzyl phthalate	28
2-sec-Butyl-4,6-dinitrophenol	2.5
Carbon disulfide	4.81
Carbon tetrachloride	6.0
Chlordane	0.26
p-Chloroaniline	16
Chlorobenzene	6.0
Chlorodibromomethane	15
Chloroethane	6.0
bis-(2-Chloroethoxy) methane	7.2
bis-(2-Chloroethyl) ether	6.0
bis-(2-Chloroisopropyl) ether	7.2
p-Chloro-m-cresol	14
Chloroform	6.0
Chloromethane	30
2-Chloronaphthalene	5.6
2-Chlorophenol	5.7
3-Chloropropene	30
Chrysene	3.4
Cresol(m- and p-)	3.2
o-Cresol	5.6
Cyclohexanone	0.75
Dibenz(a,h)-anthracene	8.2
1,2-Dibromo-3-Chloropropane	15
1,2-Dibromoethane (Ethylene dibromide)	15
Dibromomethane	15
m-Dichlorobenzene	6.0
o-Dichlorobenzene	6.0
p-Dichlorobenzene	6.0
1,1-Dichloroethane	6.0

PROPOSED UNIVERSAL TREATMENT STANDARDS FOR ORGANICS—Continued

[Nonwastewaters]

Regulated constituent	Maximum for any grab sample total composition (mg/kg)
1,2-Dichloroethane	6.0
2,4-Dichlorophenol	14
2,6-Dichlorophenol	14
2,4-Dichlorophenoxyacetic acid	10
o,p'-DDD	0.087
p,p'-DDD	0.087
o,p'-DDE	0.087
p,p'-DDE	0.087
o,p'-DDT	0.087
p,p'-DDT	0.087
Dichlorodifluoromethane	7.2
1,1-Dichloroethylene	6.0
trans-1,2-Dichloroethylene	30
1,2-Dichloropropane	18
cis-1,3-Dichloropropene	18
trans-1,3-Dichloropropene	18
Dieldrin	0.13
Diethyl phthalate	28
2,4-Dimethyl phenol	14
Dimethyl phthalate	28
1,4-Dinitrobenzene	2.3
4,6-Dinitro-o-cresol	160
2,4-Dinitrophenol	160
2,4-Dinitrotoluene	140
2,6-Dinitrotoluene	28
Di-n-butyl phthalate	28
Di-n-octyl phthalate	28
Di-n-propylnitrosoamine	14
1,4-Dioxane	170
Diphenylamine	[1]13
Diphenylnitrosamine	[1]13
Disulfoton	6.2
Endosulfan I	0.066
Endosulfan II	0.13
Endosulfan sulfate	0.13
Endrin	0.13
Endrin aldehyde	0.13
Ethyl acetate	33
Ethyl benzene	10
Ethyl ether	160
Ethyl methacrylate	160
Famphur	15
Fluoranthene	3.4
Fluorene	3.4
Heptachlor	0.066
Heptachlor epoxide	0.066
Hexachlorobenzene	10
Hexachlorobutadiene	5.6
Hexachlorocyclopentadiene	2.4
Hexachlorodibenzo-furans	0.001
Hexachlorodibenzo-p-dioxins	0.001
Hexachloroethane	30
Hexachloropropene	30
Ideno(1,2,3-cd)pyrene	3.4
Iodomethane	65
Isobutanol	170
Isodrin	0.066
Isosafrole	2.6
Kepone	0.13
Methacrylonitrile	84
Methanol	0.75
Methapyrilene	1.5
Methoxychlor	0.18
3-Methylchloanthrene	15
4,4-Methylene-bis-(2-chloroaniline)	30
Methylene Chloride	30
Methyl ethyl ketone	36
Methyl isobutyl ketone	33
Methyl methacrylate	160
Methyl Parathion	4.6
Naphthalene	5.6
o-Nitroaniline	14
p-Nitroaniline	28
Nitrobenzene	14
5-Nitro-o-toluidine	28
o-Nitrophenol	13
p-Nitrophenol	29
N-Nitrosodiethylamine	28
N-Nitroso-di-n-butyamine	17
N-Nitrosomethylethylamine	2.3
N-Nitrosomorpholine	2.3
N-Nitrosopiperidine	35
N-Nitrosopyrrolidine	35
Parathion	4.6
Pentachlorobenzene	10
Pentachlorodibenzo-furans	0.001
Pentachlorodibenzo-p-dioxins	0.001
Pentachloroethane	6
Pentachloronitrobenzene	4.8
Pentachlorophenol	7.4
Phenacetin	16
Phenanthrene	5.6
Phenol	6.2
Phorate	4.6
Phthalic anhydride	28
Propanenitrile	360
Pronamide	1.5
Pyrene	8.2
Pyridine	16
Safrole	22
Silvex (2,4,5-TP)	7.9
2,4,5-T	7.9
1,2,4,5-Tetrachlorobenzene	14
Tetrachlorodibenzo-furans	0.001
Tetrachlorodibenzo-p-dioxins	0.001
1,1,1,2-Tetrachloroethane	6.0
1,1,2,2-Tetrachloroethane	6.0
Tetrachloroethylene	6.0
2,3,4,6-Tetrachlorophenol	7.4
Toluene	10
Toxaphene	2.6
1,2,4-Trichlorobenzene	19
1,1,1-Trichloroethane	6.0
1,1,2-Trichloroethane	6.0
Trichloroethylene	6.0
2,4,5-Trichlorophenol	7.4
2,4,6-Trichlorophenol	7.4
1,2,3-Trichloropropane	30
1,1,2-Trichloro-1,2,2-trifluoroethane	30
Vinyl chloride	6.0
Xylene(s)	[3]30
Total PCBs	10

[1] This standard represents the sum of the concentrations for each of this pair of constituents.

[2] This standard represents the sum of the concentrations for each of this pair of constituents.

[3] This standard represents the sum of the concentrations of m-xylene, o-xylene, and p-xylene.

PROPOSED UNIVERSAL TREATMENT STANDARDS FOR ORGANICS

[Wastewaters]

Regulated constituents	Maximum for any 24 hr. composite total composition (mg/l)
Acetone	0.28
Acenaphthalene	0.059
Acenaphthene	0.059
Acetonitrile	0.17
Acrolein	0.29
Acetophenone	0.010
2-Acetylaminofluorene	0.059
Acrylonitrile	0.24
Aldrin	0.021
4-Aminobiphenyl	0.13
Aniline	0.81
Anthracene	0.059
Aramite	0.36
Aroclor 1016	0.013
Aroclor 1221	0.014
Aroclor 1232	0.013
Aroclor 1242	0.017
Aroclor 1248	0.013
Aroclor 1254	0.014
Aroclor 1260	0.014
alpha-BHC	0.00014
beta-BHC	0.00014
delta-BHC	0.023
gamma-BHC	0.0017
Benzal chloride	0.055
Benzene	0.14
Benz(a)anthracene	0.059
Benzo(a)pyrene	0.061
Benzo(b)fluoranthene	[1]0.11
Benzo(g,h,i)perylene	0.0055
Benzo(k)fluoranthene	[1]0.11
Bromodichloromethane	0.35
Bromomethane	0.11
4-Bromophenyl phenyl ether	0.055
n-Butyl alcohol	5.6
Butyl benzyl phthalate	0.017
2-sec-Butyl-4,6-dinitrophenol	0.066
Carbon tetrachloride	0.057
Carbon disulfide	0.014

PROPOSED UNIVERSAL TREATMENT STANDARDS FOR ORGANICS—Continued

[Wastewaters]

Regulated constituents	Maximum for any 24 hr. composite total composition (mg/l)
Chlordane	0.0033
p-Chloroaniline	0.46
Chlorobenzene	0.057
Chlorobenzilate	0.10
2-Chloro-1,3-butadiene	0.057
Chlorodibromomethane	0.057
Chloroethane	0.27
bis-(2-Chloroethoxy) methane	0.036
bis-(2-Chloroethyl) ether	0.033
2-Chloroethyl vinyl ether	0.062
Chloroform	0.046
bis-(2-Chloroisopropyl) ether	0.055
p-Chloro-m-cresol	0.018
Chloromethane (methyl chloride)	0.19
2-Chloronaphthalene	0.055
2-Chlorophenol	0.044
3-Chloropropene	0.036
Chrysene	0.059
o-Cresol	0.11
Cresol (m- and p- isomers)	0.77
Cyclohexanone	0.36
1,2-Dibromo-3-chloropropane	0.11
1,2-Dibromoethane	0.028
Dibromomethane	0.11
2,4-Dichlorophenoxyacetic acid	0.72
o,p'-DDD	0.023
p,p'-DDD	0.023
o,p'-DDE	0.031
p,p'-DDE	0.031
o,p'-DDT	0.0039
p,p'-DDT	0.0039
Dibenzo(a,e)pyrene	0.061
Dibenzo(a,h) anthracene	0.055
tris-(2,3-Dibromopropyl) phosphate	0.11
m-Dichlorobenzene	0.036
o-Dichlorobenzene	0.088
p-Dichlorobenzene	0.090
Dichlorodifluoromethane	0.23
1,1-Dichloroethane	0.059
1,2-Dichloroethane	0.21
1,1-Dichloroethylene	0.025
trans-1,2-Dichloroethene	0.054
2,4-Dichlorophenol	0.044
2,6-Dichlorophenol	0.044
1,2-Dichloropropane	0.85
cis-1,3-Dichloropropene	0.036
trans-1,3-Dichloropropene	0.036
Dieldrin	0.017
Diethyl phthalate	0.20
p-Dimethylaminoazobenzene	0.13
2,4-Dimethyl phenol	0.036
Dimethyl phthalate	0.047
Di-n-butyl phthalate	0.057
1,4-Dinitrobenzene	0.32
4,6-Dinitrocresol	0.28
2,4-Dinitrophenol	0.12
2,4-Dinitrotoluene	0.32
2,6-Dinitrotoluene	0.55
Di-n-octyl phthalate	0.017
Di-n-propylnitrosoamine	0.40
Diphenylamine	[2]0.92
1,2-Diphenyl hydrazine	0.087
Diphenylnitrosoamine	[2]0.92
1,4-Dioxane	0.12
Disulfoton	0.017
Endosulfan I	0.023
Endosulfan II	0.029
Endosulfan sulfate	0.029
Endrin	0.0028
Endrin aldehyde	0.025
Ethyl acetate	0.34
Ethyl benzene	0.057
Ethyl ether	0.12
bis-(2-Ethylhexyl) phthalate	0.28
Ethyl methacrylate	0.14
Ethylene oxide	0.12
Famphur	0.017
Fluoranthene	0.068
Fluorene	0.059
Heptachlor	0.0012
Heptachlor epoxide	0.016
Hexachlorobenzene	0.055
Hexachlorobutadiene	0.055
Hexachlorodibenzo-furans	0.000063
Hexachlorodibenzo-p-dioxins	0.000063
Hexachloroethane	0.055
Hexachloropropene	0.035
Indeno(1,2,3,-c,d)pyrene	0.0055
Iodomethane	0.19
Isobutyl alcohol	5.6
Isodrin	0.021
Isosafrole	0.081
Kepone	0.0011
Methacrylonitrile	0.24
Methanol	5.6
Methapyrilene	0.081
Methoxychlor	0.25
3-Methylchloanthrene	0.0055
4,4-Methylene-bis-(2-chloroaniline)	0.50
Methylene chloride	0.089
Methyl ethyl ketone	0.28
Methyl isobutyl ketone	0.14
Methyl methacrylate	0.14
Methyl methansulfonate	0.018
Methyl Parathion	0.014
Naphthalene	0.059
2-Naphthylamine	0.52
p-Nitroaniline	0.028
Nitrobenzene	0.068
5-Nitro-o-toluidine	0.32
p-Nitrophenol	0.12
N-Nitrosodiethylamine	0.40
N-Nitrosodimethylamine	0.40
N-Nitroso-di-n-butylamine	0.40
N-Nitrosomethylethylamine	0.40
N-Nitrosomorpholine	0.40
N-Nitrosopiperidine	0.013
N-Nitrosopyrrolidine	0.013
Parathion	0.014
Pentachlorobenzene	0.055
Pentachlorodibenzo-furans	0.000035
Pentachlorodibenzo-p-dioxins	0.000063
Pentachloronitrobenzene	0.055
Pentachlorophenol	0.089
Phenacetin	0.081
Phenanthrene	0.059
Phenol	0.039
Phorate	0.021
Phthalic anhydride	0.055
Pronamide	0.093
Propanenitrile	0.24
Pyrene	0.067
Pyridine	0.014
Safrole	0.081
Silvex (2,4,5-TP)	0.72
2,4,5-T	0.72
1,2,4,5-Tetrachlorobenzene	0.055
Tetrachlorodibenzo-furans	0.000063
Tetrachlorodibenzo-p-dioxins	0.000063
1,1,1,2-Tetrachloroethane	0.057
1,1,2,2-Tetrachloroethane	0.057
Tetrachloroethene	0.056
2,3,4,6-Tetrachlorophenol	0.030
Toluene	0.080
Toxaphene	0.0095
Tribromomethane (bromoform)	0.63
1,2,4-Trichlorobenzene	0.055
1,1,1-Trichloroethane	0.054
1,1,2-Trichloroethane	0.054
Trichloroethene	0.054
Trichloromonofluoromethane	0.020
2,4,5-Trichlorophenol	0.18
2,4,6-Trichlorophenol	0.035
1,2,3-Trichloropropane	0.85
81,1,2-Trichloro-1,2,2-trifluoroethane	0.057
Vinyl chloride	0.27
Xylene(s)	[3]0.32
Total PCBs	0.1

[1] This standard represents the sum of the concentrations for each of this pair of constituents.

[2] This standard represents the sum of the concentrations for each of this pair of constituents.

[3] This standard represents the sum of the concentrations of m-xylene, o-xylene, and p-xylene.

2. Universal Standards for Metal Hazardous Constituents

EPA is also proposing both wastewater and nonwastewater

universal treatment standards for all 14 BDAT list metal constituents. The Agency believes it appropriate to develop universal treatment standards for all 14 metals because it is common practice to mix metal wastes during both wastewater and nonwastewater treatment. Since universal standards would apply to all listed wastes, all 14 metals have the potential to be in the treatment residuals and effluents. Further evaluation of characteristic metal wastes to determine the applicability of universal standards will be made in future LDR rulemakings.

These universal metal standards would replace the existing listed metal treatment standards. However, just as for the organic universal standards, the generator or owner/operator would not have to analyze for the entire BDAT list of constituents when measuring compliance; only those constituents that are regulated constituents in the listed waste would have to be analyzed.

a. Nonwastewaters. Since metals cannot be destroyed, treatment options are limited, and typically include technologies that can either recover the metal or incorporate the metal in a stable matrix resistant to leaching. The Agency believes that the "best" treatment for metals is recovery, where feasible, especially when the waste material contains high concentrations of metals. See, e.g., S. Rep. No. 284, 98th Cong. 1st Sess. 17. It is encouraging to see the regulated community increasingly evaluating both pyrometallurgical and hydrometallurgical recovery processes as treatment options.

Pyrometallurgical technologies (often referred to by EPA as high temperature metals recovery or HTMR) use heat to separate metals and other constituents based on differences in constituent oxidation potential, melting point, vapor pressure and/or miscibility when melted. Hydrometallurgical technologies separate metals and other constituents based on differences in constituent solubilities and electrochemical properties in aqueous solutions (or in some cases, such as solvent extraction, organic solutions).

Both of these technologies appear to be matrix independent, especially the pyrometallurgical processes (i.e., HTMR). That is, these systems consistently achieve the same level of treatment performance regardless of the influent matrix compositions. Often, pretreatment steps such as crushing and pelletizing may be necessary, but the amount of metal recovered is generally consistent for each matrix, depending on the design of the recovery process. For instance, a HTMR process designed to recover 95% of chromium from wastes will recover 95% of the chromium in a spent material refractory brick and 95% of the chromium in a wastewater treatment sludge.

If recovery is not feasible because the metal content in the material is low or the material contains constituents that may adversely affect the product, then the generator could investigate ways to generate wastes that are amenable to recovery (e.g., segregation), or to substitute materials that are suitable for recovery for the unrecoverable materials that eventually become wastes. Also, combinations of hydrometallurgical and pyrometallurgical recovery processes may be suitable for some wastes concentrated with different metals. Because many hazardous wastes contain a variety of metal constituents, it often takes a series of separation and concentration steps before a material is generated that is suitable for primary or secondary smelting operations.

As a last resort (see S. Rep. No. 284 at 17), technologies such as stabilization and chemical conversion to less leachable metal compounds should be used to treat metal-containing wastes. The Agency realizes that recovery of metals from all wastes is not practical. Therefore, at some level of metal concentration (EPA believes this level to be approximately one percent total BDAT list metals), recovery efforts typically cease, and the remaining metals can instead be incorporated into a stable, leach-resistant matrix for safe disposal.

EPA is, therefore, proposing to develop universal treatment standards for 13 of the BDAT list metals based on the performance of high temperature metals recovery (HTMR) or stabilization. (The treatment standards are presented in a table at the end of this section.) While the Agency's available data indicate that these standards can be achieved by either HTMR or stabilization, the Agency solicits data on whether any specific waste matrices will not be able to achieve these universal treatment standards.

The Agency believes that the choice of technology will likely depend on the concentration of the metals present in the waste. At low concentrations, stabilization may be the preferred treatment technology. As the metal concentration increases, stabilization may be difficult and increase volumes to such a degree as to make that form of treatment undesirable. At high concentrations, recovery will be the preferred method of treatment because it reduces the amount of waste destined for land disposal and recovers valuable resources. (Environmentally sound recycling is favored as the best treatment for any waste, whenever feasible.) As always, when the Agency develops concentration-based treatment standards, the use of other technologies to achieve those standards is not precluded.

With respect to the other BDAT list metal, arsenic, EPA is proposing to base the arsenic treatment standard on slag vitrification. Currently, most arsenic is not reclaimed from waste materials, but is imported into the United States from other countries. The Agency knows of one facility that has plans to recover arsenic from waste in the near future. Until these recovery processes for arsenic can be evaluated, EPA is proposing to base the arsenic treatment standard on the treatment performance of slag vitrification.

b. Wastewaters. The proposed universal metals standards for wastewaters are based on chemical precipitation as BDAT. These treatment standards are presented in a table at the end of this section. The wastewater treatment standards were developed by evaluating many different wastewaters.

For the most part, chemical precipitation is a matrix independent technology. In fact, many hydrometallurgical recovery processes recover metals from a wide variety of wastewaters by adjusting the wastewater with chemicals so that metals can be selectively solubilized and precipitated. Simple pretreatment steps such as equalization, skimming, and settling or filtration may be needed before precipitating reagents are added to the wastewater to facilitate effective treatment. Also, depending on the initial concentration of metal constituents in the wastewater, the operating conditions such as retention time and mixing may need to be adjusted. Hence, EPA believes that the proposed universal treatment standards are achievable for all RCRA listed wastewaters.

The Agency notes that the universal standards for metal wastewaters are different from both the 1987 and 1993 effluent guidelines standards established under the Clean Water Act. The Agency solicits comments on whether the Clean Water Act standards for Metal Finishing Point Source Category would provide a more appropriate set of universal wastewater standards.

c. Comments on the Advance Notice of Proposed Rulemaking. Most commenters to the Advance Notice of Proposed Rulemaking supported the establishment of universal treatment standards for metal bearing wastes. However, several disagreed with the

approach. In particular, one commenter argued that establishing only one standard for each metal constituent would cause a problem because it would not account for the variety of waste matrices, and the differences in the ability of stabilization to treat different matrices. The commenter suggested that EPA develop a separate set of treatment standards for the following seven different metal-bearing waste subcategories: (1) Wastewater treatment residues, (2) direct process wastes, (3) biological and organic containing residues, (4) direct process dusts and solids, (5) soils and sludges from remediation projects, (6) incineration residues, and (7) waste treatment residues (i.e., brines), slags, and refractories.

EPA is not adopting the approach suggested by the commenter. As stated previously, HTMR and stabilization are being proposed as BDAT for metal-containing nonwastewaters. Because HTMR is not matrix dependent, and, where the metal concentrations are appropriate, stabilization is able to achieve those levels, treatment standards for different matrices are not necessary. While it may be possible to set lower treatment standards for certain of the subcategories, one of the major reasons for establishing universal treatment standards is to streamline the LDR program. Establishing different subcategories could be just as complex as the current system. In addition, questions on how to distinguish between different subcategories would require development of a multitude of regulatory definitions. Available data indicate that each of the suggested waste subcategories can be treated to comply with the universal metal standards.

One commenter argued that in order for EPA to establish universal standards, the Agency would have to adopt the highest standard for any constituent to ensure that all wastes can be treated to conform with the standard. The commenter argued that there is variation among the specific treatment standards for identical metal constituents in different wastes and treatment groups. The commenter indicated that the main reasons for the differences are the wide variety of matrices treated, along with the limitations of stabilization.

The Agency does not believe that the variety of treatment standards is solely the result of treating different matrices. For example, analytical laboratories have different levels of accuracy for reporting detection limits, and many of the metal treatment standards are based on detection limits.

Several commenters submitted data on the treatability of metal wastes using stabilization. EPA reviewed the data and concluded that most metal wastes can be stabilized to the levels proposed as nonwastewater universal treatment standards. Some concentrated chromium waste streams were treated to levels slightly above the universal standards; however, the Agency believes HTMR to be a more appropriate treatment technology for concentrated metal wastes. This is especially true of wastes with high levels of chromium which are technically very responsive to HTMR and have considerable economic value relative to other common metals.

Moreover, since the inception of the Land Disposal Restrictions, EPA has observed that treatment facilities alter process design and/or operating parameters to achieve the levels established as treatment standards. Consequently, the Agency believes that there exists a certain degree of flexibility with most treatment technologies. (In addition, national and site-specific variances from the treatment standards remain an option, (See § 268.44).)

In summary, EPA believes it is appropriate to base BDAT for the universal metal standards on HTMR because it is a matrix independent technology that reduces the amount of material ultimately sent for land disposal. Also, because these standards could also be achieved by stabilization, the proposed levels would not be technology forcing (i.e., data indicate that stabilization can achieve the proposed universal treatment standards for a wide variety of nonwastewater matrices.)

d. Request for data. The Agency requests data and comment on whether there are any especially difficult to treat wastes that cannot achieve the proposed universal treatment standards. For nonwastewaters, information provided should include characterization data on the untreated wastes, such as total metal content, TCLP leachate concentrations, and technical explanations of why the waste material is inappropriate for recovery or ineffectively stabilized. Stabilization information should include type of binder, both weight and volume binder-to-waste ratios, whether premixing with less concentrated wastes is used to make the waste more amenable to stabilization, and TCLP results for the 14 metals. Information describing the treatment performance of stabilization (or other technologies) should also be submitted.

For wastewaters, information should include total metal concentrations (preferably for all 14 metals present) in the influent and effluent. Information should also address any other constituents in the waste that may be interfering with treatment (such as complexing agents), operating conditions such as Ph and retention times, amount and type of precipitating reagents added, and any other information needed to assist the Agency in evaluating the wastewater treatment process.

PROPOSED UNIVERSAL TREATMENT STANDARDS FOR METALS

[Nonwastewaters]

Regulated Constituent	Maximum for any single composite sample TCLP (mg/l)
Antimony	2.1
Arsenic	5.0
Barium	7.6
Beryllium	0.014
Cadmium	0.19
Chromium (Total)	0.33
Lead	0.37
Mercury	0.009
Nickel	5.0
Selenium	0.16
Silver	0.30
Thallium	0.078
Vanadium	0.23
Zinc	5.3

PROPOSED UNIVERSAL TREATMENT STANDARDS FOR METALS

[Wastewaters]

Regulated Constituent	Maximum for any single composite sample (mg/l)
Antimony	1.9
Arsenic	1.4
Barium	1.2
Beryllium	0.82
Cadmium	0.20
Chromium (Total)	0.37
Lead	0.28
Mercury	0.15
Nickel	0.55
Selenium	0.82
Silver	0.29
Thallium	1.4
Vanadium	0.042
Zinc	1.0

3. Universal Standards for Cyanide

Both wastewater and nonwastewater universal treatment standards are being proposed for cyanide in today's rule. The Agency believes it is appropriate to regulate cyanide because cyanide is commonly found in many listed metal-containing and organic-containing wastes. Furthermore, it is common practice to mix wastes during both wastewater and nonwastewater treatment. In developing universal standards for cyanide, the Agency reviewed the existing treatment

standards for cyanide as well as the data that were used in developing those standards; some of the standards include levels for total and amenable cyanide, while others only regulate total cyanide.

The existing wastewater standards are based primarily on the performance of alkaline chlorination. Wet air oxidation is another treatment technology supporting treatment standards for acrylonitrile wastewaters (i.e., K011, K013, and K014). With regard to nonwastewater forms, several of the existing standards are based on incineration (i.e., K048–K052, F037, F038, and F010) while several are based on treatment of the wastewater to destroy the cyanide prior to generation of the nonwastewater residual by technologies such as alkaline chlorination (i.e., F006 and F019) and electrolytic oxidation followed by alkaline chlorination (i.e., F011 and F012). Several of the existing standards were established based on transfers of treatment data from the treatment of a similar waste.

The types of wastes in which cyanide has been regulated under the BDAT program include: Electroplating (D003 reactive cyanides, F006); aluminum coil conversion (F019); heat treating (F010, F011, F012); metal cyanides (P013, P021, P029, P030, P063, P074, P098, P099, P104, P106, P121); multi-source leachate (F039); pigments (K005, K007); petroleum (K048, K049, K050, K051, K052, F037, F038); coking (K060); and organo-nitrogen (K104). Cyanide is also a regulated constituent in acrylonitrile wastes (K011, K013, K014) which are not included under universal standards (see earlier discussion in this section of today's preamble.)

a. Wastewaters. In developing the cyanide universal standards, the Agency examined the existing data and noticed certain patterns. In particular, it appears that regardless of process waste type, the wastewaters could generally be treated to levels on the order of 1.9 mg/l for total cyanide. Thus, the Agency is proposing for universal standards a total cyanide limit of 1.9 mg/l for wastewaters. This level is widely used in wastewater discharge regulations—namely those for the Metal Finishing Industry and the Organic Chemicals, Plastics and Synthetic Fibers Industry. The Agency has also established for the Metal Finishing Industry, an alternative standard of 0.86 mg/l for amenable cyanide. As such, EPA solicits comment on the need to regulate wastewaters for both total and amenable cyanide, or whether the amenable cyanide level should be an alternative to the total standard as provided in the Metal Finishing standards, 40 CFR 433.14(b).

b. Nonwastewaters. In developing universal standards for cyanide in nonwastewaters, the Agency examined three options: A standard based on total and amenable cyanide concentrations, a standard based on TCLP concentrations, and a standard that specifies treatment methods. Although EPA is proposing today adoption of the first option, comments are solicited on all three options. These three options are discussed below. In addition, the Agency solicits comment on the appropriateness of withdrawing the cyanide treatability variances in the 40 CFR 268.44, if EPA decides to promulgate the leach or the specified method option. Also, the Agency solicits data on any technology advances in treating iron cyanide wastewaters that would justify withdrawing these variances, if EPA promulgates the concentration option.

i. A Concentration-Based Standard. In examining the total concentration option, the Agency examined several issues that would affect the development of a universal concentration-based number. First, there is a wide range of existing BDAT treatment standards for nonwastewater forms of cyanide, ranging from 1.8 to 590 mg/kg (total cyanide) and 9.1 to 30 mg/kg (amenable cyanide). EPA established these different treatment levels after concluding that the available treatment data supported the establishment of separate treatability groups as a direct result of waste characteristics affecting treatment performance. For example, iron levels, the presence of organics, or the presence of complex iron-cyanides can affect the treatability of cyanide wastes. In addition, EPA found that some wastes, as generated, already contained low levels of cyanide in the waste.

Second, the analytical method for measuring cyanide in nonwastewaters allows significant variabilities in the resulting concentrations of total and amenable cyanides. The specified methods, SW 846/Method 9010 and 9012, do not specify sample size or distillation time. By varying these two factors, reported cyanide concentrations may differ by a factor of more than 100. In the Third Third BDAT rulemaking, the Agency avoided these kind of variabilities by specifying a 10 gram sample and a 1 hour and 15 minute distillation time in order to comply with LDRs applicable to nonwastewater forms of D003, F006, and F019. However, the 10 gram sample size and 1 hour and 15 minute distillation time have not been specified in setting other LDR treatment standards and thus, do not apply to all LDR cyanide limits—that is, EPA's existing data-base contains treatability results using various sample sizes/distillation times. This basically ensures that we cannot group and compare these data as though they were all based on the same analytical method.

A third issue that EPA is considering is that much of the treatability variance activity has been associated with total cyanide concentrations. There have been two variances approved allowing significantly higher levels (see 56 FR 12351, March 25, 1991) and three other treatability variance requests indicating that the 1.8 mg/kg level of total cyanide in F039 is unachievable. Again, the analytical test methods or the presence of iron-cyanide complexes appear to play some role in these treatability variance petitions.

In spite of these issues, EPA believes that it is technically feasible to develop a concentration based standard provided analytical variabilities and treatment of complex cyanides are taken into account. Electroplating wastes, the aluminum coil conversion wastes, the heat treating wastes, and the metal cyanide P- wastecodes all have high levels of cyanide in the untreated waste and/or have cyanide in a matrix (such as an iron-cyanide complex) that is difficult to treat. In the June 23, 1989 preamble (54 FR 26608), the Agency agreed with commentors that high concentrations of iron in the cyanide wastes (when present as iron-cyanide complexes) appear to effect the level of cyanide destruction that is achievable.)

Based on the most difficult to treat nonwastewaters, the Agency is proposing universal treatment standards of 590 mg/kg for total cyanide and 30 mg/kg for amenable cyanide (as measured by Method 9010 or 9012). EPA is also proposing that a 10 gram sample and 1 hour and 15 minute distillation time be used for the purpose of complying with these universal standards.

Other wastes such as multi-source leachate, pigments, petroleum, coking, ink solvents and organo-nitrogen wastes generally have very little cyanide in the untreated waste to begin with, have cyanide along with organic constituents which are routinely incinerated, or have cyanide in a free form which is easier to treat by conventional treatment methods. For these nonwastewaters, the Agency is soliciting comment on whether these other wastes need to be regulated at a level below the universal treatment standard, namely, at 30 mg/kg for total cyanide and 1.8 for amenable cyanide.

At this time, the Agency believes that establishing a lower limit to address wastes that contain little to no cyanide is unnecessary; that control of organic constituents which are routinely incinerated provides adequate control, and that inorganic wastes with cyanide in a free form are adequately controlled by the amenable cyanide limit of 30 mg/kg. However, the Agency specifically solicits comments on these points.

ii. A Leachable Based Standard. The leach option involves specifying a concentration standard based on the TCLP or some other leaching procedure. For previous LDRs, the Agency has selected a total concentration standard to best reflect the capabilities of destruction technologies. In rare instances, where there are analytical difficulties, the Agency has elected to regulate wastes based on a TCLP concentration, even though the basis for BDAT was a destruction technology. For cyanide, EPA is faced with a chemical that has analytical difficulties and can be effectively destroyed by certain technologies. Basing the standard on the TCLP concentration, however, avoids the analytical difficulties and still provides the treater with the flexibility of using a variety of destruction technologies to comply with the standard.

After examining the treatment data for TCLP levels, the Agency solicits comments on the following TCLP cyanide limits: 16 mg/l for total cyanide and 3.5 mg/l for amenable cyanide. Each concentration based standard is based on two data points from a data set of three data points (an outlier test on TCLP levels for the amenable and total cyanide rejected one data point.) These cyanide limits are based on cyanide levels measured in residues from EPA's rotary kiln incineration test study of EPA Hazardous Waste No. K088. These hazardous wastes are associated with spent carbon electrodes (spent pot liners) generated by the aluminum industry. EPA Hazardous Waste No. K088 wastes are contaminated with sodium aluminum fluoride salts, trace metals, and heavy concentrations of free and iron complex cyanides.

EPA subsequently stabilized these K088 incineration residues in order to treat leachable fluoride values. None of the stabilized wastes show, however, any improvement for the leachability of amenable and total cyanide levels. To the contrary, some of the stabilized K088-incineration wastes show an increase of TCLP levels for amenable and total cyanide. Still, EPA's study shows that K088 underwent significant destruction of total and amenable cyanide values by rotary kiln incineration; concentrations of cyanide in untreated wastes ranged from 3,400 mg/kg to 5,240 mg/kg and in treated residues ranged from 95 to 210 mg/kg total cyanide and from 38 to 140 mg/kg amenable cyanide.

An alternative to these levels is an amenable cyanide level of 36 mg/l based on a modified TCLP. The modified TCLP is based on a deionized water leach as opposed to an acid leach. This proposed water leach level is based on residues resulting from the calcination of spent potliners via a Reynolds process. The Reynolds process carries out the calcination of K088 in a rotary kiln that operates at similar temperature and residence time conditions to those of EPA's incineration test study. In contrast to EPA's incineration study, Reynolds' process adds up to 35% sand and 35% limestone to the calcination of K088 (K088 may comprise up to 30% of the total feed charged to the calciner.)

Like EPA's incineration study, Reynolds' calcination process shows that substantial destruction of cyanide values can be achieved by thermal processes (in Reynolds' demonstration study, cyanide values in the untreated K088 wastes ranged from 18.1 mg/kg to 1,110 mg/kg for total cyanide and from 2.6 mg/kg to 1,110 mg/kg for amenable cyanide and in treated K088 residues levels of both cyanide species were below the detection level of 10 mg/kg. Taking into account any dilution resulting from the addition of lime and sand, these treated values are more likely to be in the range of 30 mg/kg.)

Other performance data measuring cyanide concentrations in leachate extracts include CyanoKem's stabilization of alkaline chlorinated cyanide wastes, EPA's stabilization study of cyanide wastes from the aluminum coil industry, and stabilization data submitted by commentors to EPA's second and third third rulemakings of cyanide wastes. EPA has placed all these stabilization data in the administrative record of today's proposal. (See memorandum to Administrative Record on Available Stabilization Data on Cyanide Wastes.)

Except for CyanoKem's data, these stabilization studies lack information on whether any pretreatment step for the destruction of the cyanide occurred prior to stabilization. Of course, a majority of the RCRA-cyanide wastes are likely to be sludges resulting from the treatment of cyanide/metal-bearing wastewaters discharged to POTWs or to outfalls under NPDES permits; however, these wastewater treatment sludges may not have been generated from cyanide destruction technologies. Some facilities discharging under NPDES or POTW permits may simply switch cyanides from wastewaters to sludges in a cyanide-metal complex form or into a thiocyanate form for the purpose of complying with their water effluent limitations. These matrices may leach from the landfill, migrate to surface waters, or oxidize when exposed to sunlight and thus, release free cyanides into the environment. EPA thus believes that treatment standards for cyanides must be based on residues from the destruction of cyanides prior to any stabilization or ultimate disposal. However, the Agency is soliciting comment on whether there are cyanide wastes that are more appropriately immobilized. Any commentors submitting such data should include proper justification for why the cyanide in these wastes cannot be destroyed (which is the Agency's preference).

Although 3004(m) of HSWA gives regulatory discretion to EPA on whether to set treatment standards that substantially reduce the mobility or toxicity of hazardous constituents prior to land disposal, the legislative history also emphasizes the Congressional concern that cyanides should be treated by destruction technologies prior to disposal: "[d]estruction of total cyanides should be required as a precondition to land disposal." 130 Cong. Rec. S 9179 (daily ed. July 25, 1984) (Statement of Senator Chaffee explaining the amendment which became section 3004(m).)

CyanoKem's stabilization data submittal may support development of a treatment standard of 10 mg/l of amenable cyanide, as measured in an extract of an alkaline leach of chemically stabilized cyanide wastes. These cyanide wastes were previously treated by alkaline chlorination and subsequently treated by stabilization. CyanoKem's data are based on monthly composite samples. CyanoKem points out, however, that the amenable leachate cyanide level can be enforced with the collection of grab samples. CyanoKem's data also indicate that a broad variety of cyanide wastes with untreated total cyanide concentrations up to 500,000 mg/kg, including complex cyanides, were treated by alkaline chlorination (to levels below 400 ppm—total cyanide, as measured by Method 9010) followed by chemical stabilization. The wastes treated by CyanoKem include: D003, F006–F012, P013, P021, P029, P030, P098, P106, and P121. CyanoKem also indicated that the addition of solidification/stabilization agents such as fly ash or cement does not result in any further treatment of cyanide in the final (the alkaline chlorinated) sludge. EPA

requests comments on the feasibility of basing a leachate standard based on these CyanoKem data including the adoption of its leaching procedure. The Agency also requests comments on whether amenable, total, or both total and amenable cyanide should be regulated under the universal standards.

iii. Specifying Treatment Methods. The final option is to specify methods. EPA is soliciting comments on requiring the use of incineration, alkaline chlorination, or electrolytic oxidation followed by alkaline chlorination, and wet air oxidation to treat cyanide. EPA believes these technologies have been demonstrated to treat wastes with high concentrations of free cyanides (over 100,000 ppm) or complex iron cyanides (the most difficult to treat of all the cyanide species.)

As part of the First, Second, and Third Third rulemakings, EPA examined a broad range of oxidation technologies that enable the destruction of cyanides in a diverse universe of wastewater and nonwastewater forms of hazardous wastes. Chemical oxidation technologies enable the destruction of dissolved cyanides in aqueous solutions, such as wastewaters from plating and finishing operations, or of inorganic sludges from these operations. Chemical oxidation technologies examined by EPA include:

(1) Electrical oxidation, (2) hypochlorite or chlorine oxidation (alkaline chlorination), (3) permanganate, ozone, or Sulfur dioxide/air (Inco process) oxidation, (4) wet air oxidation, (5) high temperature (cyanide) hydrolysis, and (6) UV/Ozonolysis.

One, or combinations, of these technologies can reduce the concentration of cyanides in the wastes. Incineration, peroxide treatment, alkaline chlorination, or electric oxidation followed by alkaline chlorination, high temperature hydrolysis, or UV/ozonolysis appear to effectively destroy amenable cyanides, cyanide-metal complexes (to varying degrees), or chelating agents. EPA has data in today's docket showing that high concentrations of amenable cyanides (over 100,000 ppm) can be treated effectively by high temperature hydrolysis or electric oxidation to levels below 500 ppm when followed by alkaline chlorination or other oxidation technologies. There are also data showing that complex cyanides, including iron-cyanides, can be treated effectively by combinations of alkaline chlorination and some oxidation technologies.

It appears that the use of sulfur dioxide/air oxidation, the Kastone process (an oxidation process for treating rinse waters from zinc or cadmium metal finishing operations), and potassium permanganate alone may only oxidize amenable cyanides to cyanates or thiocyanates and thus, further oxidation treatment is necessary to destroy cyanides. These technologies do not appear to destroy iron-cyanide complexes. For instance, sulfur dioxide/air oxidation leaves behind iron cyanide complexes reduced in a ferrous state that are removed from solution by precipitation of ferro-cyanide complexes. EPA solicits comments that demonstrate how these chemical oxidation technologies can destroy iron-cyanide complex wastes and not just shift iron-cyanide complexes from one media to another.

Incineration, UV/ozonation (catalyzed), and a proprietary improved alkaline chlorination process appear to more effectively treat complex cyanides including iron cyanides—the most resistant to oxidation treatment of the cyanide-metal complexes. EPA has data demonstrating its applicability to the following cyanide wastes: K086, F010, K048–K052, F037, F038, K011, K013, K014, K104, K106, F006, F010, and F019.

EPA also has data on the treatment of aluminum spent potliners by incineration and calcination technologies. These incineration and calcination data show that cyanide complexes and amenable cyanides can be treated to a total cyanide level below 210 mg/kg. (See above discussion supporting the alternative universal leachable levels for cyanides.)

Wet Air Oxidation (WAO) is another cyanide destruction technology examined by EPA. It is, in fact, the basis of treatment standards for K011, K013, and K014 (acrylonitrile) wastewaters (See 55 FR 22584, June 1, 1990). WAO can reduce the concentration of organics and cyanides in wastewaters (that contain less than 1% Total Suspended Solids and less than 5% Total Organic Content.) Effluent wastewaters often undergo additional treatment by other technologies such as biological treatment to further reduce organic levels in the wastewaters. Similarly, subsequent treatment of nonwastewater forms is often provided in order to comply with applicable LDRs for organics and metals. EPA thus believes that it is technically feasible to include WAO among those cyanide destruction technologies being considered under the option of prescribed technologies.

These treatment standards for wastewaters and nonwastewaters must be achieved by destruction, not by stabilization or immobilization or by simply converting the cyanide to cyanate, ferrous or ferric cyanide complexes. In light of the legislative history of HSWA, EPA believes (cyanide) destruction technologies will serve better the requirements of 3004(m).

In general, the Agency would prefer to specify a numerical standard, so that treaters may be free to use other technologies to destroy the cyanide and achieve the standard. Due to the complexity of the issues involved in treating cyanide, the Agency is including this option to provide commentors a complete range of options to consider.

PROPOSED UNIVERSAL TREATMENT STANDARD FOR CYANIDE

[Wastewaters]

Regulated constituent	Maximum for any single composite sample (mg/l)
Cyanide (Total)	1.9

PROPOSED UNIVERSAL TREATMENT STANDARDS FOR CYANIDE*

[Nonwastewaters]

Regulated constituent	Maximum for any single composite sample (mg/kg)
Cyanide (Total)	590
Cyanide (Amenable)	30

Note: *Cyanide nonwastewaters are analyzed using SW–846 Method 9010 or 9012, sample size 10 grams, distillation time, one hour and 15 minutes.

4. Universal Standards for Petroleum Refining Wastes

In the Third Third final rule (55 FR 22520, June 1, 1990) the Agency examined treatment data from noncombustion technologies as a basis for BDAT for certain petroleum refining listed wastes—K048–52. In the LDR Phase I final rule (57 FR 37194, August 18, 1992), the Agency extended those limits to other petroleum refining wastes—F037–38. The universal standards for organics, however, are based on combustion. The proposal to cover these wastes under the universal standards is based on the expectation that the noncombustion technologies considered during the development of the K048–52 standards (viz. 3- or 5-phase solvent extraction) can also achieve the universal standards. The background document for the F037–38 standards lists in Appendix B twenty treatability tests used to develop the

K048–52 standards. Eleven of these tests fully complied with the universal treatment standards. Appendix C of the same document identifies 28 other test runs using noncombustion technologies. All of these tests fully complied with universal standards.

During the later development of the F037–38 standards, comments were submitted that thermal desorption could achieve much lower levels than those used for K048–52; lower, in fact, than the universal treatment standards proposed in today's rule. Based on the information that noncombustion technologies can also achieve the universal standards when treating petroleum refining wastes, the Agency is proposing to include K048–52 and F037–38 petroleum refining wastes under the universal standards.

The Agency is aware that the industry is using combustion and thermal desorption, both of which should be capable of meeting the universal standards. Comments are solicited on whether the industry has invested in other technology that cannot meet the universal standards. In particular, information on the type of treatment, performance data, and an explanation as to why operational factors could not be adjusted to comply with the universal standards, are solicited. To the extent data demonstrates that petroleum refining wastes treated by appropriate noncombustion technologies can achieve slightly higher levels than those proposed for universal standards, the Agency may choose to revise the universal standards.

As a general matter for all hazardous wastes, the Agency solicits comments and data on whether slight adjustments to the universal standards would encourage the further use of noncombustion technologies and still represent BDAT.

5. Universal Standards Will Not Apply to F024

F024 is being excluded from the universal treatment standards. Treatment standards for F024 constituents, including polychlorinated dioxins and polychlorinated furans, were promulgated in the Second Third rule (54 FR 26615, June 23, 1989). The standards were revised in the Third Third rule (55 FR 22580, June 1, 1990). These concentration-based treatment standards for F024 are lower than the universal standards for the regulated F024 constituents. The revised standards did not include any specific concentration-based treatment standards for dioxins or furans, but did require that the F024 waste be treated by incineration.

The Agency believes that if F024 wastes are properly incinerated, and the treatment standards for the nine regulated organic constituents are met, then dioxins and furans, as well as all of the other hazardous constituents in the waste will be substantially destroyed. In light of this issue, the Agency is retaining the existing treatment standards for F024 and is not applying the universal treatment standards to this waste.

B. Incorporation of Newly Listed Wastes into Lab Packs and Proposed Changes to Appendices

On June 1, 1990 (55 FR 22629), EPA promulgated alternative treatment standards for lab packs under 40 CFR 268.42(c) that specified methods of treatment that could be used prior to land disposal. EPA promulgated these alternative standards to provide relief to treaters from having to monitor compliance with numeric treatment standards for many different wastes that could be included in the lab pack. The alternative treatment standards applied to two categories of lab packs as specified in Appendix IV (organometallic) and Appendix V (organic) to part 268. In the January, 1991, correction notice and again in the May 30, 1991, Advance Notice of Proposed Rulemaking (56 FR 24453), the Agency requested comment on potential improvements to the existing alternative treatment standards for Appendix IV and Appendix V. In particular, the Agency solicited opinions on whether a regulatory definition of organometallics was necessary, or whether other regulatory requirements should be developed to prevent potential misuse of the existing appendix IV lab pack requirements.

As noted in the May, 1991 ANPRM, EPA's original intent in establishing these two appendices was to simplify the regulations related to lab packs needed incineration followed by chemical stabilization of the ash (Appendix IV), from those lab packs needing only incineration (Appendix V). However, under 40 CFR 268.42(c)(4), the residue from incineration of both types of lab packs must be treated to address any hazardous characteristic for the TC metals, i.e., D004–D008, D010, and D011. (D009 mercury wastes are not included in this list because mercury-bearing wastes are excluded from the alternative lab pack treatment standard.) As such, there is no practical difference between the treatment required for the two types of lab packs. The Agency believes that combing the appendices into appendix IV will simplify procedures. In the May 30, 1991 ANPRM, EPA solicited comment on consolidating appendix V into appendix IV. Comments received were favorable in that such a change would simplify compliance with the procedures.

The Agency is proposing to replace the two appendices with a list of excluded wastes. The existing alternative treatment standard for lab packs would be retrained: Incineration (40 CFR 268.42(c)(3)) followed by treatment of characteristic metals (excluding mercury (40 CFR 268.42(c)(4).) Considering that two organo-mercury wastes, PO65 and PO92, are allowed in lab packs, the Agency solicits comments on whether incinerator residues should also be required to comply with the D009 mercury standards.

Because the number of prohibition waste codes is small, the regulated community will be able to quickly determine if a waste is excluded from the alternative lab pack treatment standard. The proposed list of excluded waste codes is shown in table D–1, below.

TABLE D–1.—LIST OF WASTE CODES TO BE EXCLUDED FROM THE LAB PACKS

D009, F019, K003, K004, K005, K006, K062, K071, K100, K106, P010, P011, P012, P076, P078, U134, U151.

The waste proposed for exclusion are the same as those currently excluded, with the following exceptions. K071, a mercury waste that was inadvertently listed on appendix IV, will now be excluded. The Agency's action regarding K071 is consistent with the exclusion of all other inorganic mercury wastes. Another difference with the current exclusion list is that six cyanide-containing wastes—F007, F008, F009, F011, F012, and K007 will be allowed in lab packs. EPA believes that cyanide will be effectively destroyed by combustion.

EPA is also proposing that the following newly listed wastes (i.e., all wastes listed or identified since November 1984) be eligible for the alternative treatment standards for lab packs: The newly listed wastes for which treatment standards were promulgated in the LDR Phase I rule (57 FR 37194, August 18, 1992), and the newly listed and TC wastes for which treatment standards are being proposed in today's rule.

EPA requests comments on all aspects of today's alternative lab pack proposal, including the usefulness of the proposed standards at treatment,

storage, and disposal facilities, and whether a list of excluded wastes is necessary, given the alternative of using limits on emissions from combustion units and metal limits on the solid residuals. For example, inorganic mercury wastes are excluded from lab packs. The reason for excluding these wastes is that they are not effectively treated by combustion; and furthermore mercury, which is a volatile metal, may cause emission concerns. Alternatively, EPA could rely on existing mercury standards for Boilers and Industrial Furnaces and omnibus limits for hazardous waste incinerators to address emission concerns; and a mercury limit could be placed on the solid residual by adding D009 to the list of metal limits in § 268.42(c)(4) to ensure effective treatment of the solid residual.

C. Proposed Changes in the LDR Program in Response to the LDR Roundtable

1. Background

The Office of Solid Waste convened a roundtable meeting on January 12–14, 1993, to discuss the LDR program. The purpose of the roundtable was to hear from persons experienced in implementing the LDR program on what was working well, what was not working well, and what could be done to improve the program. These discussions were a forum for sharing concerns and information in a constructive and candid manner, rather than to reach consensus or serve as formal negotiations.

In the spirit of quality improvement, EPA's goal is to make the LDR program more efficient and easier to implement. The roundtable was part of a comprehensive LDR implementation study. EPA developed the LDR program under stringent deadlines; thus the implementation study presents an opportunity to assess its effectiveness and implementation. The Agency is using the information gained from this study, beginning with the January roundtable, to improve the existing LDR program and to guide its future direction.

Roundtable participants were waste generators, treaters and disposers, public interest groups, state environmental agencies, other Federal agencies, and EPA headquarters and regional personnel. Major issues were identified in advance by roundtable participants and the discussions focused on these topics: Treatment standards, monitoring, and administrative and paperwork requirements.

To facilitate discussion, five small groups were created. The small groups discussed the issues, identified the most important issues associated with each topic and provided additional detail or potential solutions. The small groups then reconvened in general session to report back the group's recommendations. (The complete proceedings for the roundtable are included in the RCRA docket numbered F–92–CD2F–S0144.)

The participants identified the following major issues relative to the LDR treatment standards:

- Waste code-carry through,
- Use of health-based versus technology-based numbers as the standard,
- Defining the point at which wastes enter or exit the LDR "system",
- Inconsistency of individual standards for constituents across waste codes,
- Capacity for treatment,
- Storage of waste for greater than one year,
- Existing treatment standards for hazardous soil,
- Standards modifications, and
- The need for user-friendly guidance on treatment standards.

The participants identified the following major issues relative to LDR monitoring:

- Providing clarification for the use of generator knowledge,
- Constituent monitoring,
- Revisions to the Toxicity Characteristic Leaching Procedure (TCLP),
- Detection limits,
- Waste analysis plans, and
- Guidance and training.

Although views on the LDR program varied, feedback from the participants indicated that coming together to discuss these issues was very worthwhile. EPA is today proposing to incorporate some of the recommendations made by roundtable participants, as discussed below. For example, the Agency is proposing to consolidate the three existing treatment standard tables and to simplify the notification requirements, as discussed below. In addition, as discussed in section III.A., the Agency is also preparing to develop a uniform set of universal treatment standards. For other issues raised at the roundtable, the Agency is continuing to develop improvements to the LDR program.

2. Consolidated Treatment Table

Several of the groups present at the LDR roundtable expressed an interest in having a consolidated treatment standard table in the regulations. Participants stated that the existing system of three tables (see 40 CFR 268.41–268.43) was too complex and burdensome to use.

When the LDR program began, the Agency believed it was useful to clearly delineate in the regulation the differences between numerical treatment standards as measured in leachate from the Toxicity Characteristic Leaching Procedure (table CCWE at 268.43) from standards measured through a total waste analysis (table CCW at 268.42). Furthermore, it was useful to clarify that the specified methods of treatment (tables 2 and 3 at 268.43) differed from numerical standards in that numerical standards can be met through the use of any technology, whereas specified methods must be used to treat the waste. When specified methods are used, there is no need to measure the treatment residue for compliance purposes.

However, now that the program has been in place for a number of years and almost all hazardous wastes are subject to treatment standards, the Agency agrees that the regulations can be simplified. First, the Agency believes the program has been in place long enough so that the regulated community generally understands the system. Thus, it may not be necessary to make such obvious delineations. Second, there is considerable overlap between the tables. For instance, a listed waste may contain both organic constituents and metals. Treatment standards for the organic constituents appear in § 268.43, where a cross reference to § 268.41 appears that refers the reader to the treatment standards for the metals. A few wastes have treatment standards appearing in all three places. The consolidated table provides all necessary information in an easier-to-read format. The Agency notes that the new table does not contain the proposed universal treatment standards, instead relying on the standards currently found in the three existing tables. If the consolidated table and the universal standards are both finalized, the table will contain the universal standards.

Therefore, EPA is proposing in today's rule a table which combines the information found in § 268.41 Table CCWE.—Constituent Concentrations in Waste Extract, § 268.42 Table 2.—Technology-Based Standards by RCRA Waste Code, and § 268.43 Table CCW.—Constituent Concentrations in Wastes. The Agency is proposing to call the table "Treatment Standards for Hazardous Waste" and place it at § 268.40 along with much of the text found currently in §§ 268.41, 268.42, and 268.43. Section 268.42 would continue to be used to describe the technology codes, regulate California

list PCBs and HOCs, set out exemptions from the required methods, and provide for procedures for equivalency determinations. The Agency requests comments on the usefulness of the consolidated table.

3. Simplified LDR Notification Requirements

Comments on the § 268.7 notification requirements at the LDR roundtable ranged from eliminating notification altogether to modifying or deleting data items on the notification form. It was also suggested that the LDR notification form be combined with the manifest. The manifest form is currently being revised through a regulatory negotiation process; as part of the process, the group discussed the possibility of combining the manifest and the notification form. Due to a number of factors, the group decided not to consider combining the LDR notification requirements with the manifest form. Since it is not possible at this time to combine the manifest with the notification form, and since the Agency believes that the LDR notifications are necessary to document cradle-to-grave hazardous waste management, the Agency explored ways to simplify the information required on the notification form. The Agency proposes to omit the requirement at § 268.7(a)(1)(ii) and at § 268.9(d)(1) that the notification include treatment standards or references to those standards.

Such a simplification makes particular sense in conjunction with consolidating the treatment standard tables. Therefore, the Agency is proposing that the only information required to be included in the notification will be the EPA Hazardous Waste Number, whether the waste is a nonwastewater or wastewater, waste analysis data where available, the manifest number associated with the shipment, the constituents in the waste for certain D001 and D002 wastes for which treatment standards for the underlying hazardous constituents must be met (see 58 FR 29860, May 24, 1993), and the specific hazardous constituents in EPA Hazardous Wastes Nos. F001–F005, and F039 for which treatment is required. Today's proposal would not alter the certification requirements at § 268.7.

Participants at the LDR roundtable also requested a summary of all the LDR paperwork requirements. The Agency is therefore proposing that such a table be included as an appendix to part 268. The Agency requests comment on the notification simplification and summary table shown below. Also, comment and examples are requested on whether a flow chart might be more useful than the summary table.

TABLE 1.—RECORD-KEEPING, NOTIFICATION, AND/OR CERTIFICATION REQUIREMENTS

Entity	Scenario	Frequency	Recipient of notification	Record-keeping, notification, and/or certification requirements
I. Generator	A. Waste does not meet applicable treatment standards or exceeds applicable prohibition levels [§ 268.7(a)(1)].	Each shipment	Treatment or storage facility.	Notice must be in writing and include: • EPA hazardous waste number • Constituents of concern for certain wastes • Treatability group • Waste analysis data (where available).
	B. Waste can be disposed of without further treatment (meets applicable treatment standards or does not exceed prohibition levels upon generation) [§ 268.7(a)(2)].	Each shipment	Land disposal facility ...	Notice and certification statement that waste meets applicable treatment standards or applicable prohibition levels. Notice must include: • EPA hazardous waste number • Constituents of concern for certain wastes • Treatability group • Manifest number • Waste analysis data (where available) Certification statement required under § 266.7(a)(2)(ii) that waste complies with treatment standards and prohibitions.
	C. Waste is subject to exemption from a prohibition on the type of land disposal utilized for the waste, such as a case-by-case extension under § 268.5, an exemption under § 268.6, or a nationwide capacity variance [§ 268.7(a)(3)].	Each shipment	Receiving facility	Notice must include: • Statement that waste is not prohibited from land disposal • EPA hazardous waste number • Constituents of concern for certain wastes • Treatability group • Manifest number • Waste analysis data (where available) • Date the waste is subject to the prohibitions.
	D. Waste is in tanks or containers regulated under 40 CFR 262.34 (accumulated waste) and being treated in such containers to meet applicable treatment standards [§ 268.7(a)(4)].	Minimum of 30 days prior to treatment activity.	EPA Regional Administrator (or his designated representative) or authorized State. Delivery must be verified.	Generator must develop, keep onsite, and follow a written waste analysis plan describing procedures used to comply with the treatment standards. If waste is shipped offsite, generator also must comply with notification requirement of § 268.7(a)(2).

TABLE 1.—RECORD-KEEPING, NOTIFICATION, AND/OR CERTIFICATION REQUIREMENTS—Continued

Entity	Scenario	Frequency	Recipient of notification	Record-keeping, notification, and/or certification requirements
	E. Where generator is managing a lab pack containing certain wastes and wishes to use an alternative treatment standard [§268.7(a)(8) or (a)(9)].	Each shipment	Treatment facility	Notice in accordance with §268.7(a)(1), (a)(5), and (a)(6), where applicable. Certification in accordance with §268.7(a)(8) or §268.7(a)(9), respectively.
	F. Small quantity generators with tolling agreements [pursuant to 40 CFR 262.20(c)] [§268.7(a)(10)].	Initial Shipment	Treatment facility	Must comply with applicable notification and certification requirements in §268.7(a). Generator also must retain copy of the notification and certification together with tolling agreement onsite for at least 3 years after termination or expiration of agreement.
	G. Generator has determined waste is restricted based solely on his knowledge of the waste [§268.7(a)(5)].	N/A	Generator's file	All supporting data must be retained onsite in generator's files.
	H. Generator has determined waste is restricted based on testing waste or an extract [§268.7(a)(5)].	N/A	Generator's file	All waste analysis data must be retained onsite in generator's files.
	I. Generator has determined that waste is excluded from the definition of hazardous or solid waste or exempt from Subtitle C regulation [§268.7(a)(6)].	One-time	Generator's file	File a one-time notice stating such generation, subsequent exclusion from the definition or exemption from Subtitle C, and the disposition of waste.
	J. Other record-keeping requirements [§268.7(a)(7)].	N/A	Generator's file	Generator must retain a copy of all notices, certifications, demonstrations, waste analysis data, and other documentation produced pursuant to §268.7 onsite for at least 5 years from the date that the waste was last sent to onsite or offsite treatment, storage, or disposal. This period is automatically extended during enforcement actions or as requested by the Administrator.
II. Treatment Facility.	A. Waste shipped from treatment facility to land disposal facility [§268.7(b)(4), (b)(5)].	Each shipment	Land disposal facility	Notice must include: • EPA hazardous waste number • Constituents of concern • Treatability group • Prohibition levels • Manifest number • Waste analysis data (where available) Certification as set out in §268.7(b)(5)(i), (ii) and (iii) stating that the waste or treatment residue has been treated in compliance with applicable performance standards and prohibitions.
	B. Waste treatment residue from a treatment or storage facility will be further managed at a different treatment or storage facility [§268.7(b)(6)].	Each shipment	Receiving facility	Treatment, storage, or disposal facility must comply with all notice and certification requirements applicable to generators.

TABLE 1.—RECORD-KEEPING, NOTIFICATION, AND/OR CERTIFICATION REQUIREMENTS—Continued

Entity	Scenario	Frequency	Recipient of notification	Record-keeping, notification, and/or certification requirements
	C. Where wastes are recyclable materials used in a manner constituting disposal subject to §266.20(b) [§268.7(b)(7)].	Each shipment	Regional Administrator (or his delegated representative).	No notification to receiving facility required pursuant to §268.7(b)(4). Certification as described in §268.7(b)(5) and notice with information listed in §268.7(b)(4), except manifest number. Recycling facility must keep records of the name and location of each entity receiving hazardous waste-derived products.
III. Land Disposal Facility.	A. Wastes taken to land disposal facility [§268.7(c)].	.....	.....	Maintain copies of notice and certifications specified in §268.7(a) and (b) and §268.8, if applicable.

4. Demonstrating Acceptable Knowledge of One's Waste

Under the LDR program, generators may characterize their waste based either on knowledge of the waste or on analytical data. On the other hand, treatment, storage, and disposal facilities (TSDFs) must periodically test their wastes, according to the frequency specified in the Waste Analysis plan (WAP); at other times, they may use knowledge to characterize their waste. Several participants at the LDR Roundtable expressed the need for guidance as to what constitutes acceptable knowledge when characterizing waste.

a. Background. The general and specific waste characterization requirements can be met using several methods or combinations of methods. Wherever feasible, the preferred method to meet the waste characterization requirement is to conduct sampling and laboratory analysis because this data in most cases provides the most definitive information on constituent concentration levels in waste compared to LDR treatment standards. However, generators and TSDFs also can meet waste characterization requirements by applying "acceptable knowledge." Acceptable knowledge can be used to meet all or part of the waste characterization requirements.

b. What Constitutes Acceptable Knowledge? Acceptable knowledge is broadly defined to include "process knowledge" and the facility's records of analysis performed before the effective date of RCRA regulations, or a combination of these with actual chemical analysis of the waste.

"Process knowledge" could constitute acceptable knowledge when detailed information on the wastes is obtained from existing published or documented waste analysis data or studies conducted on hazardous wastes generated by processes similar to that which generated the waste. EPA also solicits comment on other types of information that would come under the definition of process knowledge.

EPA lists certain hazardous wastes in 40 CFR part 261. For example, the K-listed wastes (e.g., K001 wastes, defined as bottom sediment sludge from the treatment of wastewaters from wood preserving processes that use creosote and/or pentachlorophenol) are listed by the specific process that generated the waste (rather than by the characteristic of the waste that is generated.) Therefore, with many listed wastes ("K", "P", and "U") the application of acceptable knowledge is appropriate because the waste characteristics are generally consistent and well known from facility to facility. In the case where a generator sends waste off-site for treatment, storage, or disposal, the TSDF may rely on process knowledge supplied by the generator as a basis for the TSDF's waste characterization. (See § 264.13.)

Some facilities have records of analysis performed before the effective date of RCRA regulations. While seemingly attractive because of the potential savings associated with using existing information (such as published data), the facility must ensure that this information accurately characterizes applicable wastes.

c. When Might Acceptable Knowledge Be Used? Generators and TSDFs may use acceptable knowledge alone or in conjunction with sampling and laboratory analysis. There are situations where it is appropriate to apply acceptable knowledge, for example, when:

- The hazardous constituents in wastes from specific processes are well documented, such as with the K-listed wastes mentioned previously.
- Wastes are discarded unused commercial chemical products, reagents or chemicals of known physical and chemical constituents. Several of these fall into the "P" and "U" categories.
- Other site-specific/process-specific factors.

The Agency requests comment on other appropriate situations in which acceptable knowledge is appropriate.

d. Why Provide Evidence to Support Acceptable Knowledge? For enforcement purposes, EPA seeks evidence that demonstrates that the information relied upon is sufficient to identify the waste accurately and completely. Such evidence (e.g., knowledge of the process that generated the waste) is essential for identifying constituents that must meet LDR standards.

e. How Can A TSDF Verify Data Supplied by a Generator? There are considerations that a TSDF should be aware of when relying upon acceptable knowledge to manage wastes. First, if the TSDF relies in part on information supplied by a generator, the TSDF must become thoroughly familiar with the generator's processes to verify the integrity of the data. This can be accomplished by: (1) Conducting facility visits of generators, (2) obtaining split sampling for confirmatory analysis, and/or (3) gathering other information.

Second, if the TSDF uses process descriptions and documented studies as acceptable knowledge, the data should be scrutinized carefully as to whether:

- There are any differences between the process in the study and the process used by the generator.
- The studies used are applicable.

These issues are of concern, for example, because EPA revised the criteria that qualify a waste as a hazardous waste due to meeting the toxicity characteristic. Not only were the number and type of constituents that could deem a waste hazardous modified but also the test for identifying these constituents was amended (i.e., the Toxicity Characteristic Leaching Procedure (TCLP) replaced the Extraction Procedure Toxicity Test (EP TOX Test).)

Therefore, if a TSDF has been using acceptable knowledge, it needs to review the waste analysis or waste characterization data to determine if it is managing any solid wastes that are now hazardous wastes. The TSDF needs to determine whether its existing data is sufficient to identify any new constituent concentrations limitation (i.e., demonstrate compliance with LDR requirements).

In addition, where documented studies are used as acceptable knowledge, the TSDF should determine whether the information is based on valid sampling and analytical techniques. Also, the ability of analytical equipment to detect low concentrations of contaminants has improved over the years, and constituents that once were determined to be "nondetectable" may, in fact, be detectable using the sophisticated equipment available today.

Although EPA recognizes that sampling and analysis is not as economical or convenient as using acceptable knowledge, it does have a number of advantages. Because accurate waste identification is such a critical factor for demonstrating compliance with RCRA, misidentification can render a facility liable for enforcement actions with respect to permit conditions, LDR requirements, annual reporting, and other RCRA requirements. In addition, accurate waste analysis is critical for meeting some of the requirements of other regulatory programs such as effluent discharges under the Clean Water Act, and transportation requirements regulated by the Department of Transportation.

5. Advance Notice of Possible Changes to the LDR Program Resulting From the LDR Roundtable

As was elaborated above in the section presenting background on the LDR Roundtable, EPA intends further review comments and recommendations made during the Roundtable and propose to incorporate them—where appropriate—into future LDR regulations. Below, some of the main problems and recommendations identified by Roundtable participants are briefly discussed. The recommendations are being presented in this proposed rule to solicit further comments that will be considered when developing possible revisions to existing LDR provisions in future rulemakings. Comment is solicited on each of the recommendations discussed above. More detailed information on the LDR Roundtable can be obtained by calling or writing the RCRA Docket and requesting the document "Summary of the Land Disposal Restrictions Evaluation Roundtable" found in the docket numbered F–92–CD2F–S0144.

a. Waste code carry through. One of the issues concerns the management of residuals from treating listed wastes. The waste codes for these wastes "carry through" to the treatment residual, even when the physical or chemical state of the waste has been modified. The Roundtable participants' recommendations included: (1) Dropping the waste code when the LDR treatment standards are met—groups contended that once standards are met for a waste, the waste code should be dropped from the residual so that legitimate mixing and other treatment could occur without retesting; (2) allowing the use of process knowledge to identify a short list of constituents in residuals for which analysis should be conducted; and (3) developing residual waste codes (as the Agency has done for multi-source leachate.)

b. Use of health-based levels versus technology-based levels in establishing treatment standards. A number of the participants suggested that the LDRs should be revised to allow materials to leave the hazardous waste (i.e., RCRA subtitle C) system—that is, the LDR treatment standards should be based on risk. Other participants recommended that EPA should consider socioeconomic factors and resource allocations during these risk evaluations. For further discussion, see Section II.H. Furthermore, it was also suggested that the Agency create a *de minimis* program to eliminate certain specific categories of small volume wastes from the LDR requirements. (This last alternative would, of course, likely require a statutory change.)

c. Inconsistency of standards. Some participants stated that requiring characteristic wastes to be treated below the characteristic level is inconsistent with the regulatory standards used for hazardous waste identification. Remedies included: (1) Capping treatment with risk-based levels; (2) implementing universal standards based on the least-stringent treatment standard; and (3) having EPA focus on hazardous compounds in wastes rather than on the existing set of waste codes, and establish technology-based treatment standards so that each compound would have a specific standard regardless of the waste in which it was found (such "universal standards" are proposed in section III.A of this preamble.)

d. Capacity-related issues. Participants cited a number of capacity-related concerns, including the lack of treatment capacity for highly-concentrated mercury waste, and insufficient treatment technologies to address ignitable, corrosive and reactive (ICR) wastes. With regard to mercury wastes, participants suggested EPA allow the low-level mercury treatment standard to be applied to high-level mercury wastes. For ICR wastes, the recommendation was to allow maximum flexibility concerning continued use of deactivation.

Furthermore, it was stated that the storage for greater than one year will occur for certain wastes because no treatment capacity exists (e.g., radioactive mixed wastes, mercury-bearing wastes not amenable to the current standards, PCBs, and dioxin-contaminated wastes.) (The 'one-year limitation' is, of course, a misnomer. Persons storing for over one year merely have the burden of showing they are storing waste in order to accumulate sufficient quantities to facilitate proper treatment or disposal. § 268.50(c).) Participants also indicated that the one-year storage limitation is a disincentive for waste minimization because the cost of disposal decreases as the volume of waste increases, and pollution prevention/waste minimization programs have created problems associated with generating sufficient waste for disposal. There is also confusion on the part of industry on what constitutes a good-faith effort to find treatment capacity. Possible solutions voiced included: (1) Guidance on what constitutes a good-faith effort to find treatment capacity; (2) streamlining capacity variance procedures; and (3) waste minimization storage allowances (e.g., EPA offering storage for greater than one year as a waste minimization incentive for non-permitted facilities.)

e. Generator knowledge. It was stated by a number of the participants that generator knowledge with respect to identifying constituents of concern in their hazardous waste was often rejected by TSDs, requiring testing by generators prior to acceptance of wastes for treatment or disposal. The one recommendation was to institute guidance on what the Agency considers sufficient written documentation to support a generator's knowledge of the waste. (The Agency is providing some guidance on this issue in section 4 above.)

f. Constituents. Conversely, a number of the participants stated that the Agency requires testing for too many constituents, presenting a cost burden to industry. Because generators are said to know the constituent content of their waste, it is unnecessary to test. Potential solutions to this problem included: (1)

Developing short, waste-specific, indicator constituent lists for testing; (2) initially testing the whole range of constituents, then testing again only if the waste stream changes; and (3) having EPA remove dioxins and furans from the F039 list due to the expense of analysis, while retaining the current standards for these compounds in F020–F023 and F026–F027.

g. Detection limits. Some participants maintained that some treatment standards are set at levels that may be below detection limits, creating obvious compliance difficulties. Recommendations included: (1) Allowing ranges in detection limits and in LDR treatment standards; (2) establishing LDR standards at levels that are not below detection limits; (3) use the practical quantitation limits (PQLs) as the default for matrix difficulties; (4) refining detection limits over time and allow the use of indicator compounds in difficult analyses; and (5) allowing the states and regions discretion when dealing with difficult matrices and standards.

h. Waste Analysis Plans (WAPs). The general problem voiced was that generators, treaters, disposers, and enforcement officials often obtain different analytical results for the same waste depending on the sampling (eg., grab versus composite samples), and the statistical or weighting methods employed, necessitating re-testing. Potential remedies included: (1) Developing WAP guidance to, among other things, minimize redundant testing and over-certification of wastes, and solicit comment on whether to specify WAP guidance at the time of promulgation of the rules; (2) having the Agency develop sampling guidance; (3) using composite sampling over grab sampling; (4) establishing mandatory quality control procedures; and (5) having the waste analysis plans rely more on generator knowledge.

i. Paperwork. In general it was felt that the paperwork requirements were too complicated. Some participants suggested that there is no longer a need for the LDR notification, and said that the separate LDR notification hampers inspections. Alternative options included: (1) Including the LDR notification on the manifest; (2) revising the LDR notification to exempt generators from informing the treater of the treatment standards applicable to the waste (EPA is proposing to make this change in this preamble at section 3 above); (3) creating a summary table of notification and certification requirements (included above in Table 1); and (4) solicit comment on reducing the number of years that records must be retained.

j. Complexity of the regulations. Most of the participants agreed that the preamble language is not consistently interpreted among government officials and that it is necessary to work with both the regulations and the preamble to understand what is required. Discussion in the groups pointed to the LDRs being difficult to understand, largely because the Codes of Federal Regulations (CFR) are quickly out of date; the preamble language contains significant guidance that is not always implicit in the regulatory language; and the treatment standards are found in the CFR in several tables. Recommendations included: (1) Developing consolidated treatment tables (this suggestion is being proposed in this notice, as discussed at section C.2 above); (2) having EPA develop a bulletin board to keep all involved parties informed of policy memoranda, scheduled briefings, and new rules; (3) having the Agency make inspector checklists available to the regulated community and hold workshops on compliance; (4) EPA physically reorganizing its regulations by incorporating part 268 into the generator and facility requirements (parts 262, 264 and 265); and, (5) having EPA expand preambles to include an implementation section, soliciting comment on implementation information during the development of the regulations (this is being implemented in this proposed rule in section XI.)

IV. Treatment Standards for Toxicity Characteristic Waste

A. The Third Third Court Decision, the Emergency Interim Final Rule, and Their Applicability to TC Wastes

In today's notice, EPA is proposing treatment standards for wastes displaying the toxicity characteristic (TC wastes) when the TC wastes are managed in systems other than: (1) In wastewater treatment systems which include surface impoundments and whose ultimate discharge is subject to the Clean Water Act (CWA); (2) in Class I non-hazardous underground injection wells subject to the Safe Drinking Water Act (SDWA) Underground Injection Control (UIC) program; or, (3) by a zero discharger who, before permanent land disposal of the wastewater, treats the wastewaters in a wastewater treatment system equivalent to that utilized by CWA dischargers. Consistent with the *Third Third Case*, the treatment standards proposed for these wastes include standards for "constituents subject to treatment" (i.e., any regulated constituent present at levels above the universal constituent-specific treatment standards at the point of generation of the TC waste).

This proposed approach is the same as that adopted in the recent interim final rule, promulgated on May 10, 1993 (published on May 24, 1993, 58 FR 29860) in response to the court's decision in *Chemical Waste Management* v. *EPA*, 976 F. 2d 2 (D.C. Cir. 1992). That case vacated and remanded certain Agency regulations (commonly referred to as the Third Third rule) establishing prohibitions and treatment standards for characteristic wastes, and also established rules as to when the prohibitions and standards would not apply.

This section provides a summary of the court's decision, an overview of the interim final rule published on May 24, 1993, and how the Agency proposes to apply this approach to the TC wastes.

1. Background

Among other things in the Third Third final rule, the Agency promulgated treatment standards and prohibitions for hazardous wastes that exhibited one or more of the following characteristics: Ignitability, corrosivity, reactivity, or EP toxicity (40 CFR 261.21–261.24). The Agency also evaluated the applicability of the LDR dilution prohibition to characteristic wastes, including characteristic wastes ultimately managed in wastewater management systems with land disposal units (i.e., impoundments or injection wells) which are subject to varying degrees of regulation under the CWA and SDWA. This was done in an effort to ensure the successful integration of these programs with the LDR regulations (see generally 55 FR 22653–59 (June 1, 1990)). Thus, except where the Agency specifically identified and required that hazardous constituents be treated, the rule indicated in essence that characteristic wastes need only be treated to remove the characteristic before land disposal where land disposal involved placement in surface impoundments whose ultimate discharge was subject to regulation under the CWA, or where the waste was injected into a Class I UIC well.

On September 25, 1992, the United States Court of Appeals for the District of Columbia Circuit ruled on various petitions for review of this rule. The principal holdings of the case with respect to characteristic wastes were that: (1) EPA may require treatment under RCRA section 3004(m) to more stringent levels than those at which wastes are identified as hazardous so

long as the level defining the waste as hazardous was above the level at which threats to human health and the environment are minimized, 976 F. 2d at 12–14; (2) section 3004(m) requires that treatment standards address both short-term and long-term potential harms posed by hazardous wastes, as well as removal of the characteristic property, *id.* at 16, 17, 23; as a consequence, dilution is permissible as an exclusive method of treatment only for those characteristic wastes that do not contain hazardous constituents "in sufficient concentrations to pose a threat to human health or the environment" (i.e., the minimize threat level in section 3004(m)), *id.* at 16; and, (3) situations where characteristic hazardous wastes are diluted, lose their characteristic(s) and are then managed in centralized wastewater management land disposal units (i.e., subtitle D surface impoundments or injection wells) are legal only if it can be demonstrated that hazardous constituents are reduced, destroyed or immobilized to the same extent as they would be pursuant to otherwise-applicable RCRA treatment standards, *id.* at 7.

As a consequence of these holdings, the court held that the deactivation treatment standard for ignitable and corrosive wastes (which allowed the hazardous characteristic to be removed by any type of treatment, including dilution) did not fully comport with RCRA section 3004(m). This was because that standard could be achieved by dilution, and section 3004(m) "* * * requires that any hazardous waste be treated in such a way that hazardous constituents be removed from the waste before it enters the environment." 976 F. 2d at 24.

In response to the court decision, EPA issued an emergency interim final rule with respect to those treatment standards that were vacated (as opposed to remanded) by the court (58 FR 29860, May 24, 1993). The distinction between vacated and remanded rules is that vacated rules are no longer in effect (once the court's mandate issues), whereas remanded rules remain in force until the Agency acts to replace them. This distinction has considerable significance with respect to LDR treatment standards. If there is no treatment standard for a prohibited waste (for example, as a result of a vacatur), that waste is prohibited from land disposal, because it has not been treated to meet the treatment standard established by EPA, and (presumably) is not being disposed in a no-migration unit. RCRA sections 3004 (d), (e), and (g)(5). A remanded treatment standard, on the other hand, would remain in effect, and disposal of prohibited wastes treated pursuant to that standard is legal until the standard is amended.

In the Agency's opinion, the rules dealing with centralized wastewater management involving land disposal (§§ 268.1(c)(3) and 268.3(b)) were remanded, not vacated. (See 976 F.2d at 7, 19–26 where these rules are discussed and not expressly vacated.) This means that the only wastes to which the interim final rule applied were those ignitable and corrosive wastes for which the treatment standard was deactivation (since the deactivation standard for these wastes was vacated) *and* which were managed in systems other than CWA, CWA-equivalent, or Class I UIC wells regulated under the SDWA.

The treatment standards promulgated in the interim final rule retained the requirement of deactivation to remove the hazardous characteristic; however, the rule also established numerical treatment standards for the underlying hazardous constituents that could be present in the wastes.

2. Applicability of This Approach to TC Wastes and Hazardous Soil Covered by This Proposed Rule

The Agency is today proposing the same approach adopted in the interim final rule for determining which hazardous constituents in TC wastes and hazardous soils to regulate and the types of treatment/disposal units covered. As with ignitable and corrosive wastes, the underlying hazardous constituents must be treated. The Agency believes that to do otherwise would be inconsistent with the court's holding that RCRA section 3004(m) requires that treatment standards address both short-term and long-term potential harms posed by hazardous wastes.

With respect to the units to be regulated, EPA is proposing to defer control of the same units not addressed by the interim final rule. Under that rule, the new treatment standards do not apply to ignitable or corrosive wastes managed in wastewater treatment systems whose ultimate discharge is subject to the CWA, Class I underground injection wells subject to the SDWA Underground Injection Control (UIC) program, and zero dischargers who, before final land disposal, treat wastewater with treatment equivalent to that utilized by CWA dischargers. CWA-equivalent treatment means biological treatment for organics, reduction of hexavalent chromium, precipitation/sedimentation for metals, alkaline chlorination or ferrous sulfate precipitation of cyanide (to the extent these constituents are present in the untreated influent to wastewater treatment systems), or treatment that the facility can show performs as well or better than these enumerated technologies. See § 258.37(a), 58 FR at 29885 (May 24, 1993).

EPA is proposing the same deferred coverage when these units are used to treat TC wastes. The Agency believes that it would be most appropriate to address all issues pertaining to such wastewater management operations at one time. Therefore, it is not addressing TC wastes managed in these systems in this rulemaking. They will be addressed in a later rulemaking, along with issues that pertain to the wastewater management facilities excluded from the interim final rule.

The treatment standards being proposed today for TC wastes would apply, however, when these wastes are injected into other than Class I wells (e.g., Class V shallow injection wells), even if the wastes were rendered noncharacteristic ("decharacterized") first. The exception to the dilution prohibition of the Third Third Final Rule never applied to other than Class I nonhazardous injection wells. This means that today's proposed requirements will apply to some injection practices, in particular, those involving Class V injection wells. These typically are wells injecting nonhazardous wastes above or into underground sources of drinking water. (If, however, the TC wastes injected into non-Class I wells were to be treated by CWA-equivalent means before injection, the proposed treatment standards would not apply. This is an example of the type of zero discharger referred to above.) The Agency solicits comments and data on volumes of TC wastes managed in Class V injection wells, and on waste management practices employed prior to injection.

The TC wastes covered by this rule have been, and will continue to be, managed in combustion devices or be stabilized. Upon promulgation of a final rule, such facilities must treat the wastes to meet the treatment standard for the TC waste—including standards for any underlying hazardous constituents—prior to land disposal.

3. Future Response to Issues Remanded by the Court

The Agency plans to address the issues having to do with CWA and CWA-equivalent wastewater management systems and injection into Class I injection wells in future rulemakings. For example: (1) Direct dischargers managing decharacterized wastes in surface impoundments; (2) indirect dischargers managing

decharacterized wastes in surface impoundments; (3) zero dischargers (including those injecting into non-Class I injection wells) who perform CWA-equivalent treatment before ultimate disposal; and (4) persons injecting decharacterized wastes into Class I deep injection wells will be subject to regulation in the future when the Agency addresses remanded issues from the *Third Third Case.* See 58 FR at 29860, May 24, 1993 explaining the basis for these categorizations.

Many of these remanded issues are significantly more complex than those dealt with in the interim final rule and in today's proposed rule. In addition, the universe of facilities affected by the remanded portions of the Third Third rule is much broader than that covered in either of these rules, as it will include (among other things) treatment systems regulated under the CWA, Class I nonhazardous injection wells regulated under the SDWA, plus zero discharge facilities that engage in treatment that is equivalent to that of CWA dischargers. Furthermore, the volumes of wastes affected by the remanded rules are much greater than those at issue in this regulation and the interim final rule.

Options for addressing these remanded issues with respect to ignitable, corrosive, and reactive characteristic wastes were presented in the Supplemental Information Report prepared for the January 19, 1993 Notice of Data Availability (58 FR 4972), available in the RCRA docket. EPA expects that most of the issues discussed there will also apply to TC wastes when treatment standards are promulgated. The following discussion summarizes many of the issues raised in the Supplemental Information Report.

It is clear that the court intended for the Agency to revise the special dilution provisions for management in a CWA facility (§ 268.3(b)) and in SDWA Class I injection wells (§ 268.1(c)(3)), because it specified that dilution alone is not adequate treatment if an ignitable, corrosive, and reactive waste contains hazardous constituents at levels above those the Agency finds minimize threats. This will greatly impact the injection of these wastes (and, potentially, TC wastes) in Class I nonhazardous deep wells, since there are few treatment systems currently in place upstream of the injection well that could treat the underlying hazardous constituents that are present. Such facilities seem to have few options for dealing with the court's decision: undertaking substantial waste minimization efforts; installing on-site treatment systems; arranging for off-site transport and treatment; or, applying for, and being granted, a no-migration petition that would allow continued land disposal of untreated wastes. Although commenters on the Supplemental Information Report suggested that EPA could promulgate a rule that does not require treatment of the underlying hazardous constituents, based on a generic finding that injection is a protective practice, the Agency's tentative view is that this is not a viable option (see Supplemental Information Report, pp. 25–7). However, the Agency seeks additional comment on the technical and legal issues raised in Notice of Data Availability and Supplemental Options Report as they may pertain to TC wastes.

Probably the most significant issue for CWA wastewater treatment facilities will be that of determining the equivalency of CWA treatment systems with RCRA LDR treatment. Associated issues such as whether the court opinion authorizes controls on leakage or volatilization from treatment surface impoundments, or whether sludges generated in impoundments must be treated, will be particularly controversial and will take time to resolve. Comments are solicited on these issues as they pertain to treatment of TC wastes.

4. Request for Comment on Petition From Chemical Manufacturer's Association Regarding Deep Well Injection of Ignitable and Corrosive Characteristic Wastes

In the May 24, 1993 interim final rule for ignitable and corrosive wastes managed in other than wastewater treatment systems whose ultimate discharge is subject to the CWA, in other than Class I underground injection wells subject to the SDWA UIC program, and by zero dischargers who do not treat wastewater with treatment equivalent to that utilized by CWA dischargers, the Agency discussed plans for future rulemakings covering those ignitable and corrosive wastes disposed in such units. As part of its response to May 24 interim final rule, the Chemical Manufacturers' Association (CMA) requested that the Agency develop treatment standards intended for those wastes disposed in Class I deep injection wells. CMA specifically requested the Agency to promulgate treatment standards for ignitable and corrosive wastes managed by deep well injection that, in view of the unique circumstances of deep well injection, meet the statutory "minimize threats" standard. Consequently, the Agency has placed CMA's petition in the docket and is soliciting comment on the petition.

B. Background

1. Legal and Policy Background

One of the key issues in the Third Third rule was whether characteristic wastes must be treated to a lesser extent than listed wastes. This result could come about because, under Agency regulations, characteristic wastes stop being "hazardous wastes" at the point they stop exhibiting the characteristic property. § 261.3(b). However, if treatment of characteristic wastes must cease at the point they are no longer hazardous wastes, any underlying hazardous constituents (hazardous constituents other than those for which the waste exhibits the characteristic) can go untreated. 55 FR at 22652 (June 1, 1990). Moreover, at that time, the Agency viewed the characteristic level as higher than the "minimize threat" level required for treatment of hazardous wastes by section 3004(m). *id.*

The Agency consequently took the position that Congress did not compel less treatment for characteristic wastes than for listed wastes (or, put another way, did not compel non-treatment of underlying hazardous constituents, treatment only to characteristic levels, or dilution to meet treatment standards for characteristic wastes.) *id.* at 22652–58. The Agency established this principle by stating that if a waste is hazardous at the point it is generated, the obligation to treat to section 3004(m) levels attaches at that point, whether or not the waste still exhibits a characteristic at the point it is disposed. *id.*

Reviewing this rule, the D.C. Circuit upheld the point of generation principle; however, it also invalidated some of the discretion EPA had asserted in whether to apply it. 976 F. 2d at 7, 13–14, 23, 25–6. The Agency is, of course, bound by this opinion, and today's proposal for TC wastes reflects the Agency's view of what the opinion requires in establishing treatment standards for characteristic wastes. Further discussion of the opinion, in particular, when different parts of the opinion start to apply, is found in the interim final rule promulgated on May 10, 1993 (58 FR 29860, May 24, 1993), as well as the preceding section of this preamble.

Today's rule consequently proposes treatment standards for TC wastes which standards are not constrained by the characteristic level, that prevent the standard from being achieved by dilution (albeit issues related to most types of land-based centralized wastewater management are not being addressed in this proposal), and which

require treatment of the underlying hazardous constituents.

With respect to treatment below characteristic levels, section 3004(m) of RCRA states that treatment standards must substantially diminish the waste's toxicity or mobility so that short-term and long-term threats posed by the waste are minimized. See 55 FR at 22654 (June 1, 1990). EPA has noted that the EP/TC limits are levels at which wastes clearly are hazardous. 45 FR 33084 (May 19, 1980); 51 FR 21648 (June 13, 1986); See 55 FR 11798 (March 27, 1990). EPA thus believes that further treatment below a characteristic level may be necessary before threats to human health and the environment are "minimized" within the meaning of section 3004(m). See 55 FR at 22654 (June 10, 1990). For some of the TC wastes addressed in today's rule, the concentration-based treatment standards are consequently lower (i.e. more stringent) than the regulatory levels that establish those wastes as characteristically hazardous.

Dilution rules are intended to prohibit dilution in lieu of treatment and to ensure that hazardous constituents are destroyed or removed by treatment. *Third Third Case*, 976 F. 2d at 16, 28. EPA is consequently proposing that it is impermissible to achieve the treatment standards for TC wastes by means of dilution. (As stated above, however, EPA is not addressing in this rule the management of TC wastes in land-based centralized wastewater management systems that were not included within the scope of the recent emergency rule. The court remanded these issues in the *Third Third Case (id.)*, leaving in place existing regulations that allow dilution in such systems).

Also, as described earlier, EPA is proposing treatment standards for the hazardous constituents that can be present in treatable concentrations in TC wastes, but which are not the basis for causing the waste to be identified as hazardous (for example, lead present at less than TC levels, but present at levels exceeding treatable concentrations and exceeding LDR levels, in a waste that exhibits the TC because of benzene). The Agency is proposing the same types of monitoring rules for these constituents recently adopted in the emergency rule, so that (in essence) monitoring for hazardous constituents is limited to those reasonably expected to be present in the wastes.

The Agency requests comments, generally, on mechanisms that may be used to streamline the compliance monitoring requirements under the LDR program. For example, for TC wastes that contain organic underlying hazardous constituents, incineration may destroy not only the TC constituent but the underlying organic hazardous constituents present at lower concentrations than the TC concentration. Comments are solicited on the need to monitor the residual ash for compliance with the treatment standards for the underlying organic hazardous constituents, if the treatment standard for the TC constituent has been met. The Agency solicits specific data that demonstrate that alternative monitoring requirements would provide adequate assurance that all treatment standards are met.

2. Background on Toxicity Characteristic

On March 29, 1990, EPA revised 40 CFR 261.24—the Toxicity Characteristic or "TC"—replacing the extraction procedure (EP) with the toxicity characteristic leaching procedure (TCLP). This rule also increased the number of hazardous constituents regulated under this characteristic from 14 to 40. These TC wastes are newly identified wastes for the purpose of developing land disposal restrictions (LDRs). See section 3004(g)(4). They fall into three categories for purposes of the LDR program. The first category consists of new organic constituents and includes all wastes identified as D018–D043. Today's proposal would establish treatment standards for D018 through D043 wastes when they are managed in non-CWA/non-CWA-equivalent/non-Class I SDWA systems. The second and third categories consist of those D004–D011 metal wastes and D012–D017 pesticide wastes that are now hazardous based on TCLP analysis rather than EP analysis. EPA established treatment standards in the Third Third final rule for these wastes if they exhibit both the TC (because they had to be hazardous waste) and the EP (because only EP wastes were covered by the Third Third prohibition). Today's rule establishes treatment standards for the TC pesticide wastes that do not exhibit the EP characteristic. EPA is not proposing treatment standards for the TC organic and pesticide wastewaters that are managed in CWA facilities or facilities that engage in CWA-equivalent treatment prior to land disposal or in Class I injection wells, or for TC metal wastes (D004–D011). Such standards will be proposed in a later rule.

EPA is soliciting information that may be used to characterize industrial generation patterns to assess the potential for source reduction or recycling for these TC wastes. While source reduction and recycling are high priorities for any hazardous waste, the wide diversity of these TC wastes is expected to impact EPA's ability to evaluate source reduction and recycling. (See also EPA's general solicitation for information on pollution prevention opportunities in section I.B. above).

C. Treatment Standards for New TC Organic Constituents

D018—Benzene
D019—Carbon tetrachloride
D020—Chlordane
D021—Chlorobenzene
D022—Chloroform
D023—o-Cresol
D024—m-Cresol
D025—p-Cresol
D026—Cresol
D027—1,4-Dichlorobenzene
D028—1,2-Dichloroethane
D029—1,1-Dichloroethylene
D030—2,4-Dinitrotoluene
D031—Heptachlor
D031—Heptachlor epoxide
D032—Hexachlorobenzene
D033—Hexachloro-1,3-butadiene
D034—Hexachloroethane
D035—Methyl ethyl ketone
D036—Nitrobenzene
D037—Pentachlorophenol
D038—Pyridine
D039—Tetrachloroethylene
D040—Trichloroethylene
D041—2,4,5-Trichlorophenol
D042—2,4,6-Trichlorophenol
D043—Vinyl chloride

1. General Approach for Establishing Concentration-Based Treatment Standards

Treatment standards established under the land disposal restrictions (LDR) program are based on performance of the best demonstrated available technology (BDAT) for treating a waste. Under EPA's procedure for establishing treatment standards, the Agency establishes concentration-based treatment standards with compliance measured through a total waste analysis as the best measure of destruction or extraction (typically BDAT for organics), or establishes concentration-based treatment standards with compliance measured through analysis of the TCLP leachate, as the best measure of metal treatment. The Agency generally specifies treatment technologies only for those situations where there are no analytical methods to measure compliance with a concentration-based treatment standard.

a. Nonwastewaters. The Agency is today proposing concentration-based treatment standards for nonwastewater TC organic wastes based on existing treatment data that were used to establish treatment standards for these same constituents in listed wastes. The proposed standards are presented at the end of this section. The treatment

standards proposed today are at the same levels as those proposed as universal standards in a separate part of today's rule.

The concentration-based treatment standards being proposed are primarily based on incineration data. The Agency believes, however, these proposed treatment standards can also be met by a number of other treatment technologies. (See discussion in section III.A of this preamble for more information about these proposed treatment standards). In fact, the Agency has some data on the treatment of these constituents by innovative technologies (i.e., solvent extraction, thermal desorption) that support the levels being proposed today.

The treatment technologies typically used for organic nonwastewaters (e.g., incineration, thermal desorption, solvent extraction) tend to destroy or extract the organics to a highly efficient degree. Thus, setting standards based on these treatment data may result in hazardous constituents being removed from the waste before disposal.

The *Third Third Case* directs EPA to ensure that the hazardous constituents in characteristic waste are adequately treated. Many TC organic nonwastewaters contain hazardous constituents in addition to those constituents which caused the waste to be identified as a hazardous TC waste; for example, a waste which is classified as TC hazardous waste because of its benzene concentration may also contain lead at levels of concern although not characteristically hazardous for lead, or may contain non-TC hazardous constituents. (Standards for these hazardous constituents would also be based on the universal treatment standards, since these are virtually identical to standards for F039, the basis for the standards included in the May 10 emergency interim final rule).

PROPOSED BDAT STANDARDS FOR TC ORGANIC WASTES

[Nonwastewaters]

Code	Regulated constituent	Maximum for any single grab sample: Total composition (mg/kg)
D018	Benzene	10
D019	Carbon tetrachloride.	6.0
D020	Chlordane	0.26
D021	Chlorobenzene	6.0
D022	Chloroform	6.0
D023	o-Cresol	5.6
D024	m-Cresol	3.2
D025	p-Cresol	3.2
D026	Cresol	8.8

PROPOSED BDAT STANDARDS FOR TC ORGANIC WASTES—Continued

[Nonwastewaters]

Code	Regulated constituent	Maximum for any single grab sample: Total composition (mg/kg)
D027	1,4-Dichlorobenzene	6.0
D028	1,2-Dichloroethane	6.0
D029	qxl1,1-Dichloroethylene.	6.0
D030	2,4-Dinitrotoluene	140
D031	Heptachlor	0.066
D031	Heptachlor epoxide.	0.066
D032	Hexachlorobenzene	10
D033	Hexachloro-1,3-butadiene.	5.6
D034	Hexachloroethane	30
D035	Methyl ethyl ketone	36
D036	Nitrobenzene	14
D037	Pentachlorophenol	7.4
D038	Pyridine	16
D039	Tetrachloroethylene	6.0
D040	Trichloroethy- lene	6.0
D041	2,4,5-Trichlorophenol	7.4
D042	2,4,6-Trichlorophenol	7.4
D043	Vinyl Chloride	6.0

b. Wastewaters. In today's notice, EPA is proposing treatment standards for newly identified TC wastewaters that are managed in systems other than those regulated under the CWA, those regulated under the SDWA that inject TC wastewaters into Class I injection wells, and those zero discharge facilities that engage in CWA-equivalent treatment prior to land disposal. The proposed treatment standards for newly identified TC wastewaters would require treatment to meet the universal treatment standards for the TC constituent and for the underlying hazardous constituents.

BDAT STANDARDS FOR TC ORGANICS

[Wastewaters]

Constituent	Maximum for any single grab sample: Total composition (mg/l)
D018—Benzene	0.014
D019—Carbon tetrachloride	0.057
D020—Chlordane	0.0033
D021—Chlorobenzene	0.057
D022—Chloroform	0.046
D023—o-Cresol	0.11
D024—m-Cresol	0.77
D025—p-Cresol	0.77
D026—Cresol	0.88
D027—1,4-Dichlorobenzene	0.09
D028—1,2-Dichloroethane	0.21
D029—1,1-Dichloroethylene	0.025
D030—2,4-Dinitrotol- uene	0.32
D031—Heptachlor	0.0012
D031—Heptachlor epoxide	0.016
D032—Hexachlorobenzene	0.055
D033—Hexachloro-1,3-butadiene	0.055
D034—Hexachaloroethane	0.055
D035—Methyl ethyl ketone	0.28
D036—Nitrobenzene	0.068
D037—Pentachlorophenol	0.089
D038—Pyridine	0.014
D039—Tetrachloroethylene	0.056
D040—Trichloroethylene	0.054
D041—2,4,5-Trichlorophenol	0.18
D042—2,4,6-Trichlorophenol	0.035
D043—Vinyl Chloride	0.27

2. Radioactive Mixed Waste

Radioactive mixed wastes are those wastes that satisfy the definition of radioactive waste subject to the Atomic Energy Act (AEA) that also contain waste that is either listed as a hazardous waste in subpart D of 40 CFR part 261, or that exhibit any of the hazardous waste characteristics identified in subpart C of 40 CFR part 261. Since the hazardous portions of the mixed waste are subject to RCRA, the land disposal restrictions apply. This means that the RCRA hazardous portion of all mixed waste must meet the appropriate treatment standards for all applicable waste codes before land disposal. In the case of these organic TC wastes, any radioactive waste mixed with organic TC wastes that are managed in non-CWA/non-CWA-equivalent/non-Class I SDWA facilities would have to meet the

promulgated treatment standards for the TC waste.

For the most part, the low concentrations of radioactive compounds should not interfere with the treatability of the hazardous constituents in the waste. Therefore, the standards being proposed for TC wastes are also being proposed for TC radioactive mixed wastes. The Agency is requesting data where this is not the case. The Department of Energy (DOE) has expressed some concerns about meeting certain treatment standards. DOE is currently collecting data from their facilities on mixed TC wastes. They are welcome to submit these data as part of this rulemaking, and the data will be placed in the RCRA docket for public review. The EPA will analyze these data along with all other data received on TC wastes, and consider them in promulgating final treatment standards.

D. Treatment Standards for TC Pesticide Wastes (D012–D017)

D012—Endrin
D013—Lindane
D014—Methoxychlor
D015—Toxaphene
D016—2,4-D
D017—2,4,5-TP (Silvex)

In the final rule for the Third Third wastes (55 FR 22520), EPA promulgated treatment standards for D012–D017 wastes, but only for those wastes that were hazardous by both the TCLP and the EP leaching procedures. Wastes that were not hazardous by the EP leaching procedure, but hazardous by the TCLP, are newly identified D012–D017 wastes and are currently not prohibited. EPA is proposing treatment standards for D012–D017 wastes managed in non-CWA/non-CWA-equivalent/non-Class I SDWA facilities in this notice. EPA is also proposing revised treatment standards for pesticide wastewaters, as explained below.

1. Newly Identified Pesticide Nonwastewaters

There is no reason to think these wastes cannot meet the existing treatment standards for D012–D017 nonwastewaters (55 FR 22554). Therefore, EPA is proposing that the existing treatment standards apply to newly identified D012–D017 nonwastewaters. (It should be noted that EPA determined that the amount of D012–D017 waste subject to the treatment standards is very small. 55 FR at 22634, 22646. Based on this determination, it is very unlikely that newly identified D012–D017 are being generated).

The Agency is also proposing to prohibit dilution of D012 and D017 nonwastewaters injected into Class I deep injection wells. If this prohibition on dilution before Class I injection is promulgated, these pesticide wastes must be treated to meet the treatment standards before they can permissibly be injected into such units, unless that unit has been granted a no-migration determination. See section IV.E which follows for more discussion on the proposed dilution prohibition for these and certain ignitable wastes.

2. Pesticide Wastewaters

EPA set treatment standards expressed as required methods of treatment for the EP toxic pesticide wastewaters in the Third Third final rule (55 FR 22554). EPA is not proposing to revise the treatment standards for pesticide wastewaters in today's rule. (See 268.40)

PROPOSED BDAT STANDARDS FOR PESTICIDES

[Nonwastewaters]

Code	Regulated constituent	Maximum for any single grab sample: Total composition (mg/kg)
D012	Endrin	.13
D013	alpha-BHC	.066
D013	beta-BHC	.066
D013	gamma-BHC	.066
D013	delta-BHC	.066
D014	Methoxychlor	.18
D015	Toxaphene	2.6
D016	2,4-D	10
D017	2,4,5-TP (Silvex)	7.9

E. Proposed Exemptions for De Minimis Losses of TC Wastes and for TC Laboratory Wastes Discharged to CWA Wastewater Treatment

The Agency is proposing to extend the exemptions established in the May 24, 1993 emergency interim final rule to TC organic wastes (58 FR 29860). Thus *de minimis* losses of TC organic wastes and TC organic laboratory wastes discharged to CWA wastewater treatment systems would not be subject to the requirements of 40 CFR part 268. (See proposed § 268.1 in today's rule.)

V. Deep Well Injection Issues

A. Prohibition of Dilution of High TOC Ignitable and of TC Pesticide Wastes Injected Into Class I Deep Wells

In the Third Third rule, EPA determined that decharacterized wastes could permissibly be injected in Safe Drinking Water Act Class I nonhazardous deep injection wells (wells that dispose of wastewaters deep below the lowermost underground source of drinking water) without first being treated to meet the treatment standard for the waste. See 55 FR at 22658 and § 268.1(c)(3). EPA indicated that so long as wastes that exhibit a characteristic at the point they are generated no longer exhibit a characteristic when disposed in a Class I deep injection well, they are not prohibited from land disposal. EPA took that position because the Agency believed that the deep injection of such wastewaters was an environmentally sound and technically effective waste management practice, and consequently that disposal of decharacterized wastes in Class I deep injection wells would not pose hazards to drinking water or to human health. *Id.*

As described previously, this determination was remanded by the D.C. Circuit. The court said, in essence, that not only must characteristic wastes be treated to destroy or remove hazardous constituents before land disposal, but that no deviation from this principle (pursuant to RCRA section 1006) was acceptable for underground injection practices because these practices were a type of permanent land disposal (as opposed to temporary land disposal incident to treatment in units that are part of Clean Water Act treatment systems). 976 F.2d at 25–6. Although the Agency is still evaluating its interpretation of this part of the opinion, the Agency has indicated (at least initially) that the most likely reading is that the available alternatives for decharacterized wastes being injected in Class I nonhazardous deep wells is for either these wastes to be treated to meet the treatment standard before injection (which option may involve segregation of wastes exhibiting characteristics at the point they are generated), or apply for and obtain a no-migration variance for the injection well. See 58 FR 4972, January 19, 1993 and 58 FR 29860, May 24, 1993. The treatment standards that apply to these wastes are found in the proposed treatment table found at § 268.40 of this rule. For D001 High TOC ignitables, the treatment standard is expressed as methods of treatment that must be used prior to land disposal: Fuel substitution,

solvent recovery or incineration. The treatment standards for EP pesticide wastewaters are also expressed as methods: Biodegradation or incineration. The treatment standards for EP pesticide nonwastewaters are expressed as levels that may be achieved by using any treatment technology.

EPA is proposing today to exclude two types of wastes from the portion of the rule (§ 268.1(c)(3)) that allows the waste to be injected into a Class I deep injection well if it no longer exhibits a characteristic when it is injected. The two types of waste are nonwastewaters that at the point of generation exhibit the characteristic of ignitability and contain greater than 10 percent Total Organic Carbon ("high TOC ignitable liquids subcategory") and TC toxic halogenated pesticide wastes (D012–D017). The Agency is singling out these wastes not only because of the court's mandate in the *Third Third Case*, but because the Agency believes that treatment of these wastes is a preferred management approach for them. (Indeed, the Agency had already singled these wastes out from the exception that allowed dilution of characteristic wastes that were to be managed in Clean Water Act treatment systems including land disposal units, § 268.3(b) and 55 FR at 22657). High TOC ignitable nonwastewaters contain high concentrations of organics that can either be recovered directly for reuse, or that can be burned for energy recovery. Treatment, consequently, not only eliminates the hazardous constituents in these wastes but utilizes recoverable resources in the wastes. The prohibited pesticide wastes contain a number of particularly toxic hazardous constituents (such as toxaphene, 2,4-D, and (in some cases) dioxins and furans) that warrant destruction or removal before land disposal. See generally 55 FR at 22657 and the waste management hierarchy in RCRA section 1003(6).

In addition, these wastes are not injected in significant volumes, so that redirection of the wastes to treatment technologies will not have any significant impact on well operators. (Although the issue of adverse impact on injection practices is ultimately "irrelevant" to determining how to apply prohibitions to underground injection practices, see 976 F. 2d at 26, the issue is relevant (at least to some extent) in determining how quickly EPA responds to the issues remanded by the court). In fact, as a worst case, the information the Agency gathered for the Third Third rulemaking indicated that a maximum of 6.9 million gallons of point of generation D001 ignitable wastes were injected in Class I nonhazardous deep injection wells annually. That same data set also indicated that all wastewaters which exhibit the toxicity characteristic for halogenated pesticide content (D012–D017) at the point they are generated totaled approximately 15 million gallons annually. The most recent information used for capacity determination in this proposed rule indicate that these injected volumes are, in fact, much lower. However, even the largest potential volumes are relatively small for Class I underground injection well waste streams.

EPA is not proposing to grant a national capacity variance for either of these waste types. There is approximately one-half million tons (i.e., approximately 120 million gallons) of available alternative treatment capacity for these liquid wastes. This treatment capacity is large compared to even the largest potential injected waste volumes; however, a three month capacity variance is proposed for the other wastes included in this proposed rule, in order that generators have time to locate and arrange for treatment of their wastes (see section XII for more information about capacity variances). This three-month variance would also apply to the prohibition of dilution of high TOC ignitable and TC pesticide wastes when they are injected into Class I wells.

The Agency is requesting any and all information regarding volumes, facilities, and properties of these wastes being injected in Class I nonhazardous deep wells in order to make a final determination on these issues.

B. Request for Comment on Petition From Chemical Manufacturer's Association Regarding Deep Well Injection of Ignitable and Corrosive Characteristic Wastes

In the May 24, 1993 interim final rule for ignitable and corrosive wastes managed in other than wastewater treatment systems whose ultimate discharge is subject to the CWA, in other than Class I underground injection wells subject to the SDWA UIC program, and by zero dischargers who do not treat wastewater with treatment equivalent to that utilized by CWA dischargers, the Agency discussed plans for future rulemakings covering those ignitable and corrosive wastes disposed in such units. As part of its response to May 24 interim final rule, the Chemical Manufacturers' Association (CMA) requested that the Agency develop treatment standards intended for those wastes disposed in Class I deep injection wells. CMA specifically requested the Agency to promulgate treatment standards for ignitable and corrosive wastes managed by deep well injection that, in view of the unique circumstances of deep well injection, meet the statutory "minimize threats" standard. Consequently, the Agency has placed CMA's petition in the docket and is soliciting comment on the petition.

VI. Treatment Standards for Newly Listed Wastes

A. Treatment Standards for Coke By-Product Production Wastes

K141—Process residues from the recovery of coal tar, including but not limited to tar collecting sump residues from the production of coke from coal or the recovery of coke by-products produced from coal. This listing does not include K087, decanter tank tar sludge from coking operations.

K142—Tar storage tank residues from the production of coke from coal or the recovery of coke by-products produced from coal.

K143—Process residues from the recovery of light oil, including but not limited to those generated in stills, decanters, and wash oil recovery units from the recovery of coke by-products produced from coal.

K144—Wastewater treatment sludges from light oil refining, including but not limited to intercepting or contamination sump sludges from the recovery of coke by-products produced from coal.

K145—Residues from naphthalene collection and recovery operations from the recovery of coke by-products produced from coal.

K147—Tar storage tank residues from coal tar refining.

K148—Residues from coal tar distillation, including but not limited to still bottoms.

The Agency recently promulgated the listing of K141, K142, K143, K144, K145, K147, and K148 as hazardous wastes (August 18, 1992 (57 FR 37284)). These seven wastes are generated in the production, recovery, and refining of coke and coke by-products produced from coal. EPA estimates that there are approximately thirty-four facilities in the United States generating these wastes. Greater details on the description and generation of these wastes can be found in the listing rule and in the technical background document supporting that rule.

The final listing rule also describes certain recycling scenarios in which these materials are excluded from the definition of solid wastes (i.e., they are not listed as K141, K142, K143, K144, K145, K147, and K148). This occurs when these materials are recycled in one of three ways: Combined with coal feedstock residue as it is charged into the coke oven; added to the tar recovery process; or mixed with coal tar before this coal tar is sold as a product or further refined. See 57 FR 37285, 37297–37299 (August 18, 1992) for specific details of these conditions.

Under such conditions, since they are not the listed wastes, the proposed land disposal restrictions in today's rule for K141–K145, K147, and K148 would not apply.

1. Proposed Treatment Standards

In general, these waste streams consist primarily of organics with a minimum amount of water. Many are quite viscous and have the consistency of semisolids or sludges. With respect to hazardous organics, these wastes typically contain thousands of ppm of polynuclear aromatic compounds and hundreds of ppm of phenols, benzenes, and other single-ring aromatic compounds.

Because of their highly organic nature, EPA has determined that thermal destruction technologies, such as incineration or fuel substitution, represent BDAT for these wastes. While extraction technologies, such as thermal desorption and critical fluid extraction, appear to be potentially applicable, EPA currently lacks data verifying their performance on wastes similar to K141, K142, K143, K144, K145, K147, and K148. If these technologies can achieve the levels of performance (i.e., comply with the concentrations) of the proposed treatment standards, they could also be considered to be BDAT.

While most of these wastes, as generated, would be classified as "nonwastewaters" according to definitions applicable to the land disposal restrictions (40 CFR 268.2 (d) and (f)), EPA nevertheless sets treatment standards for wastewater forms as well as nonwastewater forms of these wastes on a waste code-basis. Even though the listing of these seven wastes does not specifically include wastewaters, if water or wastewater comes in contact with these wastes (such as during storage, treatment, or disposal), a wastewater form of these wastes would be generated that would have to comply with the treatment standards (provided the waste was to be placed in a land disposal unit).

As a result, EPA is proposing treatment standards for both wastewater and nonwastewater forms of K141, K142, K143, K144, K145, K147, and K148 wastes which are numerically equivalent to the universal standards proposed for the constituents selected for regulation in these wastes. The development of these standards is presented in the BDAT background document for these wastes located in the administrative docket for today's rule. EPA is proposing maximum concentration limits for benzene, naphthalene, and six polynuclear organics in both wastewaters and nonwastewaters. The tables at the end of this section list, by waste form, the proposed standards for each constituent and indicate the constituents that are regulated in each waste code. The proposed nonwastewater standards are based on the limits of analytical detection of these eight compounds in incineration ash residues. EPA has data from the incineration of fourteen vastly different, difficult to treat hazardous wastes indicating that these standards should be achievable on a routine basis for most hazardous wastes. The proposed wastewater standards reflect the performance of industrial wastewater treatment systems as documented in several of EPA's Office of Water and Risk Reduction Engineering Laboratory databases and presented in Volume C of the Final BDAT Background Document for U and P Wastes and Multi-Source Leachate available in the Third Third rulemaking docket.

2. Potential Future Revisions to Treatment Standards for Existing Coking Wastes K087, K060, and K035

In response to the rulemaking for Third Third wastes, the Hazardous Waste Treatment Council submitted data that they believe indicate that treatment standards for certain constituents (e.g., benzene) in other coking wastes, namely K087, K060, and K035, cannot be achieved on a regular basis in ash residues from the incineration of other types of hazardous wastes. (Note: The proposed nonwastewater standard for benzene in K141, K142, K143, K144, K145, K147, and K148 in today's rule is not transferred from K087, K060, or K035). The Agency agrees that when K087, K060, and K035 nonwastewaters are commingled with other wastes prior to treatment (such as the new coking wastes) the promulgated standards for those nonwastewaters may not always be achievable (primarily the benzene nonwastewater standard for K087 and K060). The Agency has not, however, received any requests for a treatability variance for any of these three wastes (i.e., K087, K060, and K035) nor has it been notified that any particular generator has had a problem complying with the standards. EPA believes that this is primarily because these wastes are no longer generated or generate no residues when treated, and there is, therefore, no demand for treatment. The Agency is, nevertheless, soliciting comment from generators on whether they have been unable to get their K087, K060, and K035 wastes treated because treatment standards could not be achieved or verified. The Agency requests any additional comment or information that would assist in determining whether the standards for these three wastes need to be revised.

PROPOSED BDAT STANDARDS FOR K141, K142, K143, K144, K145, K147, AND K148

[Nonwastewaters]

Constituent	Maximum for any single grab sample	Constituents regulated for waste codes						
	Total composition (mg/kg)	K141	K142	K143	K144	K145	K147	K148
Benzene	10.0	X	X	X	X	X	X	
Benz(a)anthracene	3.4	X	X	X	X	X	X	X
Benzo(a)pyrene	3.4	X	X	X	X	X	X	X
Benzo(b)fluoranthene [1]	6.8	X	X	X	X		X	X
Benzo(k)fluoranthene [1]	6.8	X	X	X	X		X	X
Chrysene	3.4	X	X	X	X	X	X	X
Dibenz(a,h)anthracene	8.2	X	X		X	X	X	X
Indeno(1,2,3-cd)pyrene	3.4	X	X				X	X
Naphthalene	5.6					X		

[1] This standard represents the sum of the concentrations for each of this pair of constituents.

PROPOSED BDAT STANDARDS FOR K141, K142, K143, K144, K145, K147, AND K148

[Wastewaters]

Constituent	Maximum for any single grab sample	Constituents regulated for waste codes						
	Total composition (mg/l)	K141	K142	K143	K144	K145	K147	K148
Benzene	0.14	X	X	X	X	X	X	
Benz(a)anthracene	0.059	X	X	X	X	X	X	
Benzo(a)pyrene	0.061	X	X	X	X	X	X	X
Benzo(b)fluoranthene	[1]0.11	X	X	X	X		X	X
Benzo(k)fluoranthene	[1]0.11	X	X	X	X		X	X
Chrysene	0.059	X	X	X	X	X	X	X
Dibenz(a,h)anthracene	0.055	X	X		X	X	X	X
Indeno(1,2,3-cd)pyrene	0.0055	X	X				X	X
Naphthalene	0.059					X		

[1] This standard represents the sum of the concentrations for each of this pair of constituents.

B. Treatment Standards for Chlorotoluenes

K149—Distillation bottoms from the production of alpha (methyl) chlorinated toluenes, ring-chlorinated toluenes, benzoyl chlorides, and compounds with mixtures of these functional groups. (This waste does not include still bottoms from the distillation of benzyl chloride.)

K150—Organic residuals, excluding spent carbon adsorbent, from the spent chlorine gas and hydrochloric acid recovery processes associated with the production of alpha (methyl) chlorinated toluenes, ring-chlorinated toluenes, benzoyl chlorides, and compounds with mixtures of these functional groups.

K151—Wastewater treatment sludges, excluding neutralization and biological sludges, generated during the treatment of wastewaters from the production of alpha (methyl) chlorinated toluenes, ring-chlorinated toluenes, benzoyl chlorides and compounds with mixtures of these functional groups.

The Agency recently promulgated the listing of K149, K150, and K151 as hazardous wastes on October 15, 1992 (57 FR 47377). These three wastes are generated in the production of chlorinated toluenes and include both ring-chlorinated toluenes (where the chlorine atoms are attached to the aromatic ring) and methyl-chlorinated toluenes (where the chlorine atoms are attached to toluene's methyl moiety). EPA estimates that there are four facilities in the United States generating these wastes. Greater details on the description and generation of these wastes can be found in the final listing rule and in the technical background document supporting that rule.

K149 and K150 waste streams are typically generated as organic liquids. Any aqueous phase that may be present in these streams is expected to be extremely acidic; therefore, both streams could potentially be hazardous by the characteristic of corrosivity (i.e., D002). With respect to hazardous organics, both of these wastes contain thousands of ppm of chlorinated aromatic and chlorinated aliphatic compounds. In fact, K149 wastes can contain up to 10 percent benzotrichloride. K151 wastes include a variety of solid and semisolid streams including sludges and skimmings from various separation units. K151 can contain up to 3 percent toluene and lesser concentrations of chlorinated aliphatics, chlorinated aromatics, and benzene.

Because of their highly organic nature, EPA has determined that thermal destruction technologies, such as incineration or fuel substitution, represent BDAT for K149 and K150. In a similar manner, since K151 wastes may contain significant concentrations of hazardous organics and since K151 wastes comprise a variety of waste matrices, EPA has determined that incineration also represents BDAT for these wastes. While extraction technologies, such as thermal desorption and critical fluid extraction, appear to be potentially applicable to some K151 wastes, EPA currently lacks data verifying their performance on wastes similar to these K151 wastes. If these technologies can achieve the levels of performance (i.e., comply with the concentrations) of the proposed treatment standards, they could also be considered to be BDAT.

While most of these wastes, as generated, would be classified as "nonwastewaters" according to definitions applicable to the land disposal restrictions (40 CFR 268.2 (d) and (f)), EPA nevertheless sets treatment standards for wastewater forms as well as nonwastewater forms of these wastes on a waste code-basis. Even though the listing of these three wastes does not specifically include wastewaters, if water or wastewater comes in contact with these wastes (such as during storage, treatment, or disposal), a wastewater form of these would be generated that would have to comply with the treatment standards (provided the waste was to be placed in a land disposal unit.)

As a result, EPA is proposing treatment standards for both wastewater and nonwastewater forms of K149, K150, and K151 wastes which are numerically equivalent to the universal standards proposed for the constituents selected for regulation in these wastes. The development of these standards is presented in the BDAT background document for these wastes located in the administrative docket for today's rule. EPA is proposing maximum concentration limits for benzene, toluene, five chlorinated aliphatics, and six chlorinated aromatics in both wastewater and nonwastewater forms of these wastes. The tables at the end of this section list, by waste form, the proposed standards for each constituent and indicate the constituents that are regulated in each waste code. The proposed nonwastewater standards are based on the limits of analytical detection of these compounds in incineration ash residues. EPA has data from the incineration of fourteen vastly different, difficult to treat hazardous wastes indicating that these standards should be achievable on a routine basis for most hazardous wastes. The proposed wastewater standards reflect the performance of industrial wastewater treatment systems as documented in several of EPA's Office of Water and Risk Reduction Engineering Laboratory databases and presented in Volume C of the Final BDAT Background Document for U and P Wastes and Multi-Source Leachate available in the Third Third rulemaking docket.

PROPOSED BDAT STANDARDS FOR K149, K150, AND K151

[Nonwastewaters]

Constituent	Maximum for any single grab sample	Constituents regulated for waste codes		
	Total composition (mg/kg)	K149	K150	K151
Benzene	10			X
Carbon tetrachloride	6.0		X	X
Chloroform	6.0	X	X	X
Chloromethane	30	X	X	
Chlorobenzene	6.0	X		
1,4-Dichlorobenzene	6.0	X	X	
Hexachlorobenzene	10	X	X	X
Pentachlorobenzene	10	X	X	X
1,2,4,5-Tetrachlorobenzene	14	X	X	X
1,1,2,2-Tetrachloroethane	6.0		X	
Tetrachloroethylene	6.0		X	X
1,2,4-Trichlorobenzene	19		X	
Toluene	10	X		X

PROPOSED BDAT STANDARDS FOR K149, K150, AND K151

[Wastewaters]

Constituent	Maximum for any single grab sample	Constituents regulated for waste codes		
	Total composition (mg/l)	K149	K150	K151
Benzene	0.14			X
Carbon tetrachloride	0.057		X	X
Chloroform	0.046	X	X	X
Chloromethane	0.19	X	X	
Chlorobenzene	0.057	X		
1,4-Dichlorobenzene	0.090	X	X	
Hexachlorobenzene	0.055	X	X	X
Pentachlorobenzene	0.055	X	X	X
1,2,4,5-Tetrachlorobenzene	0.055	X	X	X
1,1,2,2-Tetrachloroethane	0.057		X	
Tetrachloroethylene	0.056		X	X
1,2,4-Trichlorobenzene	0.055		X	
Toluene	0.080	X		X

VII. Treatment Standards for Hazardous Soils

A. Introduction

This section discusses proposed alternative treatment standards for hazardous soils that may be met instead of the treatment standards that currently apply to the contaminating hazardous wastes. These proposed alternative standards would apply to soils that contain listed hazardous wastes, and soils that exhibit any of the characteristics of hazardous waste.

In particular, EPA is proposing two alternative technology-based treatment approaches for compliance with the hazardous soil treatment standards and also soliciting comment on variations of these alternate approaches. It should be understood that the Agency is also in the process of developing a proposed rule for contaminated media (including soil) in the context of the Hazardous Waste Identification Rule. As a result of that effort, the Agency may propose additional regulatory options for LDR treatment standards for hazardous soils, or modify the options presented here in order to establish a consistent regulatory framework for hazardous soils under RCRA.

Today's proposal is important in several respects. First, it continues the process of developing tailored standards, such as the previously promulgated treatment standards tailored to multi-source leachate and to hazardous debris. Because today's proposed treatment standards are tailored to contaminated soil media, this proposal would primarily affect activities associated with cleanup and consequent waste management at contaminated facilities and sites.

Second and more important, the treatment standards proposed today are based on levels attainable by a variety of technologies, including innovative technologies. Thus, technologies that are more appropriate for the treatment of hazardous soils than combustion are identified as BDAT.

In addition, EPA is proposing to codify the contained-in policy for soils (as it did for debris in the Phase I LDR rule, see 57 FR 37194, August 18, 1992.) The regulation would establish a process for determining on a site-specific basis whether or not environmental media (e.g., soil and ground water) "contain" a hazardous waste.

B. Applicability, Regulatory Status of Treated Soils, and Definitions

1. Applicability

Under current regulations, land disposal of soils that contain a prohibited listed hazardous waste, or that exhibit a prohibited characteristic of hazardous waste, is prohibited unless such soils have been treated to meet the treatment standards promulgated for that hazardous waste (i.e., the same treatment standard the waste would have to meet if it was newly generated rather than found in the soil matrix.) Today's rule proposes alternative treatment standards that are specific to hazardous soils. This continues the process of developing treatment standards tailored to specific types of hazardous wastes associated with remediation activities. The Agency thus has promulgated treatment standards specific to multi-source leachate and for hazardous debris.

2. Regulatory Status of Treated Soils

Under this proposal, treatment of soils to meet the proposed treatment standards may or may not affect the regulatory status of the soils under RCRA subtitle C, depending on whether the soil is contaminated with listed waste or displays a hazardous characteristic, or upon a site-specific determination that the soil no longer contains hazardous waste (see section 3 below). Treatment of hazardous soils to meet the proposed treatment standards would not, of itself, determine whether the soils would remain a hazardous waste. However, treatment to meet the proposed treatment standards may, in some cases, achieve the result that the soil is no longer hazardous based on separate regulatory determinations.

It is not possible to predict at this time precisely how, or if, the Agency may exempt certain hazardous soils from subtitle C in future actions, or how those exemptions (if such exemptions are developed) might compare with the LDR treatment standards proposed here for hazardous soils. If, however, the final exemption levels were at or above the LDR treatment standards and represented minimize threat levels, treatment standards would be capped at those levels, and the wastes also would no longer be subject to any other subtitle C control.

3. "Contained-in" Determinations

The Agency's "contained-in" policy says that environmental media such as soil or ground water that is contaminated with hazardous waste must be managed as the hazardous waste until the waste is separated from the media so that it no longer "contains" the hazardous waste. EPA is proposing in this notice to codify the contained-in policy for environmental media. The codification will provide a mechanism for determining when environmental media (e.g., soil, ground water) no longer "contain" listed hazardous wastes, and thus, are no longer subject to subtitle C regulation.

As proposed today, these contained-in determinations will be made by the EPA Regional Administrator or designee on a site-specific basis, considering factors such as exposure potential and contaminant characteristics (e.g., concentrations, mobility, persistence). Management scenarios for the contaminated media (e.g., disposal in a lined landfill) would not be a factor in making contained-in determinations. However, contained-in determinations could constitute "minimize threat" levels at a particular site. Thus, for a particular site, contained-in levels could function as a cap for LDR treatment standards.

4. Definitions

EPA is proposing a definition for hazardous soil, and identifying the constituents subject to treatment for hazardous soil. Soil is unconsolidated earth material composing the superficial geologic strata (material overlying bedrock), consisting of clay, silt, sand, or gravel size particles (sizes as classified by the U.S. Soil Conservation Service), or a mixture of such materials with liquids, sludges, or solids which is inseparable by simple mechanical removal processes and is made up primarily of soil. Cf. 57 FR at 37224 (August 18, 1992) where EPA adopted a similar classification scheme for debris.

This proposed definition would allow site managers (e.g., on-scene coordinators, remedial project managers, or equivalent corrective action officials) to determine whether the material to be excavated is waste, debris, or soil by judging the results of simple in-situ mechanical removal processes to separate the materials. Such processes include pumping, dredging, or excavation by backhoe, forklifts, or other devices. Of course, any non-soil that is separated is subject to the treatment standard for that material. *Id.* In addition, any intentional mixing of soil with non-soil does not result in the mixture being classified as soil. Rather, it is a type of impermissible dilution. *Id.* and *id.* at 37243.

This approach would avoid requiring chemical analysis for soil properties in order to differentiate precisely between waste, soil and debris (e.g., considering such things as soil particle size, elemental composition of the soil, or other properties that might distinguish soil from waste or debris). Attempting to distinguish more precisely between waste, soil, or debris using a chemical analysis or other tests would be difficult to develop and support, and cumbersome to administer. In addition, a basis for chemical analysis or other tests has not been developed, and implementation of any such approach would most likely not be beneficial, but rather simply delay the progress of remedial actions. The Agency specifically solicits comment on the definition proposed for soil and this type of pragmatic approach for classifying mixtures of soil and other materials. (As noted in a following section, however, adding soil to other materials to attempt to reclassify the mixture as "hazardous soil" is a form of impermissible dilution and is illegal under the LDR program.)

a. Hazardous soil. Hazardous soil is soil that contains RCRA hazardous waste(s) listed in 40 CFR part 261, subpart D, or soil that exhibits one or more of the characteristics of a hazardous waste defined in 40 CFR part 261, subpart C. It can be generated from a wide variety of activities, including remedial actions at Superfund and RCRA corrective action sites, and spills at manufacturing plants. It should be noted that in the Advance Notice of Proposed Rulemaking (ANPRM) published on October 24, 1991 (see 56 FR 55160 at 55172), EPA suggested that soils containing listed hazardous wastes and soils that exhibit one or more of the hazardous characteristics be defined as "contaminated soil." Many commenters to the ANPRM were confused as to the scope of the definition. They felt that the definition suggested in the ANPRM included not only hazardous soils but all soils contaminated with any toxic constituents. To clarify this point, the Agency is changing the term used to refer to soils subject to regulation from "contaminated soil" to "hazardous soil."

b. Constituents subject to treatment. Under today's proposed approach, hazardous soil would be treated for each constituent subject to treatment, regardless of whether the contaminating waste is a listed or characteristic waste. The Agency is proposing to define constituents subject to treatment as any regulated constituent found on Table UTS in today's proposed § 268.48, that is present at levels above the universal constituent-specific treatment standards. The constituents in Table UTS are all of the BDAT list hazardous constituents that can be analyzed. As with multi-source leachate, hazardous

soil can contain potentially all of these constituents. See, e.g., 55 FR at 22619–620 (June 1, 1990). Of course, not every soil will contain all of these constituents, and EPA is not proposing that soils necessarily be monitored for the entire list of hazardous constituents. (See section VII.A.) However, a scheme that limited treatment only to the hazardous constituents in the listed waste or the TC constituent contaminating the soil would usually overlook the reality of the situation: Soils (like multi-source leachates) frequently are contaminated with an enormous variety of contaminants from diverse sources. A treatment scheme that ignored this reality would not fulfill the requirement of section 3004(m) of RCRA that the hazardous constituents present in prohibited wastes be treated so as to minimize threats to human health and the environment. See also *Third Third Case*, 976 F.2d at 16 (treatment must remove or destroy the hazardous constituents in prohibited wastes in order to satisfy section 3004(m), and merely removing one indicia of hazardousness is insufficient to satisfy this requirement). For soil which is hazardous because it exhibits the characteristics of ignitability, corrosivity, or reactivity, the Agency would require treatment until the soil no longer exhibits the characteristic and also requires that the numerical treatment standards be met for all constituents subject to treatment.

c. Illegal contamination of soil. As noted above, illegal contamination of soil is the deliberate addition of hazardous constituents or hazardous waste to soil (or vice versa). The Agency believes that existing regulations concerning impermissible dilution (40 CFR 268.3 (a) and (b)) already make this conduct illegal, and subject the mixture to the most stringent treatment standard for any waste in the mixture (40 CFR 268.41(b)). The Agency acknowledges, however, that the promulgation of standards for hazardous soil which are less stringent than the treatment standards that apply to hazardous waste may create an incentive to illegally mix waste with soil.

Because such action would be illegal, the Agency believes that most generators of hazardous waste will not mix prohibited hazardous waste with soil. Specifically, section 3008(a) of RCRA provides EPA the authority to issue an order assessing a civil penalty against any person who violates any requirement of subtitle C of RCRA. Criminal penalties may also apply. EPA requests comment on whether any further safeguards are needed, however, to assure that no attempts are made to dilute hazardous waste with soil.

d. Nonanalyzable constituents. Hazardous soils are often contaminated with more than one hazardous constituent, many of which have analytical methods available while others do not. For soils containing multiple organic constituents, some of which are nonanalyzable, the Agency believes that treatment of the analyzable constituents to meet the soil treatment standards should provide adequate treatment of any nonanalyzable constituents to appropriate levels. The Agency is therefore not proposing treatment standards for nonanalyzable constituents found in such hazardous soil. The Agency requests comment on this approach as well as data on the degree to which nonanalyzable constituents are treated when the soil is treated for other organic constituents. If EPA should choose, based on public comments, to regulate these constituents, it could require treatment by specific technologies known to achieve adequate treatment of the constituent. If this is determined to be necessary, EPA could publish performance standards for the specified technologies with the promulgation of this regulation.

In other cases, a hazardous soil may be contaminated solely by nonanalyzable constituents, such as nonanalyzable U or P wastes. For these soils, the Agency proposes requiring treatment by the methods specified in § 268.42 for those U or P wastes. The Agency solicits comment on whether other technologies should be allowed for treatment of such soils.

EPA points out that in proposing to exempt certain wastes from subtitle C control (see 57 FR at 21469, May 29, 1992), the Agency did not allow wastes that contained nonanalyzable constituents to qualify for the generic exemption. The Agency has not yet finally determined whether such wastes will be available for the generic exemption, and whether hazardous soils should be addressed differently than wastes.

C. Proposed Approaches for Establishing Treatment Standards for Hazardous Soils

In developing an LDR program for hazardous soil, the Agency had a primary objective: The treatment standards should be appropriate for soil. The technology-based soil standards thus should not be based exclusively on incineration. See 55 FR at 8760–61 (March 8, 1990). Innovative technologies are particularly appropriate to treat the large volumes of low and moderately contaminated soil.

To satisfy this objective, the Agency is proposing two approaches it believes are achievable (in most cases) using innovative technologies, and is soliciting comment on a variation of one of the two options. The Agency solicits comments on which of the approaches should be promulgated in the final rule. Table UTS in today's proposal (§ 268.48) lists the constituents subject to treatment and the universal treatment standards which are the basis of the soil treatment standards.

1. Technology-Based Treatment Standards for Hazardous Soils

As indicated above, the Agency is considering several approaches for developing technology-based treatment standards for hazardous soils. Under these approaches, the universal treatment standards (discussed in section III.A of this preamble) are proposed for soil as "base" standards. Each approach allows for treatment to levels above the universal standards and differ primarily in the extent of treatment required.

Under the first approach, the Agency is proposing a range of standards with a "ceiling" one order of magnitude above the universal standard, provided 90% treatment of each constituent subject to treatment is achieved. The second approach is a variation of the first, in that the Agency is proposing a range of standards with a "ceiling" one order of magnitude above the universal standard, however, there is no requirement that 90% reduction occur. The third approach proposes an unlimited range of values above the universal standard provided 90% treatment is attained (i.e., there would be no "ceiling" value) unless 90% treatment would treat the waste to a level below the universal treatment standards. If such a level would be achieved through 90% treatment, the universal treatment standards would be met.

Analysis of the available soil treatability data has revealed that innovative technologies (e.g., thermal desorption, biological treatment, dechlorination) can generally achieve the universal standards proposed today. In several cases, however, non-combustion does not achieve the universal standards. Thus, the various approaches proposed today provide an additional assurance as to the achievability of meeting the treatment standards for potentially hard-to-treat soil matrices. Additionally, the proposed approaches would encourage the use of effective innovative (i.e. non-

incineration) technologies, a reasonable objective given EPA's determination that combustion is not always appropriate as the Best Demonstrated Available Technology for many soils. 55 FR at 8761.

Furthermore, the Agency believes these approaches are appropriate for setting treatment standards for hazardous soils, given the unique and often heterogeneous characteristics of soils. The proposed approaches accommodate possible limitations of the data: That is, the data may not represent potentially problematic matrices and varying contaminant levels. The proposed universal treatment standards are expressed as total concentration levels for each organic constituent. The proposed universal treatment standards for each metal constituent is expressed as a level measured in the TCLP extract, because metal treatment technologies typically involve stabilization or immobilization, and leachability and reduced mobility of the metals is best reflected in the concentrations in the TC extract (i.e., metals are not destroyed or eliminated after treatment with stabilization or immobilization technologies, but rather have reduced mobility.) Although metals recovery technologies are available, they are not generally practical for treating hazardous soil because of the relatively low levels of metal contamination typically found in soil (i.e., low relative to the concentrations necessary for economical metal recovery).

Soils that were contaminated with both organic and metal constituents would possibly require treatment by more than one technology. Generally, the first technology would treat the organic constituents (e.g., by thermal desorption) and the second technology would treat the metals (e.g., by stabilization).

Stabilization is typically not considered an effective treatment technology for organics; in addition, organics can interfere with the stabilization process. Nevertheless, difficulties can occur at those sites where metals are the constituents of concern, and where organic compounds are also present at concentrations only slightly greater than the universal standards. In this case, the generator or treater may consider treating the soil by stabilization without additional treatment for the organic constituents present. The data currently available to the Agency do not fully address the effectiveness of stabilization technologies for treatment of very low levels of specific organic constituents. Although not considered an appropriate treatment technology for organic constituents, the Agency requests comment on the practicality of using stabilization technologies for treating soil containing low levels of organic constituents. The Agency also requests that commenters provide analytical data demonstrating the effective treatment by stabilization of soil contaminated with organic constituents, if available.

a. Range of standards with a "Ceiling" one order of magnitude above the Universal Standard, provided 90% treatment occurs. Under this approach, EPA is proposing treatment standards for hazardous soil as a range of values. The base levels would correspond to the proposed universal standards, and the "ceiling" would be one order of magnitude above the universal levels. If the generator or treater of hazardous soil achieves a treatment standard above the universal level (but no higher than one order of magnitude above the universal standard, or the "ceiling"), they must document that at least 90% treatment of the constituent has been achieved by indicating the initial constituent concentration and the final constituent concentration. Such documentation would be placed in the generator's or facilities' files. (See proposed § 268.48.)

As concentrations increase in a hazardous soil, the percent treatment necessary to achieve at least the "ceiling" levels would also increase. For example, if the untreated concentration is one order of magnitude above the ceiling, achieving the ceiling level will require a 90% reduction of the constituent. As the initial concentration increases beyond an order of magnitude above the ceiling, reductions of greater than 90% would be needed in order to achieve the ceiling level. Thus, high initial concentrations would require high treatment efficiencies. For example, an initial concentration of 5,000 mg/kg of anthracene in hazardous soil would require a treatment efficiency of 99.3% to achieve the "ceiling" level of 34 mg/kg (anthracene universal standard = 3.4 mg/kg).

It could be argued that high initial concentrations requiring high treatment efficiencies would force treaters to select incineration and other high efficiency technologies. The Agency acknowledges that this may be the case with very high untreated concentrations. However, the Agency does not consider this a problem for three reasons: (1) Data indicate that relatively high treatment efficiencies are possible using some innovative technologies; (2) most hazardous soil is not highly contaminated and is well-suited to the use of innovative technologies; and, (3) when highly contaminated hazardous soils are encountered, the use of highly efficient technologies (i.e. incineration) may be appropriate. Thus, the Agency acknowledges that a highly contaminated hazardous soil may have to be treated with a fairly aggressive technology in order to achieve the "ceiling" value.

In analyzing the data, the Agency determined that a one order of magnitude "ceiling" was appropriate given the Agency's commitment to the increased use of innovative technologies. Although 65% of all data pairs for treated organics in EPA's database were treated using innovative technologies to levels less than the proposed universal standards, the proportion of data pairs capable of achieving the standard increased to 69% when the levels were established at the order of magnitude "ceiling" provided 90% treatment. Many innovative technologies were capable of achieving the treatment levels under this approach. The EPA solicits comment on this overall approach and also on whether the "ceiling" of ten times the universal standard (or other ceiling) appropriately addresses technical and environmental concerns where hazardous soils are heavily contaminated with toxic constituents and the 90% treatment portion of the option neither optimizes technology performance nor reduces hazardous constituents to levels at which threats are minimized.

b. Range of standards with a "ceiling" one order of magnitude above the universal standard. The Agency also requests comment on a variation of this approach: The order of magnitude increase over today's proposed universal standard would be the treatment standard. Under this option, the treater would be required to treat all constituents subject to treatment to levels at or below the ceiling, (i.e., the universal standard times ten), without consideration of treatment efficiency. In other words, the treater would have to achieve the standard regardless of whether to do so for a given constituent required a 20% treatment efficiency or a 99.9% treatment efficiency.

The basis for this option would be to increase the number and type of innovative technologies capable of achieving the treatment standards. In addition, this option has the advantage of simplifying compliance with the rule: Only one number per constituent would function as the treatment standard independent of treatment efficiencies. Under this option, analysis of the data for treatment of organic hazardous constituents in soils reveals that 91% of the organic data were treated to levels

less than or equal to the universal standard times 10 by a diverse range of innovative treatment technologies. The Agency solicits comment on how much waste volume would still be incinerated if this option is promulgated as the treatment standard.

c. Achieving 90% treatment with no "ceiling". Alternatively, EPA is also proposing today an approach which would allow the treater of hazardous soil the option of meeting the land disposal restriction requirement for soil by either achieving 90% treatment of each constituent subject to treatment or by achieving treatment to the universal treatment standard (in cases where 90% treatment would result in a concentration lower than the universal treatment standard.) This approach differs from the previous approaches in that there would be no numerical treatment standards that would have to be met in situations where 90% treatment occurs; documenting 90% treatment would be sufficient to meet the LDR requirements.

The Agency is presenting this approach as an alternative to possibly encourage the development of new and innovative technologies to provide safer, more cost-effective, and more publicly accepted methods for treating remediation-related wastes. There is some question whether innovative technologies can generally meet the numerical standards proposed under the approaches discussed above because it is unclear whether the available data in the soils database fully characterize the wide range of soils and contaminants potentially encountered in the field. Remediation-related soils are highly variable in concentration, contaminant mix, and type in the field, and EPA is concerned that its existing data may not adequately represent this diversity.

In addition, there is also concern that the existing data may not be representative of the performance of innovative technologies in the field. EPA collected available data of three scales: Bench, pilot, and field. EPA considered all available data in determining the treatment standards proposed under the previous approach; however, over 50% of the treatment tests upon which EPA based the treatment standards are bench scale tests. The Agency believes that less weight may need to be given to bench scale data than full and pilot scale data because of the greater uncertainty in performance of the technology.

EPA solicits comment on the technical or environmental appropriateness of a 90% reduction approach, in particular where hazardous soils are heavily contaminated with toxic constituents and a 90% floor on treatment neither optimizes technology performance nor reduces hazardous constituents to levels at which threats are minimized. EPA also solicits comments as to whether a 90% approach should be applied to inorganic hazardous constituents.

2. Explanation of Numeric Treatment Standards for Hazardous Soils

Under today's proposal, the specific hazardous soil treatment standard for a given constituent will depend on which of the approaches is promulgated. The following examples illustrate how the proposed approaches would work.

Example 1. The hypothetical basis for this example is a waste regulated for pentachlorophenol, which is present in the untreated soil at 1200 mg/kg.

Scenario 1. Today's proposed rule would require treatment to a level one order of magnitude greater than the universal standard (7.4 mg/kg), provided a 90% reduction in the constituent concentration occurs. Under this approach, pentachlorophenol would be reduced to at least 74 mg/kg, the value one order of magnitude greater than the universal standard (totals levels). Achieving the technology-based standard of 74 mg/kg would require a treatment efficiency of 94% for treating pentachlorophenol. The standard under this scenario is affected by the untreated contaminant level. If the untreated waste was at 120 mg/kg, 90% treatment would require achieving 12 mg/kg. If the untreated level was 12 mg/kg, 90% treatment would achieve 1.2 mg/kg; however, because the universal standard is 7.4 mg/kg, treatment would be required only to the 7.4 mg/kg universal standard level.

Scenario 2. Under this scenario, the proposed rule would require treatment to a level one order of magnitude greater than the universal standard. The proposed universal treatment standard for pentachlorophenol is 7.4 mg/kg; therefore soil would need to be treated until it achieved at least 74 mg/kg. Because a percentage removal is not required under this scenario, the limit is valid for all soils regardless of the untreated level.

Scenario 3. Under this scenario, a 90% reduction in constituent concentration must be achieved. The untreated level of pentachlorophenol was 1200 mg/kg. This constituent concentration must be reduced by 90%, thus a treated level of at least 120 mg/kg (1200 mg/kg reduced 90% is 120 mg/kg) would have to be met. The standard under this scenario is also affected by the untreated contaminant level. If the untreated waste concentration is 120 mg/kg, 90% treatment would require achieving 12 mg/kg. If the untreated level was 12 mg/kg, 90% treatment would achieve 1.2 mg/kg; however, because the universal standard is 7.4 mg/kg, treatment is required only to 7.4 mg/kg.

Example 2. Soils that are hazardous because they exhibit the characteristics of ignitability, corrosivity, or reactivity, would require treatment by technologies which eliminate these characteristics. If the hazardous soil was hazardous solely because it contained a TC constituent and no other underlying hazardous constituent, the proposed hazardous soil treatment standard for that constituent would have to be achieved. If, however, these wastes contained other constituents subject to treatment, as explained above, they would have to be treated to achieve the hazardous soil treatment standards for each constituent.

3. Treatment Standards for Residues from Soil Treatment

When hazardous soil is treated, several types of residues can be generated: The treated soil, including in some cases soil fractions containing concentrated levels of contaminants, wastewater from the treatment of hazardous soil, and possibly debris. In addition, treatment units often generate air emissions. The regulatory status of these residues and emissions is discussed below.

Treated soil, and any soil-like residue, would continue to be subject to the soil treatment standards (unless, as discussed above, the soil was determined on a site-specific basis to no longer "contain" hazardous waste, and thus the level of hazardous constituents remaining in the soil were determined not to exceed minimize threat levels). In particular, when a fraction of the treated soil contains concentrated levels of contaminants, additional treatment may be necessary using a different and more appropriate treatment technology. For example, soil washing may effectively treat the sandy fraction of a hazardous soil to the soil treatment standards, but may generate a clay fraction with high concentrations of contaminants that would more appropriately be treated with a thermal desorption or immobilization technology. This (hypothetical) clay fraction would also have to be treated to meet the applicable treatment standard. Thus, EPA does not consider such residues to be a new treatability group for purposes of this rule, and consequently such a nonwastewater residue would remain subject to the soil treatment standard. Cf. 55 FR at 22661 (June 1, 1990).

Hazardous wastewater from the treatment of hazardous soil would be subject to the universal standards being proposed under 40 CFR 268.48 for all hazardous constituents subject to treatment and for any hazardous constituents added during treatment. The Agency believes the universal standards are appropriate for such wastewater, given that the standards were initially developed for multi-source leachate, a wastewater that results from contact of water with soil and disposed hazardous constituents. (Characteristic wastewater managed in

land-based wastewater treatment systems, however, would normally not be subject to treatment standards under this rule, but rather would be addressed when the Agency takes up the issues relating to centralized wastewater management remanded by the court in the *Third Third Case*.)

Any hazardous debris residuals would be subject to the treatment standards for debris that were promulgated on August 18, 1992 (57 FR 37194).

Air emissions from treatment units are controlled, in some cases, by regulatory programs under the Clean Air Act (CAA) or under RCRA. In particular, the Agency initiated a three-phased program under section 3004(n) of RCRA to address air emissions from hazardous waste management units other than thermal treatment units (e.g., incinerators, boilers, industrial furnaces). The first phase addressed organic air emissions as a class from two types of emission sources. The first source category was process equipment (e.g., pumps, valves) that contact hazardous waste that contain greater than 10 percent organic compounds, including units such as distillation columns and incinerators. The second source category was certain vents on various treatment technologies, such as air or steam strippers. These standards were promulgated as final rules and published in the **Federal Register** on June 21, 1990 (55 FR 25454). The second phase of standards developed under section 3004(n) of RCRA was proposed on July 22, 1991 (56 FR 33491) and addressed organic air emissions from containers, surface impoundments, and certain tanks. In the third phase of the section 3004(n) standards development, the Agency will develop additional standards for the sources addressed in the first two phases as necessary to address residual risks.

In addition to the RCRA section 3004(n) standards, the Agency regulates organic and metal emissions from the combustion of hazardous waste in incinerators, boilers and industrial furnaces. See subpart O, part 264 for incinerators, and subpart H, part 266 for boilers and industrial furnaces. These controls are expected to address many risks posed by air emissions during treatment of hazardous soils in these units. (A May 18, 1993 Agency statement indicated, however, that some of these standards should be amended to be made more strict in order to adequately control such pollutants as particulate matter and dioxins.)

4. Treatability Variances

When a hazardous soil cannot be treated to the specified standard, the generator or treatment facility may petition the EPA for a variance from the treatment standard. A variance mechanism exists under the LDRs for providing variances from the required treatment standards for hazardous soils. See 40 CFR 268.44.

EPA established the variance procedure to accommodate those wastes that cannot be treated to meet the standards even when appropriate well-designed and well-operated treatment systems are used. A variance is also available when a treatment technology is inappropriate for a waste. Petitioners must demonstrate that the standard cannot be met because the physical or chemical properties of the hazardous soil differ significantly from the hazardous soils EPA examined in establishing the standard or that the standard is otherwise inappropriate for the hazardous soil. (See 51 FR 40605; Nov. 7, 1986.) While treatability variances may be granted that have generic applicability, usually for hazardous soil they are granted on a site-specific basis by the Regional Administrator.

D. Contained-In Determinations

EPA is proposing today to codify the "contained-in" policy for hazardous soil and other environmental media in new § 261.3(g). EPA recently codified this principle for hazardous debris. See § 261.3(f)(2); 57 FR 37194 (August 18, 1992). Today's rule also proposes procedures for obtaining contained-in determinations for contaminated media and requests comment on decision criteria for evaluating petitions for such actions.

In current practice, the primary function of a contained-in determination has been to determine specific constituent concentrations at which the media at a specific site no longer "contained" hazardous waste, and thus would no longer be subject to the management standards for hazardous waste. Such a determination may be made prior to treatment or subsequent to treatment. In the latter case, the contained-in concentration levels for hazardous soil, if they are also minimize threat levels, would serve as a floor on the LDR hazardous soil treatment standards. Thus, such soil is no longer subject to subtitle C management standards, provided that the soil does not exhibit a hazardous waste characteristic. EPA believes that, fundamentally, it is important and necessary to be able to consider, in certain cases, site-related conditions and waste-specific characteristics in establishing soil treatment standards and subtitle C exclusion levels.

Contained-in determinations would not be self-implementing. Rather, EPA believes that site-specific determinations must be made by the appropriate regulatory agency, in careful consideration of relevant factors. This proposal therefore specifies the factors and procedures to be considered and utilized in making contained-in determinations for soil. The proposed rule would not, however, require these explicit requirements when contained-in determinations are made in the context of RCRA closures and remedy selections under RCRA and CERCLA. Such activities are typically conducted with considerable Agency oversight, and cleanup decisions are made in consideration of substantial amounts of site specific technical data. Such remedy selection decisions are generally subject to public notice and comment, through Records of Decision (under CERCLA) or permit modifications, or analogous administrative mechanisms under RCRA. Thus, these processes will provide a surrogate for the petition review process that EPA is proposing today for contained-in determinations that are pursued outside the context of RCRA or CERCLA remedial actions.

In making contained-in determinations, we believe that EPA (or the authorized State) must consider all possible exposure pathways which could pose a threat to human health or the environment. Exposure pathways to be considered thus include direct human contact through ingestion, exposure to ecosystems, and potential for leaching of constituents to ground water.

Given the extreme variations in site-specific and constituent-specific characteristics, EPA is not proposing to adopt specific formulae or other quantitative means of calculating appropriate contained-in levels. The Agency believes that considerable flexibility must be allowed for such decisions, if the process is to be workable.

Proposed § 260.42 provides a set of decision factors that may be considered by the Regional Administrator (or State Director) in making contained-in determinations. In particular:

- Media characteristics;
- Waste constituent characteristics, including solubility, mobility, toxicity, and interactive effects of constituents present that may affect these properties;
- Exposure potential, including potential for direct human contact, and

potential for exposure of sensitive environmental receptors;

- An "acceptable" risk range of 10^{-4} to 10^{-6}
- Surface and subsurface characteristics, including depth to ground water, and characteristics of subsurface formations;
- Climatic conditions; and
- Other site or waste-specific characteristics or conditions that may affect whether residual constituent concentrations will pose a hazard to human health or the environment.

The Agency specifically requests comment regarding these contained-in decision criteria. In particular: (1) Should the final rule specify a list of criteria that must be considered; (2) should the criteria listed above be more specific regarding the conditions which would allow for or preclude contained-in determinations; and (3) are there other factors the Agency should consider when making contained-in determinations, in addition to those listed above?

The procedure for contained-in determinations, as specified in proposed § 260.42, would involve submission of a petition to the EPA Regional Administrator or State Director that requests approval of specific contained-in concentration levels, and which provides adequate supporting information addressing the factors specified in this section to enable an informed decision to be made. Opportunity for public comment would generally be provided for contained-in determinations by means of notice in a local newspaper. There would be a minimum 30-day period for submission of comments from the public. The Regional Administrator (or State Director) would assess any written comments received, and a notice in the local newspaper would be published announcing the final determination. Separate written notice would be sent to the petitioner. Such determinations would constitute final Agency action, and would not be subject to administrative appeal procedures. The Agency also proposes to waive from the procedural requirements of the contained-in determination those already subject to public notice under RCRA or CERCLA authority (See proposed § 260.42(c)).

We noted above that the Agency recently codified the contained-in principle for hazardous debris. See § 261.3(f)(2); 57 FR 37194 (August 18, 1992). The Agency did not, however, establish procedures at that time for making the determinations. Given that the procedures discussed above for hazardous soil are also appropriate for hazardous debris, we are today proposing to apply these procedures to both hazardous debris and hazardous soil and other environmental media.

EPA also notes that contained-in levels could represent site-specific levels at which threats to human health and the environment posed by hazardous constituents in the waste have been minimized. See 57 FR at 985–86 (Jan. 9, 1992) where EPA made a similar statement in the context of contaminated debris. In such a case, treatment standards would be capped at that level. *Id.* Although the contained-in and minimize threat determinations need not be identical (cf. *Hazardous Waste Treatment Council* v. *EPA*, 886 F. 2d at 362–63, explaining that the minimize threat level is a stricter standard (for example) than the levels at which wastes are identified or listed as hazardous), and indeed is generally regarded as among the strictest of the statutory environmental standards (*id.* and *Third Third Case*, 976 F. 2d at 14), there is no absolute bar to a determination that sufficient concentrations of hazardous constituents have been destroyed, removed, or immobilized to determine both that the soil no longer "contains" hazardous wastes and that threats to human health and the environment posed by the hazardous constituents in the wastes have been minimized. EPA stresses that in making such a determination, threats to both human health and the environment would have to be considered (see section 3004(m) and 886 F.2d at 362). In addition, any such determination would have to be based exclusively on remaining threats posed by the waste without regard to how the waste will be managed (see *American Petroleum Institute* v. *EPA*, 906 F. 2d 729, 735–36 (D.C. Cir. 1990) explaining that section 3004(m) standard ordinarily can be satisfied only by treatment occurring before subsequent disposal of the waste).

EPA solicits comment on its proposed approach for contained-in determinations, particularly on the decision factors to be used, the procedures for making determinations, and the proposed linkage to treatment standards and subtitle C exclusion levels.

E. Soil Treatment Database

1. Treatment Technologies

EPA believes that nine general technologies have been demonstrated and are available for treating hazardous soil: (1) Biological treatment; (2) chemical extraction; (3) dechlorination; (4) high-temperature metals recovery; (5) solidification/stabilization/immobilization; (6) thermal desorption; (7) thermal destruction; (8) vitrification, and, (9) soil washing. A brief description of each technology is presented in Appendix A following this preamble.

2. Development of the Database

The Agency has collected data on the treatment of hazardous soil from CERCLA remedial actions, demonstrations under the Superfund Innovative Technology Evaluation (SITE) program, industrial sources, and EPA-sponsored treatment tests. The Agency attempted to obtain all available soil treatment data which met minimum requirements of quality assurance and quality control. Each treatment test contains information on the treatment process used and results of laboratory analyses on untreated and treated soil. A hazardous soil database was developed to organize and analyze this treatment data. The database will be available as a national resource to EPA regions, states, PRPs and other government agencies to support LDR applications and compliance, technology screening for selection of remedial actions, and variance petition screening and support.

To develop the soil treatability database, the Agency prepared Data Summary Forms (DSFs) to record information from the treatment test reports. The DSFs contain information on site identification, soil matrix, soil collection description, treatment system, design and operating conditions of the treatment system, concentrations of hazardous constituents in untreated and treated soil, QA/QC information, and residual matrix information.

After all the data were edited (the next section of this preamble explains the criteria used to edit the data), 36 treatment technologies were represented by 2541 data pairs, for a total of 295 treatment tests: 43 (15%) of the tests were full scale, 108 (36%) were pilot scale, and 144 (49%) were bench scale. Table 1 lists the number of DSFs having information for each technology as well as the scale of the test.

TABLE 1—NUMBER OF BENCH, PILOT AND FULL SCALE TREATMENT TESTS BY TECHNOLOGY

Treatment Technology	Scale of test		
	Bench	Pilot	Full
BT01*—Aerobic Bioremediation	2	1	0
BT03*—Aerobic/Anaerobic Bioremediation	0	1	0

TABLE 1—NUMBER OF BENCH, PILOT AND FULL SCALE TREATMENT TESTS BY TECHNOLOGY—Continued

Treatment Technology	Scale of test		
	Bench	Pilot	Full
BT04*—Composting	4	1	0
BT05*—Aerobic Bioslurry	7	2	1
BT07*—In-situ Bioremediation/ Unlined	0	0	1
BT08*—Aerobic Composting/ Lined	3	5	0
BT12*—Aerobic Land Treatment/Lined	2	0	2
CE00*—Chemical Extration	0	3	0
CE01*—Solvent Extraction	9	6	0
CE03*—Critical Fluid Extraction	0	2	0
CT01*—Hydrolysis	1	0	0
DC01*—KPEG Dechlorination	6	1	1
DC02*—APEG Dechlorination	4	0	1
DC03*—High Temperature Dechlorination	0	1	0
IM00—Immobilization	9	2	1
IM01—Stabilization	18	16	8
IM03—Cement Stabilization	39	3	2
IM04—Fly Ash Stabilization	3	0	0
IM04/IM05—Fly Ash/Lime Stabilization	1	0	0
IM06—Kiln Dust Stabilization	5	0	0
ST01*—Air Stripping	0	1	1
ST02*—Steam Stripping	0	0	1
ST03*—Vacuum Extraction	0	0	5
SW01*—Soil Washing	8	0	0
SW02*—Acid Washing	0	1	0
SW03*—Water Washing	4	1	1
TD00—Thermal Destruction	1	0	0
TD01—Rotary Kiln	1	13	9
TD04—Infrared	0	8	0
TD06—Pyrolysis	0	2	0
TD07—Circulating Bed Combustion	0	1	0
TD08—Vitrification	0	1	0
TH01*—Low Temperature Thermal Desorption	9	28	7
TH02*—High Temperature Thermal Desorption	6	3	1
TH03*—Photolysis	1	5	0
TH07*—Thermal Distillation	1	0	1
Totals:	144	108	43
(Percent)	(49)	(36)	(15)

* These technologies are considered by the Agency to be innovative technologies.

3. Analysis of the Database

In analyzing the soil treatability database, the Agency needed to determine the adequacy of the data for setting treatment standards for hazardous soil. Therefore, the Agency reviewed the design and operating conditions for each treatment test included in the database to determine if any data should be eliminated, i.e., the Agency believed that poorly designed and operated treatment tests should be eliminated from the data set used to determine treatment standards. To evaluate the data, the Agency developed a set of minimally acceptable design and operating conditions for each technology. These criteria, or performance standards, can be found in the Hazardous Soil Rule Background Document which is in the RCRA docket for this proposed rule. A list of the data eliminated from consideration along with the rationale for each decision can be found in the docket. A total of 1183 data pairs were removed from the soil treatment standard data set as a result of this review.

The Agency then further reviewed the data set using the following criteria: (1) Immobilization data for organic constituents were not used; (2) metal constituents data from immobilization, high temperature metals recovery, soil washing, acid washing, water washing, or detergent washing were used while metals data from all other technologies deemed as inappropriate for metals were removed, (3) dechlorination data were used only for appropriate organic constituents; (4) data pairs with nondetect untreated concentrations were not used; (5) data pairs where the treated concentration for metals was given as total concentration were not used (and initial concentration was a leachate); (6) treated levels were not used where the QA/QC indicated that the percent recovery values for spikes were less than 20% or greater than 200%, and, (7) data pairs with untreated concentrations less than the proposed universal standard were not used. A total of 2541 data pairs remained after application of these criteria.

a. *Consideration of innovative technologies.* As indicated earlier, the Agency believes it important (and reasonable) to allow the use of innovative technologies, as well as incineration, in setting treatment standards for soils. Our basis for this is severalfold: First, the data suggest that innovative technologies can achieve treatment levels within a reasonable range of the levels obtained by incineration. Second, the Agency believes that it is not generally practicable to treat the large volumes of hazardous soil by incineration, particularly given the relatively low concentrations of hazardous constituents typically present. A common sense approach would indicate that incineration may be practical only for "hot-spots" where soil is highly contaminated with organic constituents (see 55 FR 8760–61, March 8, 1990). For the large volumes of soil that are contaminated with low or moderate levels of toxic constituents, innovative technologies are practical, available, and can achieve the proposed levels of the technology-based standards. Third, several innovative technologies (e.g., high temperature metals recovery, chemical extraction) are recovery technologies; we note that RCRA voices a strong preference for use of such technologies. (See, e.g., H.R. Rep. No. 198, 98th Cong. 1st Sess. 31.) And, fourth, the Agency is committed to allowing and encouraging the use of innovative technologies, particularly biological technologies, for the treatment of hazardous waste.

b. *Rationale for not using the "traditional" BDAT approach to develop hazardous soil treatment standards.* In analyzing the data, the Agency determined that the "traditional" statistical method previously used by the LDR program was not appropriate for hazardous soil. In the past, the Agency has typically evaluated incineration treatability data to identify the "most difficult to treat" waste and established the treatment standard based on a statistical analysis of data from the treatment of that waste. We believe this approach is not appropriate for hazardous soil. As indicated above, the Agency prefers to establish soil treatment standards at levels achievable by a variety of technologies, including innovative technologies. Given the large volumes of

hazardous soil, wide variations in contamination, and varying soil types, the Agency believes that flexibility in choice of technology is appropriate. For example, an aggressive highly efficient technology would not be needed to treat a lightly contaminated soil.

c. *Graphical analysis of data.* The Agency used a graphical representation of the data for each of the 80 constituents for which there was adequate data. The Agency then developed a data set for each constituent with the screened data. The data in each data set were plotted using one variable, treated concentration. The Y-axis represented the treated concentration in parts per million and the X-axis arrayed the data from lowest to highest concentration. The data were plotted using symbols to distinguish the various treatment technologies for which data was available and to denote whether the value was a "detect" or a "nondetect" value. The existing LDR treatment standards for the constituent and the proposed universal standard were also represented on the plots as benchmarks. These graphs are available in the docket.

The graphical plots for each of the 80 constituents facilitated a comparison of the treatment levels achievable by the various technologies, the existing waste code treatment standards, and the proposed universal standards. To identify a potential soil treatment level, we identified the point on the graph that was the last point in the lowest "plateau" (i.e. where the slope of the curve is close to zero) and below which were included data representing one or more well designed and operated innovative technologies obtaining efficient removal of constituents (i.e., high percent removal). This point was called the potential BDAT level. Because the proposed universal standards were within a reasonable range of this potential BDAT level, and in order to simplify and streamline the LDR program, the universal standards were selected as base treatment levels. (We note that the proposed universal standards were within a reasonable range of, and generally higher than, the treatment level suggested by the plateau on the graph.)

To determine that the treatment data from the innovative technologies were, in fact, representative of well-operated, efficient treatment units, we analyzed all data points considering factors including: untreated concentration, percent treatment, and design and operating conditions of the technology.

Essentially, this analysis was used to answer two questions: (1.) Can the proposed universal standards be met for hazardous soil utilizing innovative technologies? and; (2.) Are there any constituents for which the universal treatment levels would not be achievable? The analysis concluded that for almost all constituents, the proposed universal standards can be met using well-designed and well-operated innovative technologies. For several constituents for which only incineration data were available, this conclusion could not be reached. However, incineration was shown to be effective in treating these constituents.

d. Transfer of proposed universal standards to constituents without data. The soil data base includes data for 94 of the 191 constituents subject to today's proposed soil treatment standards. Because the available data largely justify the use of the universal standards for soil treatment, (i.e., innovative technologies appear capable of treating soil to the universal levels proposed today), the universal standards were transferred to constituents for which the database does not contain data. This transfer is justified because for all organic constituents for which innovative technology data were available, the data supported the use of the universal standards. In addition, allowing the 90% reduction in hazardous constituents alternative, with or without the one order of magnitude "ceiling," provides assurance that the proposed levels would be routinely achievable. Treatability variances remain an option for particular soils which prove more difficult to treat.

4. Request for Additional Data and Comment

EPA continues to solicit treatability data and other information relevant to the hazardous soil treatment standards proposed today. Commenters submitting performance data for treatment or recovery technologies in response to today's proposed rule are requested to include, to the extent possible, the following: Complete chemical and physical analysis of the hazardous soil, treated soils, treatment residuals, and any other materials separated from the hazardous soil; technical descriptions of the treatment or recovery process, including design and operating parameters; and information on the quality control/quality assurance (QA/QC) procedures utilized for sampling, analyzing, and operating the technology.

EPA developed "Quality Assurance Project Plan (QAPP) for Characterization Sampling and Treatment Tests Conducted for the Hazardous Soil and Debris (CS&D) Program" that describes the data quality objectives of the hazardous soil and debris program and provides the following: Detailed protocols for field sampling and measurement; a list of hazardous soil and debris constituents; procedures for sample custody and transportation; and additional QA/QC procedures for sampling and analysis. This document is available in the docket. Those intending to submit additional data to EPA are urged to consult the QAPP and communicate with EPA to confirm that the data meets EPA's QA/QC objectives.

EPA prefers pilot and full scale data over bench scale data. The Agency considered treatment test scale to be associated closely with the quantity of material used in the individual treatment tests that provided treatment data. When entering data into EPA's database, scale was entered as indicated by the data and accompanying documents. When the data reference did not provide scale information, the scale was assigned by EPA according to the quantity of soil treated. Generally, if less than 1 kg was treated, the test was categorized as bench-scale. If more than 1 kg, but less than 1,000 kg was treated, the test was categorized as pilot-scale. Cases where treatment involved more than 1,000 kg, the tests were categorized as full-scale. EPA requests comments on these quantity specific categories.

Alternative methods for defining the scale of the treatment test will also be considered. One proposal considers the intent of the test. For example, bench-scale tests are designed to determine whether alternative technologies can achieve established performance criteria. Whereas the intent of a pilot-scale study is to provide detailed cost, design, and performance data. Thus, data collected from a pilot-scale study should yield accurate scale-up information. Full-scale operations are designed to achieve remediation of the site and are not considered studies. The Agency requests comment on this alternate definition of scale, and on other potential definitions or applications of treatment test scale.

In addition, EPA continues to solicit information on the costs associated with treatment or recovery technologies for hazardous soil in order to prepare a revised regulatory impact analysis. Of interest are technical reports that include costs or estimates of costs for set-up and operation of the treatment technology. These reports should include the appropriate information on treatment efficiencies and applicability to various soil types, including all the technical information discussed in the preceding paragraphs.

F. Sampling and Analysis Protocols—Grab vs. Composite Samples

Where performance data were based on the analysis of composite and grab samples, the Agency established treatment standards based on the analysis of grab samples. Grab samples normally reflect maximum process variability, and thus would reasonably characterize the range of treatment system performance. Basing treatment standards on grab samples (and enforcing on that basis) is, of course, permissible. *Third Third Case,* 976 F.2d at 34.

In cases where only composite data exist, the Agency considers the QA/QC of the data, the inherent efficiency of the process design, and the level of performance achieved. The Agency may then choose to use this composite data to develop treatment standards. Where these data were used to establish treatment standards, the treatment standards were identified as based on analysis of composite samples. Enforcement of that standard thus would also be based on composite samples.

G. Relationship to Other Regulations and Programs

1. RCRA Land Disposal Restrictions Program

a. Existing LDR treatment standards. The Agency has promulgated land disposal restriction treatment standards for all hazardous waste that were listed or identified in part 261 before the enactment of HSWA. Soil contaminated with a hazardous waste that is subject to a treatment standard is also subject to that treatment standard. There is a question as to whether treatment standards applicable to "as generated" hazardous waste are also appropriate for hazardous soil. The Agency is also concerned that treatment technologies considered BDAT for the actual waste may not be able to achieve the waste treatment standards in soil. The Agency believes that soil may be more difficult to treat than waste because of factors such as: (1) Contamination from multiple wastes results in complex treatment and analysis matrices; and, (2) varying soil types, such as easy-to-treat sandy soil, difficult-to-treat clays, and soils with high content of organic matter. To address these concerns, the Agency developed the soil treatment database to establish treatment standards that would be appropriate for hazardous soil. Thus, when today's proposed soil treatment standards are promulgated, hazardous soil will become subject to those standards in lieu of the treatment standards for the RCRA wastes contaminating the soil.

b. Soil contaminated with newly listed wastes which have final treatment standards. EPA recently promulgated treatment standards for "newly-listed" (i.e., listed since enactment of HSWA in 1984) hazardous wastes in the Phase I final rule (August 18, 1992) including: F037–F038, K107–K110, K111, K112, K117, K118, K123, K124, K125, K126, K131, K132, K136, U328, U353, and U359. The Agency chose not to apply the treatment standards for these wastes to hazardous soil contaminated with these wastes. Consequently, we are proposing today to subject soil contaminated with these newly listed wastes to the soil treatment standards.

c: Soil contaminated with newly listed and identified wastes which have proposed treatment standards. In a separate section of this proposed rule, the Agency is proposing treatment standards for additional newly listed and identified hazardous wastes, including those that exhibit the toxicity characteristic for organics. The proposed hazardous soil treatment standards, when final, would apply to soils contaminated with those newly listed or identified hazardous wastes.

2. RCRA Corrective Action

Treatment standards proposed in this rule would, when finalized, apply to all RCRA hazardous soil (i.e., soil contaminated with a listed waste or exhibiting a hazardous characteristic.) For example, soil treatment standards promulgated under this rule would apply to corrective action at RCRA-permitted facilities or interim status facilities, when remediation of hazardous soil involves excavation and land disposal or placement of such soil. However, the Corrective Action Management Units and Temporary Units Final Rule (58 FR 8656) creates a remediation unit, called a corrective action management unit (CAMU), within which management of remediation wastes would not constitute land disposal or placement. (See 58 FR 8659). Remediation waste includes soils containing listed hazardous wastes or which themselves exhibit a hazardous waste characteristic, that are managed for the purpose of implementing corrective action requirements under § 264.101 and RCRA section 3008(h). (See 58 FR 8683). Therefore, management of remediation wastes within a CAMU designated according to the criteria in § 264.552 would not require the application of LDRs, including today's soil treatment standards.

3. Voluntary RCRA Cleanups

The proposed hazardous soil treatment standards, when final, would apply to all RCRA hazardous waste land disposed. Therefore, hazardous soil generated during the course of a voluntary cleanup would be subject to the hazardous soil treatment standards.

The Agency is concerned that the existing treatment standards that apply to hazardous waste (and soil containing hazardous waste) may pose a disincentive to voluntary cleanups. The soil treatment standards proposed today should begin to alleviate the impediments to voluntary cleanups. In general, the treatment standards proposed in today's rule regarding hazardous soil are higher than the existing treatment standards, and are intended to allow flexibility in determining what treatment technologies to utilize. EPA requests comment regarding the proposed soil treatment standard options and the effect the approaches, if promulgated, may have on voluntary cleanups.

4. Phase I LDR Rule: Hazardous Debris

On August 18, 1992, the Agency published the Phase I LDR rule; among other things, this rule set technology-based treatment standards for hazardous waste-contaminated debris. In summary, to meet the land disposal restrictions, hazardous waste-contaminated debris must be treated to the existing standards, or alternatively by specified technologies (i.e. treatment methods) based on the type of debris and the type of contaminants present. If this treatment is performed with a specified destruction or extraction technology, the treated debris would no longer be considered contaminated nor is it a hazardous waste (provided it also does not exhibit a hazardous characteristic), and thus is no longer subject to RCRA subtitle C regulation. For a further discussion, refer to the final rule (57 FR 37194, August 18, 1992).

Debris is defined as a solid material (man-made objects or environmental media) intended for disposal that: (1) Has been originally manufactured or processed, except for solids that are listed wastes or can be identified as being residues from treatment of wastes and/or wastewaters, or air pollution control devices; or (2) is plant or animal matter; or (3) is natural geologic material exceeding a 60 mm sieve size including gravel, cobbles, and boulders (sizes as classified by the U.S. Soil Conservation Service), or is primarily debris mixed with soil, liquid, sludge, or other solid waste materials. The "primarily" determination is based on the volume of

soil and debris in the loader bucket as excavated. Separation is not required. However, the generator may use screening (or other separation techniques) to separate the soil from 60 mm and larger gravel and man-made objects.

It is clear from the definition of debris that there will be an overlap with the proposed hazardous soil requirements. The Agency is following the precedent set in the hazardous debris rule: In the event of mixtures of soil and debris that are not readily separable, the Agency has decided that the primary category of a mixture (i.e., soil or debris) based on visual inspection will determine how that mixture will be regulated.

5. CERCLA as amended by SARA

This section discusses the relationship between the proposed treatment standards for hazardous soil and the Agency's response actions implemented under CERCLA (Superfund). We discuss here the current applicability of the LDR program to the Superfund program as well as the impact of today's proposed soil LDR treatment standards on the Superfund program. In this section, we discuss the difference between applicable LDR requirements and the Superfund program's use of "relevant and appropriate" requirements of other environmental laws to remediate hazardous soil.

The Superfund program's efforts to remediate hazardous soil fall into three categories: (1) Where LDR requirements are applicable; (2) where LDR requirements are found to be relevant and appropriate under the circumstances of the release; and (3) where LDR requirements are neither applicable nor relevant and appropriate. When hazardous soil is excavated, treated in another unit, and replaced on the land, or excavated and disposed in a unit outside of the area of contamination (AOC), the LDR regulations are either applicable requirements or they may be found to be relevant and appropriate requirements under the circumstances of the release. When hazardous soil is not excavated and placed into another unit as part of a Superfund response action (e.g., consolidation within the AOC, in-situ treatment, or no treatment), the LDR treatment standards do not apply because there has been no "land disposal" of a hazardous waste (RCRA Section 3004(k), 55 FR 8759–60 (March 8, 1990).) Today's proposal would not change this.

If the hazardous soil is contaminated with a listed hazardous waste or if it fails a RCRA characteristic test, the LDR regulations are applicable to the hazardous soil (see, e.g. RCRA section 3004 (d)(3),(e)(3); also see Superfund LDR Guide #5, Directive 9347.3–06FS, July 1989.) In cases where there is no known evidence that the soil is contaminated with a prohibited listed hazardous waste and thus the LDRs are not legally applicable, but the soil is contaminated with substances known to be constituents of a particular listed waste, EPA evaluates the soil to determine whether the LDR treatment standards are relevant and appropriate. See NCP, 40 CFR 300.400 (g)(2); Superfund LDR Guide #7, Directive 9347.3–08FS, December 1989.

In determining the potential relevance and appropriateness of the LDR treatment standards in a particular response action under the Superfund program, EPA makes the following comparisons, among others, where pertinent: (1) The actions or activities regulated by the requirement as compared to the remedial action contemplated; (2) the purpose of the requirement and the purpose of the CERCLA action; (3) the substances regulated by the requirement and the substances found at the CERCLA site; and (4) the medium regulated or affected by the requirement and the medium contaminated or affected at the CERCLA site (NCP, 40 CFR 300.400 (g)(2).

Currently, as set out in the preamble to the NCP, there is an established presumption that the existing BDAT treatment standards are inappropriate for hazardous soil and debris, 55 FR 8759.62, and thus under RCRA regulations at 40 CFR 268.44(h), a treatability variance is generally appropriate (unless the presumption is rebutted). Accordingly, much of the hazardous soil from CERCLA actions now excavated and disposed of is treated to meet site specific treatability variance standards. (EPA has prepared guidance documents as an aid to implementation of treatability variances.) See Superfund LDR Guide #6a, Directive 9347.3–06FS, September 1990, or Superfund LDR Guide #6b, Directive 9347.3–07FS, December 1989. Given that today's proposed treatment standards for hazardous soil are based on actual soil treatability data from technologies other than incineration, including a number of innovative technologies, the Agency anticipates that there will be less need to invoke the variance process when soil treatment standards become effective. We note, however, that today's proposed soil treatment standards would retain the treatability variance procedures of 40 CFR 268.44.

6. Soil Contaminated by Underground Storage Tanks

Petroleum contaminated soil removed during remediation of releases from a RCRA Subtitle I underground storage tank (UST) generally are not subject to the LDR soil treatment standards. These soils would generally only be defined as hazardous because of the toxicity characteristic (TC). Such petroleum contaminated soil that fails the TC for one or more of the newly identified organic wastes (D018–D043) has been temporarily deferred from regulation as a hazardous waste (55 FR 26986). In addition, the Agency has recently proposed to permanently exempt UST petroleum-contaminated soils from the TC rule (58 FR 8504). However, should a Subtitle I petroleum contaminated soil fail the TC using the superseded Extraction Procedure (EP) for toxicity characteristics D001 through D017 (the original EP toxicity characteristics), ignitability (D001), corrosivity (D002), and reactivity (D003), the soil would not be subject to the deferral and would be subject to all applicable RCRA land disposal restriction requirements.

It is notable that there is a pending lawsuit challenging this deferral. Pending the results of the litigation, these TC soils may become subject to today's proposed soil treatment standards when finalized.

Finally, the Agency reminds the regulated community that any soil contaminated by a release from a hazardous substance UST (Subtitle I) as well as from all non-Subtitle I USTs (including petroleum tanks) will continue to be subject to applicable RCRA hazardous waste requirements, including the existing land disposal restrictions and the hazardous soil treatment standards, when promulgated.

7. Other Petroleum Contaminated Soil

In response to petitions from several states, the Agency has recently proposed to temporarily suspend from regulation as hazardous waste petroleum contaminated soils from sources other than Subtitle I USTs, such as above-ground tanks and pipelines. Such a deferral has only been proposed, however; until it is finalized, these soils would continue to be subject to the applicable RCRA hazardous waste regulations, including the existing and future land disposal restrictions. See 57 FR 61542.

8. Radioactive Mixed Wastes

a. Definition of mixed wastes. Radioactive mixed wastes are those wastes that satisfy the definition of radioactive waste subject to the Atomic

Energy Act (AEA) that also contain a waste that is either listed as a hazardous waste in subpart D of 40 CFR part 261, or that exhibits any of the hazardous waste characteristics identified in subpart C of 40 CFR part 261. On July 3, 1986 (51 FR 4504), EPA determined that the hazardous portions of mixed wastes are subject to the RCRA regulations.

The majority of mixed wastes can be divided into three categories based on the radioactive component of the waste: (1) Low-level wastes, (2) transuranic (TRU) wastes, and (3) high-level wastes. Low-level wastes include radioactive waste that are not classified as spent fuel from commercial nuclear power plants, or that is not defense high-level radioactive waste from weapons production. TRU wastes are those waste containing elements with atomic numbers greater than 92, the atomic number of uranium. High-level radioactive wastes are defined as spent fuel from commercial nuclear power plants, and wastes from weapons production.

b. RCRA requirements. In the final rule for the Third Third wastes, EPA promulgated treatment standards for four treatability groups of mixed waste: (1) Specific high-level wastes, (2) D008 radioactive lead solids, (3) mixed waste containing elemental mercury, and (4) mercury containing hydraulic fluid contaminated with radioactive materials. The Agency further asserted that "all promulgated treatment standards for RCRA listed and characteristic wastes apply to the RCRA hazardous portion of mixed radioactive (high-level, TRU and low-level) wastes unless EPA has specifically established a treatability group for that specific category of mixed waste."

The Agency is today proposing to subject mixed radioactive hazardous soil to the proposed treatment standards for hazardous soil (in addition to any regulation of that material under AEA), rather than to the treatment standards for the contaminating waste. This includes soil contaminated with mixed waste for which special treatability groups have been established. Therefore, this soil would be subject to the proposed soil standards rather than to the specified treatability group standards. The Agency solicits comments on this approach.

9. Special Provisions for Soil Containing Asbestos

Asbestos is a naturally occurring family of fibrous mineral substances. The typical size range of asbestos fibers is 0.1 to 10 micrometers in length, which is not generally visible to the human eye. When disturbed, asbestos fibers may become suspended in the air for many hours, thus increasing the extent of asbestos exposure for individuals within the area. EPA and the Occupational Safety and Health Administration (OSHA) have major responsibility for the regulatory control of exposure to asbestos. EPA controls emissions of asbestos to the ambient air under section 112 of the Clean Air Act, through the National Emission Standards for Hazardous Air Pollutants (NESHAPS) program.

The Agency believes that special provisions might be needed for regulation of hazardous soil that contains asbestos. The Agency specifically requests comment on the need for such provisions, and on what special provisions might be needed. One option the Agency is considering for disposal of hazardous soil containing asbestos is to collect and seal asbestos containing soil in leak-tight containers (as described in the NESHAP requirements), followed by macroencapsulation and disposal in a Subtitle C landfill. This option would be in lieu of treating the soil by destroying or removing the contaminants subject to treatment.

H. Related EPA Activities on Contaminated Media

1. Contaminated Media Cluster

The Agency has undertaken an initiative designed to improve the overall quality of its regulatory decision-making by looking at groups or "clusters" of regulations in order to develop more integrated approaches to various environmental problems. One of these "clusters" is contaminated media, which includes hazardous soil. The goal of the Contaminated Media Cluster project is to develop a set of overarching principles to guide the Agency's approach to policies and regulations dealing with remediation.

The Agency has gathered preliminary information on the quantities and types of media needing remediation, the types of risks they represent, the current statutory and regulatory framework, the elements of an effective cleanup process, and the costs and benefits of cleanup. As part of this effort, the Agency sponsored a forum in January 1992 with participants from industry, trade associations, and congressional staff, as well as a series of meetings for regional and state participants. The purpose of the forum and meetings was to discuss the issues involved in remediating contaminated media. This LDR proposed rule is consistent with the efforts of the Contaminated Media Cluster project. The LDR program will continue to consider the goals and principles of the Cluster as they are further developed.

2. Weathered Sludges

EPA believes that weathered sludges may constitute a new category of contaminated media, or at least a different treatability group. EPA currently is attempting to assess the definition of weathered sludges, the comparison of these sludges to newly generated sludges, methods available to treat these sludges, and the relationship of these sludges to sediments. EPA is requesting data or comments on any of the above areas to consider in developing a research program which may lead to an amendment of the LDR treatment standards that are currently applicable to weathered sludges.

3. EPA Lead Strategy

In the case of hazardous soil contaminated with lead, EPA seeks to integrate the present rulemaking effort with the Agency's Lead Strategy, which was issued on February 21, 1991. This strategy presents a coordinated approach addressing the significant health and environmental problems resulting from lead pollution. Lead is a multimedia pollutant with significant toxic concerns; accordingly, EPA plans to address lead contamination by coordinating its authorities across programs. EPA solicits comments on the option of setting a total lead standard (versus the proposed leachate standard), consistent with the goal of the lead strategy. Copies of the Lead Strategy can be obtained by calling the TSCA Hotline at 1–800–835–6700.

4. Bioremediation

As a follow-up to the Administrator's Bioremediation Summit held in February, 1990, EPA explicitly is soliciting treatment data on biological technologies to aid in the development of treatment standards for hazardous soil. EPA is aware of the impact of all LDR rulemakings on the development and application of innovative treatment technologies. This notice affirms EPA's interest in gathering private sector data for consideration in setting treatment standards.

VIII. Compliance Monitoring and Notification

A. Compliance Monitoring

In the May 24, 1993 interim final rule (58 FR 29872), the Agency adopted the same approach for monitoring underlying hazardous constituents that it had used previously (in the Third Third rule at 55 FR 22620, 22621) for

multi-source leachate (F039.) That approach allowed generators and facilities that manage ignitable or corrosive wastes to monitor for underlying hazardous constituents "reasonably expected to be present." Generators could base this determination on their knowledge of the raw materials they use, the process they operate, and the potential reaction products of the process, or upon the results of a one-time analysis for the entire list of constituents subject to treatment. Treaters and disposers must perform some testing to demonstrate compliance with the standards. 58 FR 29874–875.

In adopting these requirements, the Agency noted that they might be modified in the future, and that there are certain potential deficiencies in the process, in particular, the lack of a federal requirement to notify the subtitle D treatment (if any are actually treating decharacterized prohibited wastes) and disposal facilities (see further discussion at preamble section B.3 below, and in the interim final rule (58 FR 29874, May 24, 1990)). The Agency is further concerned that generators may not be able to adequately determine the underlying hazardous constituents present in characteristic wastes, or to determine, without testing, whether these constituents are present at levels below the treatment standards. (In the case of listed wastes, which are relatively uniform as to waste composition, EPA has identified all the potential hazardous constituents that could be in the waste and specified those that must be treated. EPA is unable to make such a general finding for characteristic wastes, because they vary to a great degree. Hence, the use of generator knowledge or sampling and analysis is necessary for determining the presence and levels of underlying hazardous constituents in characteristic wastes, although the Agency may be able to develop such information as guidance for specific types of characteristic wastes.)

The Agency solicits comment on whether generators should be required to do some testing of characteristic wastes to determine what hazardous constituents are present and whether they meet treatment standards. Alternatively, the Agency could require generators to certify what underlying hazardous constituents are in the waste and whether they meet treatment standards, in a manner similar to the existing certification requirement for generators of wastes that meet the treatment standards as generated (see 40 CFR 268.7(a)(2)(ii)). While a testing requirement would ensure that there is data for each waste, it could pose an unnecessary burden when generator knowledge would suffice.

If such testing were required, an issue would exist as to frequency of testing and how this could be determined without the type of interaction that occurs for facilities developing waste analysis plans as part of the permitting process. One possible option is to develop some type of self-implementing waste analysis plan analogous to that required for generators who treat their prohibited wastes in 90-day tanks and containers. See § 268.7(b)(4).

The Agency also solicits comment, however, whether such a testing requirement is necessary based on the following analysis of the existing rules. If a generator does no treatment of characteristic wastes, the wastes must be sent to subtitle C treatment facilities before disposal (since the wastes will still exhibit a characteristic). In this case, the wastes will be accompanied by the § 268.7(a) notice and certification telling the treater what the treatment standard for the waste is, including identification of the underlying hazardous constituents requiring treatment. Although this determination need not be based on testing, the treatment facility must do some actual testing to determine whether the treated waste meets the treatment standards, the frequency of testing to be determined by the treatment facility's waste analysis plan. § 268.7(b)(1)–(3) and 58 FR 29874. The treater would then send a notification form to the EPA Region or authorized state pursuant to § 268.9.

If a generator does some treatment, such as removing the characteristic but not treating for underlying hazardous constituents, then it would be a subtitle C treater and would be required to conduct some analysis of the waste, as just explained. If treatment is conducted in units not requiring permits, the generator must prepare a waste analysis plan "based on a detailed chemical and physical analysis of a representative sample of the prohibited waste(s)". § 268.7(b)(4)(i). Consequently, such a generator is already required to conduct some waste analysis.

EPA consequently solicits comment as to the appropriateness of a further (or perhaps, more explicit) requirement of generator testing.

B. LDR Notification

1. Constituents To Be Included on the LDR Notification

EPA solicited comment on how to limit the constituents subject to treatment to be monitored in TC wastes and hazardous soil (and thus, the ones required to be reported on the LDR notification) (see section VIII.A). Commenters on this issue when it was raised in regard to ignitable and corrosive characteristic wastes in the Supplemental Information Report prepared for the Notice of Data Availability on the *Third Third Case* generally said that the regulated community should only be required to address those constituents which are in the characteristic wastes as generated, prior to any subsequent mixing with other wastes, and the generators should monitor only for those hazardous constituents reasonably expected to be present in the characteristic waste. This is the approach being proposed in this rule. The determination of which constituents subject to treatment are in the waste may be made based on a one-time analysis of the waste to determine which of the constituents subject to treatment are present, or it may be made based on knowledge of what constituents are reasonably expected to be present in the waste. Supporting documentation for the determination should be kept in the generator's on-site files for five years. (See § 268.7(a)(7).) This approach for determining which constituents are present in the waste is not necessarily the approach that will be taken in future rulemakings.

2. Management in Subtitle C-Regulated Facilities

The Agency has information that many of the TC wastes that are not managed in CWA or SDWA systems are being treated in hazardous waste management units (primarily incinerators) subject to RCRA subtitle C. Hazardous soil contaminated with listed hazardous wastes and, perhaps, some characteristic wastes, will oftentimes be treated in a subtitle C unit. In such a case, the notification, certification, and recordkeeping requirements set out in 40 CFR 268.7 apply. This means, generally, that a notification would be prepared for each waste shipment sent from the generator to the treatment facility, in the same manner that such paperwork follows a listed waste from "cradle to grave."

For TC wastes and characteristic hazardous soils, once the waste is no longer hazardous, however, the only further recordkeeping and documentation required is set out in 40 CFR 268.9. Section 268.9 requires that the generator/treater (including generators who treat, see 51 FR at 40598, November 7, 1986) prepare a one-time notification which is sent to the EPA Region or authorized state and also kept in the generator or treater's files. The notification must include the

name and address of the subtitle D facility receiving a waste shipment, a description of the waste initially generated, and the treatment standard to which the waste is subject (see § 268.9(d), as amended at 57 FR 37271 (August 18, 1992)). For TC wastes and hazardous soils, these would be universal treatment standards. These treaters must certify that they are familiar with the treatment process used at their facility and that the process can successfully treat the waste to meet the treatment standards without impermissible dilution. See § 268.7(b)(5), which applies to persons who treat formerly characteristic wastes (see § 268.9(d)(2)). The Agency believes that, normally, at least some waste analysis is needed to make a good faith showing for meeting the treatment standards, given the number of hazardous constituents that could be covered by those standards.

It is important to state that in addition to other waste codes that are currently required to be included on notifications under § 268.7, generators of TC wastes that are managed in non-CWA/non-CWA-equivalent/non-Class I SDWA systems and in hazardous soil must identify the constituents subject to treatment along with the corresponding constituent universal treatment standards.[1]

3. Potential Management of Decharacterized Wastes at a Subtitle D Waste Management Facility

EPA is soliciting information on certain potential waste management practices for decharacterized TC wastes and soils to help determine whether new notification requirements are needed. The Agency wishes information on whether generators or treaters, after removing the characteristic, send the decharacterized TC waste or soil off-site to a subtitle D (nonhazardous waste) treatment facility for further treatment to address the underlying hazardous constituents subject to treatment. Although the initial generator of the waste would have to comply with § 268.9, there is no current requirement that the generator notify a subtitle D nonhazardous waste treater of the constituents subject to treatment in the waste, or for the subtitle D treater to verify compliance with the treatment standards or to notify the ultimate disposal facility as to the constituents in the waste. If such waste management arrangements currently exist or are likely to occur as a result of today's rule when it is finalized, some wastes would not be subject to the LDR notification requirements, as was described in the interim final rule of May 24, 1993 (58 FR 29874). Without such recordkeeping, EPA might have difficulty enforcing treatment standards for the constituents subject to treatment. However, these requirements would impose an additional burden on generators, especially those that have established alternative arrangements to provide this information to treaters. EPA solicits comment as to the potential enforcement concerns if there is not a federal requirement that generators notify subtitle D treatment and disposal facilities receiving decharacterized wastes.

Generators and subtitle D facilities may have substantial incentives to exchange and verify compliance with treatment standards for underlying hazardous constituents independently of regulatory requirements. Generators and subtitle D facilities, for example, are subject to CERCLA liability for their waste management practices. Therefore, the Agency solicits comment on whether it should consider a federally-mandated notification requirement. If a notification gap exists, one option would be to require that generators or treaters that decharacterize TC wastes or hazardous soil provide any subsequent treaters of that waste with a list of the underlying hazardous constituents subject to treatment that the waste contains, and for the final treater to provide a one-time notification to EPA.

IX. Further Solicitation of Comment Regarding Exclusion of Hazardous Debris That Has Been Treated by Immobilization Technologies

A. Background

The final Phase I Land Disposal Restrictions (LDR) rule promulgated on June 30, 1992 (57 FR 37194, August 18, 1992), excludes from subtitle C control hazardous debris that is treated using an extraction or destruction technology provided the treated debris meets the performance standards specified in § 268.45 Table 1. Our basis for doing this is that the debris no longer contains the hazardous waste. On the other hand, hazardous debris treated by an immobilization technology is still subject to the hazardous waste regulations because the Agency has insufficient data or information to support that such treated debris would not leach Appendix VIII constituents over time in a manner that would be protective to human health and the environment. In our proposal to the Phase I LDR rule, the Agency solicited comment on whether immobilized hazardous debris should be excluded from subtitle C control. While the Agency received favorable comments on excluding such treated debris from the hazardous waste regulations, no information or data was provided to support such a position. Therefore, the final rule requires that immobilized hazardous debris continue to be managed as a hazardous waste.

The Agency again wants to revisit the issue of whether immobilized hazardous debris, if treated in certain ways or is treated to meet certain limits, should be excluded from subtitle C control. As a result, since the promulgation of the Phase I LDR rule, the Agency has undertaken a number of activities.

B. Roundtable Discussion

In an attempt to gather information on the issue, the Agency sponsored a roundtable discussion on August 3, 1992. Participants at the meeting included persons who commented on the Phase I LDR rule, debris treatment vendors, hazardous waste treaters and disposers, state officials, and officials from the Department of Energy (see Docket for specific list of attendees). Representatives from the environmental interest groups were also invited but were unable to attend. The purpose of the meeting was to gather information and discuss various regulatory approaches that would allow the Agency to exclude immobilized hazardous debris from subtitle C control. While no specific information was gathered, there was a discussion on the types of standards that could be applied such as design and operating standards, leach test, structural integrity test, permeability test for encapsulating material, so as to exclude immobilized hazardous debris from hazardous waste control. Additionally, the following points were also made by one or more participants at the roundtable.

- A number of the attendees indicated that even if immobilized hazardous debris were excluded from hazardous waste control, it would continue to be managed as a hazardous waste due to CERCLA liability concerns.
- There was some question whether a specific exclusion for immobilized hazardous debris was necessary or whether the Hazardous Waste Identification Rule (HWIR) may be a

[1] An important issue that was discussed at the January 13–14, 1993, LDR Evaluation Project Roundtable meeting was the notification/recordkeeping requirements that are currently in place. Today's proposed rule would add certain requirements to the existing notification/recordkeeping system. In response to the concerns expressed by Roundtable participants and the streamlining and clarification efforts initiated in section III.C.3, however, the Agency will examine all the notification/recordkeeping requirements of the program to see if they can be simplified.

more appropriate mechanism for addressing this issue.

• A representative from the glass industry suggested that glass cullet and vitreous materials should have a separate treatment standard. He indicated that the glass matrix would not leach lead at a higher rate than would an immobilized product—that is, it made little sense to grind up the glass material and then to stabilize it when the original matrix is just as sound.

While no consensus was reached, the following principles were generally arrived at by most of the participants at the meeting.

Microencapsulation: Participants at the meeting seem to believe that using a leach test may be more appropriate to demonstrate effective microencapsulation immobilization over an approach of developing design and operating standards. It was noted that treatment of hazardous debris is very waste and debris specific; if one could define design and operating standards that were generally applicable, they would likely be too burdensome in many cases.

Macroencapsulation/Sealing: The participants seem to indicate that the grinding requirement in the TCLP leach test made it inappropriate for predicting performance of macroencapsulation/sealing immobilization technologies. These technologies rely on an impermeable coating applied to the outside of the debris. Rather, the participants suggested a structural test to determine whether the given debris/technology combination was sufficient to maintain the coating or a permeability test for the coating media. While the participants conceptually believed that such an approach was workable, no one was able to suggest a specific test or standard. In addition, it was felt by some of the participants that the development of such a test could be difficult to develop.

The Agency specifically solicits comments on the general principles described above. While no data or information was provided at the meeting, it was indicated that if such information was submitted to the Agency, the Agency would consider such information in making its decision.

C. EPA Investigations

In addition to the above roundtable discussions, EPA has also been reviewing the literature and talking to vendors in an effort to obtain sufficient information on how to propose standards that could allow the exclusion of immobilized hazardous debris. To date, no useful insights have been gained on how to specify design and operating standards that would ensure that immobilized hazardous debris was non-hazardous; the reason for this is the paucity of experience in immobilizing hazardous debris. Nevertheless, the Agency is interested in pursuing this area and specifically seeks assistance from the regulated community on this issue.

D. Conclusions

While the Agency has a better sense of the types of standards that may be appropriate for excluding immobilized hazardous debris from subtitle C control, the Agency still does not have the data to propose specific exclusions. In particular, for microencapsulation, if a leach test is the most appropriate mechanism for determining whether such treated debris is non-hazardous, the Agency believes that HWIR may be the appropriate rulemaking to address this issue. The Agency has a series of studies underway and is currently evaluating comments and is not in a position to determine what such levels are at this time. With respect to macroencapsulation/sealing, additional data or information will need to be gathered before the Agency is in a position to exclude this type of immobilized hazardous debris. To assist the Agency in this effort, we specifically solicit comment on the following questions:

Microencapsulation: Is the use of a leach test for excluding immobilized hazardous debris more appropriate than specification of design and operating standards? Is exclusion of immobilized hazardous debris using design and operating standards workable?

Macroencapsulation/Sealing: What type of structural or other test could be used? What type of criteria should be applied in determining whether such debris is non-hazardous? The Agency is considering allowing stabilization for soils containing low levels of organic constituents, and solicits comment on whether similar stabilization techniques or tests to ensure the effectiveness of such stabilization would be appropriate for excluding debris from subtitle C control.

In addition, the Agency specifically solicits comment on any data or information that is available to demonstrate that immobilized hazardous debris (if treated properly) would not pose a substantial hazard to human health and the environment. If such information is submitted to the Agency, the Agency will exclude such debris from subtitle C control.

X. Modifications to Hazardous Waste Recycling Regulations

A. Introduction

This proposal also includes changes to the hazardous waste recycling regulations which amend an exclusion (and related variance) which would allow streamlined regulatory decisions to be made regarding the regulation of certain types of recycling activities. These procedures should allow environmentally beneficial recycling to occur more easily. (This part of today's proposal is, however, not directly related to the proposed rules establishing prohibitions and treatment standards for hazardous wastes.)

EPA wishes to note that the changes to the definition of solid waste being proposed today are fairly narrow in scope. The Agency has also initiated a public dialogue process, administered by EPA's Definition of Solid Waste Task Force, which is examining the overall impacts of the RCRA program on recycling, and which will ultimately consider broader changes to the definition of solid waste.

B. Modification of the Existing "Closed-Loop" Recycling Exclusion and Related Case-Specific Variance

1. Existing "Closed-Loop" Recycling Exclusion and Related Variance

In the January 4, 1985 final rule, the Agency promulgated an exclusion from the definition of solid waste at § 261.2(e)(1)(iii) for secondary materials that are recycled in a "closed-loop," (i.e., returned to the original production process in which the material was generated (see preamble discussion at 50 FR 639)). To be considered such a "closed-loop" process, three conditions must be met. First, the secondary material must be returned to the original process without undergoing significant alteration or reprocessing (i.e., it must be returned without first being reclaimed). Second, the production process to which the unreclaimed material is returned must be a primary production process (i.e., a process that uses raw materials as the majority of its feedstock, as opposed to a secondary process that uses spent materials or scrap metal as the majority of its feedstock). And third, the secondary material must be returned as a feedstock to the original production process and must be recycled as part of that process (as opposed to an ancillary process such as degreasing). EPA believes that these conditions characterize a material that is part of an on-going production process, and as such, the management of the material should not be characterized as

waste management (i.e., the material is not part of the waste management problem).

The Agency is today proposing to readdress the second condition—that the production process to which secondary material is returned must be a primary process. The Agency imposed this condition due to considerations regarding jurisdiction, as it was understood in 1985, rather than to an evaluation of the potential impacts on the environment from closed-loop recycling involving secondary processes (i.e., this condition was established without a consideration of whether such secondary materials would be part of the waste management problem). By definition, a secondary process uses waste materials as its principal feedstock. Thus, the Agency concluded that the process residue, which is returned to the original process as a substitute for feedstock that is itself waste, is no less a waste than the waste material originally introduced (see 50 FR 639). (The Agency notes that in most cases this condition has no impact on the recycling of residues from secondary processes because such residues that exhibit a characteristic of hazardous waste (i.e., characteristic by-products and sludges) are already excluded from the definition of solid waste if reclaimed).

While the Agency continues to believe that the jurisdictional logic behind this condition is sound, the Court opinions regarding RCRA jurisdiction allow more weight to be given to environmental considerations. *API* v. *EPA*, 906 F.2d at 740–41; *AMC* v. *EPA*, 907 F2d 1179, 1186 (D.C. Cir. 1990). EPA has reevaluated this condition of the exclusion from the definition of solid waste due to its impact on the recycling of residues from secondary processes, in particular secondary lead smelters, and has determined that this condition is less relevant as an environmental consideration, assuming that the secondary material is well-managed prior to reprocessing. Therefore, the Agency is proposing to remove this condition from the "closed-loop" recycling exclusion. By doing this, secondary materials that are recycled in secondary production processes can be excluded from the definition of solid waste, provided that the materials are well-managed prior to recycling. The discussion of K069 wastes below illustrates the need for this amendment.

Following the same reasoning, the Agency is also proposing to amend § 260.33(b), a related case-by-case variance for materials that are reclaimed prior to reuse in the original primary production process from which they were generated (see 50 FR 652 for a discussion of the existing variance). The amendment would similarly expand the variance to make it available for materials that are returned to secondary processes, as well as those returned to primary processes.

2. K069 Wastes Recycled Back into the Secondary Process

In the case of K069 wastes (emission control dust/sludge from secondary lead smelting), the Agency identified thermal recovery of lead in secondary smelters (the same process that generates the waste) as BDAT in the Land Disposal Restrictions for the First Third Scheduled Wastes final rule (53 FR 31138; August 17, 1988). The treatment standard based on BDAT was expressed as "No Land Disposal" because the Agency believed the K069 waste to be "indigenous" to the smelting process and thus was no longer a solid waste within RCRA jurisdiction when introduced into the secondary smelter (which had been a long-standing policy regarding the reclamation of K069 waste, as stated in the November 29, 1985 preamble, 50 FR at 49167.) Therefore, the slag residue from the recovery of the K069 waste would not be derived from a solid waste and would thus not be a listed waste (but would be considered hazardous waste if it exhibited a hazardous characteristic.) (This view is also evident in the June 1, 1990 Land Disposal Restrictions for Third Third Scheduled Wastes final rule. In the preamble discussion regarding BDAT for wastes that exhibit the characteristic of toxicity for lead, the slag from secondary lead smelters is evaluated as a characteristic waste rather than a derived-from K069 waste (see 55 FR 22566–568; June 1, 1990).)

However, on June 26, 1990, the D.C. Circuit Court held in *American Petroleum Institute* v. *EPA*, 906 F.2d 726 (D.C. Cir. 1990) that EPA erred in disavowing the statutory authority to establish treatment standards for a slag residue of an "indigenous" waste and that RCRA jurisdiction could, in fact, extend to the slag. As a result of the mandate in that case, unless the Agency takes affirmative steps to otherwise exclude it, the slag resulting from the reclamation of K069 waste would likewise be a K069 hazardous waste, see 56 FR at 41165 (August 19, 1991), a result the Agency never intended.

The Agency notes that this would not be the outcome if the emission control dust was generated by a primary lead smelter and was recycled back into the original generating process. Such a sludge would be excluded from the definition of solid waste under 40 CFR 261.2(e)(1)(iii). The difference between the regulatory requirements applicable to the residues of primary processes and residues of secondary processes seems superfluous and is difficult to defend from an environmental standpoint because the residues of a secondary process that are recycled back into the process are no more of a waste management problem than the residues of a primary process recycled in a similar manner.

Therefore, the Agency proposes to modify the existing exclusion for secondary materials that are recycled back into the original process without prior reclamation to include those materials that are recycled back into secondary processes.

3. Storage Prior to Recycling

The Agency also proposes to condition the modification to the "closed-loop" exclusion (and the related 260.30(b) variance) such that secondary materials recycled back into secondary processes from which they were generated continue to be managed in an environmentally sound manner. Absent this condition, one possible outcome could be that a listed waste that is currently required to be managed in a protective manner (i.e., without land disposal) would begin to be managed in an unprotective manner because, as an excluded secondary material, no regulatory requirements would apply. The Agency is requiring sound management (i.e., management that is designed to contain the material or otherwise prevent its release to the environment) as a condition of this exclusion in order to keep this form of recycling from becoming part of the waste disposal problem, and to avoid a reduction in environmental protection from that currently existing. In particular, the Agency wishes to ensure that no land disposal of any excluded material occurs. EPA believes the *API* and *AMC II* cases discussed above support such an approach.

For example, under the current regulations, K069 waste is required to be managed in an environmentally sound manner prior to recycling. As a listed waste, it must be managed in storage units that meet specified criteria. And, as a waste subject to the land disposal restrictions, K069 waste may not be placed on the land, for example in open waste piles, until the applicable treatment standard has been met. However, as a secondary material that is excluded from the definition of solid waste because it is recycled back into the process from which it was generated, hazardous waste

management standards and the land disposal restrictions would not apply. (The Agency notes that such recycling is also the applicable treatment standard for K069 and that there is no conventional disposal alternative.)

The Agency solicits comment on broadening the "closed-loop recycling" exclusion and the related 260.30(b) variance to include secondary materials recycled into a secondary process. The Agency also solicits comment regarding the condition that such secondary materials from a secondary process be excluded only provided that the materials are managed such that the excluded material does not become part of the waste management problem, in particular, that there be no direct placement of materials on the land, and also solicits comments regarding whether all exclusions from the definition of solid waste should be conditioned on sound management practices.

XI. Implementation Issues

During the LDR Roundtable on January 14 and 15, 1993, participants expressed a need for more information to help implement regulations as they are issued. The Agency is specifically soliciting comments on possible implementation issues regarding the provisions being proposed today.

XII. Capacity Determinations

This section presents the data sources, methodology, and results of EPA's capacity analysis for today's rule. Section A summarizes the results of the capacity analysis for the wastes covered by this proposal; Section B summarizes the analysis of available capacity; Section C presents the results of the capacity analysis for surface disposed newly identified and listed wastes; Section D summarizes the capacity analysis for wastes mixed with radioactive contaminants; Section E summarizes the results of the capacity analysis for high TOC ignitable and TC pesticide wastes and newly listed wastes injected into Class I deep wells; and Section F presents the results of the capacity analysis for hazardous soil and debris contaminated with the newly listed and identified wastes covered in this proposal and for hazardous soil contaminated with Phase I wastes.

In general, EPA's capacity analysis methodologies focus on the amount of waste currently land disposed that will require alternative treatment as a result of the LDRs. Land-disposed wastes that do not require alternative treatment (e.g., those that are currently treated using an appropriate treatment technology) are excluded from the quantity estimates. In addition, wastes managed in CWA, SDWA, CWA-equivalent systems are not included in this rule and will be addressed in an upcoming rulemaking.

EPA's decisions on whether to grant a national capacity variance are based on the demand for commercial treatment or recovery technologies. Consequently, the methodology focuses on deriving estimates of the quantity of wastes that will require commercial treatment as a result of the LDRs—quantities of waste that will be treated on-site or by facilities owned by the same company as the generator are omitted from the required commercial capacity estimates.

The major capacity information collection initiative for this proposal was an EPA survey of all land disposal facilities that manage newly identified TC organic wastes (including TC-contaminated soil and debris) in land-based units. The survey, conducted in the spring of 1992, is a census of approximately 140 facilities. EPA identified the universe primarily based on those facilities that had submitted permit modifications or received interim status for managing these wastes. For each facility, EPA requested wastestream specific data on newly identified TC organic wastes and information on on-site land disposal units and treatment and recovery systems.

EPA developed a data set of the information on the survey results. Specifically, the data set contains information on the quantities of newly-identified organic TC wastes that will require commercial treatment capacity as a result of the LDRs. The data collected from the survey to date have been used for the required capacity estimates and are part of the docket for today's proposed rule. Additional analysis may revise the required capacity estimates for the final rule.

A. Capacity Analysis Results Summary

For the organic TC wastes (D018–D043), EPA estimates that 252,000 tons of newly identified organic TC sludges and solids will be managed off-site and require alternative treatment as a result of today's proposed rule.

EPA estimates that much smaller quantities of the other listed wastes included in today's proposed rule will require alternative treatment. In particular approximately 4,600 tons of coke by-products (K141–K145, K147 and K148) nonwastewaters are currently being land disposed. No K141–K145, K147 and K148 wastewaters are currently being land disposed. The majority of these nonwastewaters are likely to be recycled and, therefore, alternative treatment may not be required. Fewer than 100 tons of chlorinated toluene (K149–K151) nonwastewaters are currently being land disposed and will require alternative treatment due to the LDRs. No K149–K151 wastewaters are currently being land disposed.

The quantities of radioactive wastes mixed with wastes included in today's proposed rule and currently being land disposed are uncertain.

EPA has very limited information which differentiates high TOC D001 ignitable wastes from low TOC D001 ignitable wastes, particularly with reference to the type of Class I injection well (i.e., nonhazardous versus hazardous) the wastes are disposed into. However, the information the Agency does have indicates that both D001 ignitable wastes and D012–D017 TC pesticide wastes are deep well injected into Class I hazardous wells with no-migration petitions. EPA estimates that, based on management practices, little if any diluted high TOC ignitable waste is injected into Class I nonhazardous wells, and no more than 419 tons of D012–D017 pesticide wastes are deep well injected into class I wells without no-migration petitions.

EPA estimates that 3 million tons of hazardous soil contaminated with previously regulated wastes are presently land disposed without prior treatment.[2] The Agency also estimates that 234,000 tons of hazardous soil and 34,000 tons of hazardous debris contaminated with the newly identified organic TC wastes are currently being managed off-site and will require alternative treatment.

In addition, EPA expects a one-time generation of hazardous soil contaminated with F037 and F038 petroleum refining wastes of approximately 180,000 tons in 1994. This one-time generation is due to the cleanout or closure of surface impoundments at petroleum refineries. The estimation of 180,000 tons was based upon information submitted to EPA by petroleum refineries and an assessment of "typical" quantities of soil excavated during impoundment closures. Absent additional information, EPA expects a proportionate number of these surface impoundment closures to be completed prior to the effective date

[2] These wastes include soil contaminated with Third Third wastes that were granted a two-year capacity variance in the Third Third rule (55 FR 22520). This national capacity variance expired on May 8, 1992. However, the Agency granted a national case-by-case extension to hazardous soil contaminated with Third Third wastes which expired May 8, 1993.

of this rulemaking. Thus, EPA estimates approximately 90,000 tons of hazardous soil contaminated with F037 and F038 would require treatment as a result of this rulemaking. EPA requests comments on the timing of the surface impoundment closures and the affected quantities of wastes.

Table 1 lists each waste code for which EPA is proposing LDR standards today. For each code, this table indicates whether EPA is proposing to grant a national capacity variance for surface-disposed wastes. EPA is not proposing to grant a national capacity variance for newly identified organic TC wastes. However, the Agency is proposing to grant two-year national capacity variances for mixed radioactive wastes (i.e., radioactive wastes mixed with newly identified TC organic constituents D018–D043), for hazardous soil and debris contaminated with newly listed and identified wastes covered under this proposal, and hazardous soil contaminated with Phase I wastes. EPA is also proposing to extend the effective date for compliance with treatment standards for all waste codes covered by this rulemaking by granting a three-month national capacity variance. This extension would not apply to wastes with a specified longer national capacity variance. EPA is proposing to delay the effective date because the Agency realizes that even where data indicate that sufficient treatment capacity exists, such capacity may not be immediately available. Additional time may be required to determine what compliance entails, redesign tracking documents, possibly adjust facility operations, and possibly segregate wastestreams. EPA believes these legitimate delays can be encompassed within a short-term capacity variance because the ability to get wastes to the treatment capacity in a lawful manner is an inherent part of assessing available capacity.

EPA's recently promulgated final rule addressing corrective action management units (CAMUs) and temporary units (Tus) (published February 16, 1993 at 58 FR 8658) is likely to reduce the quantity of remediation wastes and soil subject to the land disposal restrictions by reducing the quantity of remediation waste and soil excavated and also by reducing the volume of material managed off-site. As a result, the CAMU/TU rule is likely to free up current hazardous waste treatment and disposal capacity and reduce the demand for future capacity.

In summary, the CAMU/TU rule is designed to facilitate RCRA corrective actions and CERCLA remediations by providing that remediation wastes managed within CAMUs and Tus will not be subject to the RCRA land disposal restrictions requirements. The CAMU rule does not apply to wastes generated from ongoing production processes or other industrial activities; it applies only to remediation wastes managed in implementing remedial actions. For example, under the final CAMU provisions, remediation wastes may be excavated from several isolated areas at a facility, treated in a central location on-site, and disposed in a CAMU without triggering the LDRs or other RCRA land disposal unit requirements. CAMUs can be used only at facilities regulated under subtitle C of RCRA, at CERCLA sites where determined to be applicable or relevant and appropriate requirements (ARARs), and under some state remedial programs (i.e., CAMUs cannot be used at facilities that are not currently remediating under federal or state authorities) and can be used only with the permission of the permit writer.

As a result, EPA believes that the CAMU rule will reduce the volume of remediation waste requiring treatment to LDR standards. In particular, incineration and off-site management are likely to be used less frequently than they currently are, while on-site management of in-situ and excavated soil will increase. Although estimates of the quantity of remediation waste and hazardous soil that will be affected by the CAMU is unknown, EPA estimates that about 1,500 facilities subject to the RCRA corrective action requirements will use CAMUs.

TABLE 1—VARIANCES FOR NEWLY LISTED AND IDENTIFIED WASTES

["Yes" Indicates EPA is Proposing to Grant a Variance]

Waste Type	Disposal Unit				
	Landfill	Land treatment	Surface impoundment	Waste pile	Deepwell
High TOC D001 Wastes	No	No	No	No	No
D012–D017 Wastes[a]	No	No	No	No	No
D018–D043 Nonwastewaters	No	No	No	No	N/A
K141–K145 Wastes	No	No	No	No	No
K147–K148 Wastes	No	No	No	No	No
K149–K151 Wastes	No	No	No	No	No
Mixed Radioactive	Yes	Yes	Yes	Yes	N/A
Soil (Prev. Regulated Wastes)[b]	No	No	No	No	N/A
Soil (Phase I Wastes)	Yes	Yes	Yes	Yes	N/A
Soil (Phase II Wastes)[c]	Yes	Yes	Yes	Yes	N/A
Debris (Phase II Wastes)[c]	Yes	Yes	Yes	Yes	N/A

N/A means Not applicable.

[a] Newly identified TC wastes that were not previously hazardous by the old EP Leaching Procedure.

[b] EPA has previously granted a two-year national capacity variance to soil contaminated with previously regulated wastes.

[c] EPA is proposing to grant a two-year national capacity variance for hazardous soil and debris contaminated with Phase II wastes, including mixed radioactive/Phase II wastes.

B. Analysis of Available Capacity

The analysis of commercial capacity for newly identified wastes is based primarily on the TSDR Survey capacity data set, data received in response to previous LDR notices and regulations, and data received in voluntary data submissions. These data include estimates of available capacity at commercial combustion facilities (i.e., incinerators and boilers and industrial furnaces (BIFs)), other conventional treatment facilities, and innovative technology vendors.

Combustion capacity. Combustion capacity for liquid hazardous wastes has historically been more readily available

than capacity for sludges and solids. Commercial capacity for combustion of sludges and solids is available at both incinerators and industrial furnaces (primarily cement kilns that are authorized to accept hazardous waste). Because of the new regulations and policies regarding the burning of hazardous wastes in boilers and industrial furnaces, many commercial cement kiln facilities are currently changing their operational practices. The effect of these new combustion controls and other changes will be addressed in future revisions to capacity estimates for wastes regulated in this final rule.

The types of wastes cement kilns are able to burn are limited by air emission limits, feed system limitations, and product (i.e., cement) quality considerations. For instance, cement quality considerations generally require that wastes burned in cement kilns have a heating value of at least 5,000 Btu/lb. In addition, combustion capacity may be limited by chemical characteristics, constituent levels, and physical properties of the waste.

Information available to EPA indicates that at least 192,000 tons/year of commercial combustion capacity are available for all newly identified TC organic sludges and solids, including soil and debris. However, EPA recently received data from the Hazardous Waste Treatment Council (HWTC) stating that a survey of their members showed approximately 300,000 tons of incineration capacity is currently available for solids. If the available capacity for cement kilns is added to this figure and the additional capacity required after the expiration of the F037/38 variance is subtracted, there would be approximately 334,000 tons of sludge/solids combustion capacity available. This quantity of available capacity takes into account capacity that will be required for Phase I wastes that were granted a national capacity variance (57 FR 37194, August 18, 1992), ignitable and corrosive wastes whose treatment standards were vacated (58 FR 29860, May 24, 1993), waste characteristics that affect the ability for a particular facility(s) to treat the wastes, and other factors that may limit capacity.

In the comments submitted in response to the October 24, 1991 Advanced Notice of Proposed Rulemaking (ANPRM), several commenters raised issues regarding EPA's methodology for determining available capacity. Commenters proposed that EPA should not consider planned capacity since new facilities and facility expansions are commonly delayed; not include capacity from facilities that violate environmental regulations; account for the expiration of capacity variances granted for combustion in the Third Third rule; and account for actual operating time in its assessment of a facility's available capacity. These factors were taken into account in the capacity analysis where appropriate.

Three commenters also reported ongoing data collection efforts that might provide additional information on available capacity in the near future. These efforts include surveys being conducted by the HWTC to determine its members' sludge and solid combustion capacity and their capacity to treat soil; the Cement Kiln Recycling Coalition on cement kiln dust issues that may contain information on the waste-burning practices at cement kilns; and Oak Ridge National Laboratories of mixed radioactive waste generators to assess mixed radioactive waste treatment capabilities. EPA has received confirmation that HWTC and the CKRC are planning to survey their members on available combustion capacity. Because of time constraints, this new information will be summarized and included in the Docket to today's proposed rule and will be considered in the capacity analysis for the final rule.

A few of the comments received on the ANPRM noted factors that may limit the applicability of commercial combustion for certain TC wastes. One commenter emphasized that EPA must consider certain external factors that can limit incineration capacity, including waste characteristics, such as heating value and chlorine content, that might affect waste acceptability; limitations imposed on wastes, such as TC wastes, which are often managed as bulk solids; packaging and transportation limitations; limited temporary storage space at certain facilities; and regulatory obstacles to permitting new incinerators. EPA requested information on these factors in the survey of facilities that manage organic TC wastes, including soil and debris, in land-based units. This information has been and will be re-evaluated and taken into account in the capacity analysis for the final rule.

Other potential capacity limitations noted in the comments were equipment problems at commercial facilities that can cause disruption in waste acceptance, and the Boiler and Industrial Furnace (BIF) rule which may potentially limit combustion capacity at cement kilns. One commenter also noted that if the cement produced by a kiln that burns listed hazardous wastes is subject to LDR standards, then cement kilns should not be considered in available capacity estimates.

EPA is also considering the capacity effects of recent court decisions regarding the regulation of hazardous constituents other than those for which the waste fails the TC test. EPA solicits comments on the treatment capacity effects of requiring facilities to treat the underlying hazardous constituents in TC organic hazardous wastes to meet the proposed universal treatment standards.

EPA will analyze the results of the combustion surveys that will be conducted by the Hazardous Waste Treatment Council and the Cement Kiln Recycling Coalition, review recent regulatory developments concerning combustion facilities, and determine how much combustion capacity will be available for wastes covered by this rule when it becomes effective.

Other conventional treatment technologies. There are three primary conventional commercial treatment technologies for the newly identified and listed wastes besides combustion: Stabilization, biological treatment, and chemical precipitation. EPA estimates that over 1 million tons of stabilization capacity, 187,000 tons of biological treatment capacity, and 813,000 tons of chemical precipitation capacity are currently available. In analyzing alternative treatment capacity for stabilization, biological treatment, and chemical precipitation for newly identified and listed wastes, the Agency built on the capacity analysis conducted for the Third Third LDR rule. This analysis was based on data contained in the TSDR Capacity Data Set which contains results from the National Survey of Hazardous Waste Treatment, Storage, Disposal and Recycling Survey (the TSDR Survey).

Innovative technologies. There are several innovative technologies for the treatment of hazardous soil including hydrolysis, vacuum extraction, photolysis, and oxidation. To the extent that these technologies can be used to treat hazardous soil on-site, the required capacity for combustion will decrease. EPA has limited information on innovative technologies with regard to both available capacity and to limitations of the technologies or constraints on the use of these technologies. EPA solicits comments on the use of innovative technologies for the treatment of hazardous soil. Specifically, EPA requests information on constraints on the use of these technologies both on- and off-site, including physical or chemical characteristics of the soils, and logistical constraints such as permitting,

scheduling, etc. EPA also solicits data on volumes of hazardous soil currently being treated by these technologies, current available capacity, and estimates of future capacity.

C. Surface Disposed Newly Identified and Listed Wastes

1. Required Capacity for Newly Identified TC Organics (D018–D043)

The Agency is proposing to develop treatment standards for TC organic nonwastewaters based primarily on incineration performance data. Newly identified organic TC wastewaters that are managed in systems other than those regulated under the CWA, those regulated under the SDWA that inject TC wastewaters into Class I injection wells, and those zero discharge facilities that engage in CWA-equivalent treatment prior to land disposal are also affected by today's proposed rule. (Organic TC wastewaters managed in CWA, SDWA, or CWA-equivalent systems will be addressed in future rulemakings, and EPA will make variance determinations at that time.) The Agency does not have data indicating that facilities managing organic TC wastewaters would be impacted. EPA solicits comments on the quantities of newly identified organic TC wastewaters affected by today's proposed rule.

EPA developed estimates of the quantities of newly identified TC organic wastes based on current management options to comply with the LDR requirements. The Agency also developed estimates of available on-site treatment and recovery capacity. Table 2 summarizes available capacity for each alternative treatment or recovery technology required for the newly identified Toxicity Characteristic nonwastewaters. The table also summarizes the required capacity for each technology. A comparison of required and available treatment capacity indicates that adequate treatment capacity exists for new TC nonwastewaters. Therefore, EPA is not proposing to grant a national capacity variance for D018 through D043 nonwastewaters. EPA is requesting comments and any additional data on its assessment that there is adequate treatment capacity for these wastes.

Table 3 presents the 1993 quantities of TC nonwastewaters requiring off-site treatment by waste code.

TABLE 2.—REQUIRED AND AVAILABLE CAPACITY FOR NEWLY IDENTIFIED ORGANIC TC WASTES[1]

[All quantities are in tons]

Treatment technology	Available capacity	Required capacity
Chemical precipitation	[2] 813,000	10,000
Liquid combustion	541,000	[3] 11,000
Sludge/solid combustion	334,000	253,000
Stabilization ..	[4] 1,127,000	41,250

[1] Does not include hazardous soil and debris, mixed radioactive wastes, or deepwell injected wastes.
[2] Capacity analysis for the Third Third rule.
[3] These are liquid nonwastewaters.
[4] Capacity analysis for the proposed Phase I Newly Listed and Newly Identified Waste rule.

Table 3.—1993 QUANTITIES OF TC NONWASTEWATERS REQUIRING OFF-SITE TREATMENT

[Surface Disposed Wastes in Tons]

Code	Non-wastewaters
D018	152,990
D019	8,510
D020	6,319
D021	8,484
D022	8,343
D023	3,897
D024	515
D025	308
D026	1,518
D027	1,142
D028	14,197
D029	3,859
D030	511
D031	203
D032	3,109
D033	450
D034	412
D035	4,216
D036	262
D037	612
D038	2,297
D039	6,900
D040	6,583
D041	108
D042	120
D043	16,482
Total	252,347

The quantities presented in Table 2 do not include used oil because in the May 1, final listing determination the Agency determined that the TC characteristic adequately defines those used oils which should be regulated as hazardous waste. Because of the TC regulation and other environmental regulation, the Agency determined that it is unnecessary to list used oil being disposed as hazardous. Thus, used oil that is not recycled and that exhibits the toxicity characteristic would be subject to the land disposal restrictions.[3] EPA has not separately quantified the amounts of used oil subject to the LDRs. The Agency requests comments on the quantities and management of the used oil that exhibits the toxicity characteristic and that is subject to the LDRs.

2. Required Capacity for Other Newly Listed Organic Wastes

This section presents EPA's analysis of required capacity for other listed organic wastes including coke by-product wastes and chlorinated toluene production wastes.

a. Surface Disposed Coke By-Product Wastes

K141 Process residues from the recovery of coal tar, including, but not limited to, tar collecting sump residues from the production of coke from coal or the recovery of coke by-products produced from coal. This listing does not include K087 (decanter tank tar sludge from coking operations).

K142 Tar storage tank residues from the production of coke from coal or the recovery of coke by-products produced from coal.

K143 Process residues from the recovery of light oil, including, but not limited to, those generated in stills, decanters, and wash oil units from the recovery of coke by-products produced from coal.

K144 Wastewater sump residues from light oil refining, including, but not limited to, intercepting or contamination sump sludges from the recovery of coke by-products produced from coal.

K145 Residues from naphthalene collection and recovery operations from the recovery of coke by-products produced from coal.

K147 Tar storage tank residues from coal tar refining.

K148 Residues from coal tar distillation, including but not limited to still bottoms.

For coke by-product nonwastewaters, EPA is proposing to establish concentration standards based on incineration. Under the authority of section 3007 of RCRA, EPA collected generation and management information concerning coke by-product wastes; this information was collected in 1985 and 1987. The Agency identified the following annualized quantities of wastes: 49 tons of K141 nonwastewaters, 2,750 tons of K142 nonwastewaters, 10 tons of K143 nonwastewaters, 304 tons of K144 nonwastewaters, 1,408 tons of K147 nonwastewaters, and less than 100 tons of K148 nonwastewaters. EPA identified no K145 nonwastewaters that were being land disposed. The majority of

[3] Used oil that is recycled is not subject to the land disposal restrictions. (40 CFR 261.6 (a) and (b))

K141 to K145 nonwastewaters generated during that timeframe were recycled or used for energy recovery. Tar storage tank and tar distillation bottoms may be removed periodically. The Agency is soliciting comments for the above estimated quantities which may require alternative treatment as a result of the LDRs.

Current management practices indicate that the majority of the newly listed coke by-product wastes are amenable to recycling, and therefore, alternative treatment may not be required as a result of today's proposed rule. Thus, EPA believes that adequate capacity exists to treat the small amount of wastes, if any, that require alternative treatment.

EPA does not have any information that coke by-product wastewaters are currently generated. The quantity of these wastewaters is assumed to be zero. EPA is soliciting comments on changes of management practices or generation data on these wastes.

As a result of this analysis, EPA is proposing not to grant a national capacity variance to K141, K142, K143, K144, K145, K147, and K148 nonwastewaters and wastewaters.

b. Surface Disposed Chlorinated Toluene Wastes

K149 Distillation bottoms from the production of alpha (methyl) chlorinated toluene, ring-chlorinated toluene, benzoyl chlorides, and compound with mixtures of these functional groups. (This waste does not include still bottoms from the distillation of benzyl chloride.)

K150 Organic residuals, excluding spent carbon adsorbent, from the spent chlorine gas and hydrochloric acid recovery processes associated with the production of alpha (methyl) chlorinated toluene, ring-chlorinated toluene, benzoyl chlorides and compounds with mixtures of these functional groups.

K151 Wastewater treatment sludges, excluding neutralization and biological sludges, generated during the treatment of wastewaters from the production of alpha (methyl) chlorinated toluene, ring-chlorinated toluene, benzoyl chlorides and compounds with mixtures of these functional groups.

For wastes generated during the production of chlorinated toluene, EPA is proposing to establish concentration-based treatment standards based on incineration for nonwastewaters. EPA collected generation and management information on wastes generated from the production of chlorinated toluene. EPA collected this information under the authority of section 3007 of RCRA during engineering site visits in 1988. This capacity analysis incorporates data from the section 3007 information request and engineering site visits. EPA identified four facilities that produce chlorinated toluene wastes.

The Agency has identified no K149 nonwastewaters, no K150 nonwastewaters, and less than 100 tons of K151 nonwastewaters that were being land disposed. For the capacity analysis, EPA assumes that these quantities are currently being land disposed and will require further treatment as a result of today's proposed rule.

EPA does not have any information that chlorinated toluene wastewaters are currently generated. The quantity of these wastewaters is assumed to be zero. EPA is soliciting comments on changes of management practices or generation data on these wastes.

Because adequate capacity exists to treat these wastes, EPA is not proposing to grant a national capacity variance for K149, K150, and K151 nonwastewaters and wastewaters.

3. Newly Identified TC Wastes That Were Not Previously Hazardous by the Old EP Leaching Procedure

In the Third LDR rule (55 FR 22520, June 1, 1990), EPA promulgated treatment standards for D012 through D017 wastes, but only for those wastes that were previously hazardous by the old EP leaching procedure and remain hazardous under the new TCLP. D012 through D017 wastes that were not hazardous by the old EP leaching procedure but are now hazardous using the new TCLP are considered newly-identified D012 through D017 wastes.

In response to the ANPRM (56 FR 55160, October 24, 1991), EPA did not receive any estimates for additional waste quantities (or newly-identified wastes) due to the use of TCLP rather than the EP leaching procedure. EPA believes that the quantities of the newly-identified D012 through D017 wastes due to the use of the TCLP rather than the EP leaching procedure are small, if any, and, hence, expects little or no additional demand for commercial treatment capacity as a result of the LDRs. Because sufficient capacity exists to treat these wastes, EPA is proposing not to grant the newly-identified D012 through D017 wastes a national capacity variance.

D. Required and Available Capacity for Newly Identified Wastes Mixed with Radioactive Components

EPA has defined a mixed RCRA/radioactive waste as any matrix containing a RCRA hazardous waste and a radioactive waste subject to the Atomic Energy Act (53 FR 37045, 37046, September 23, 1988). These mixed wastes are subject to the RCRA hazardous waste regulations, including the land disposal restrictions, regardless of the type of radioactive constituents that these wastes contain.

Radioactive wastes that are mixed with spent solvents, dioxins, California list wastes, or First Third, Second Third, or Third Third wastes are subject to the land disposal restrictions already promulgated for these hazardous wastes. EPA granted national capacity variances for all of these mixed wastes because of a lack of national treatment capacity. Today's rule addresses the radioactive wastes that contain newly listed hazardous wastes being restricted in today's proposed rulemaking.

Based on comments received by EPA in response to the ANPRM (56 FR 55160) and previous rulemakings, the U.S. Department of Energy (DOE) is the primary generator of mixed RCRA/radioactive wastes. A variety of non-DOE facilities also generate mixed wastes, including nuclear power plants, academic and medical institutions, and industrial facilities.

In response to the ANPRM, DOE developed and submitted data on its generation of mixed RCRA/radioactive wastes and its capacity available to treat such wastes. To update and refine its data, DOE requested 37 DOE Field Organizations to identify and characterize their mixed waste streams, including developing profiles of the newly regulated TC organic waste streams. Twenty DOE Field Organizations responded to the data request and provided waste stream-specific data, including annual generation rates and the inventory of such wastes expected by May 1993. In April, 1993, this Interim Mixed Waste Inventory Report was prepared and included a national inventory of all mixed wastes that are currently stored or will be generated over the next five years, and a national inventory of mixed waste treatment capacities and technologies. The report provides waste stream-specific and treatment facility-specific information for each DOE site in each state. EPA has not completed its review of the data contained in this report, and consequently, the data were not available for use in this proposed rule. Additionally, the six-month public comment period for the Interim Report has not yet expired. EPA will update the results of the capacity analysis for the final rule with the results from the Final Mixed Waste Inventory Report.

Data on some of the other DOE facilities were derived from other data sources. DOE also submitted data gathered from its Field Organizations on the availability of its existing and

planned capacity to treat mixed RCRA/radioactive wastes, including TC wastes.

While DOE has provided its best available data on mixed waste generation, uncertainty remains about mixed waste generation at DOE (and non-DOE) facilities. For example, not all DOE Field Organizations responded to DOE's request for information. In addition, DOE recently completed an Interim Mixed Waste Inventory Report (April 1993). This information will be incorporated into the final capacity analysis. In addition, the data submitted to EPA generally did not include DOE environmental restoration wastes which, when generated, will increase the quantity of newly identified mixed wastes that require treatment.

Although DOE is in the process of increasing its capacity to manage mixed RCRA/radioactive wastes, information supplied by DOE indicates that a significant capacity shortfall currently exists for the treatment of mixed RCRA/radioactive wastes, much of which is in storage facilities awaiting treatment. DOE has indicated that it will generally give treatment priority to mixed wastes that are already restricted under previous LDR rules (e.g., radioactive wastes mixed with solvents, dioxins, California list wastes, or First Third, Second Third, or Third Third wastes.) DOE is also concerned about the availability of treatment capacity for mixed wastes that will be generated as a result of site remediation activities. EPA's review of non-DOE data sources also showed a significant lack of commercial treatment capacity.

Despite the uncertainty about quantities of mixed radioactive wastes containing newly listed and identified wastes that will require treatment as a result of today's proposed rule, any new commercial capacity that becomes available will be needed for mixed radioactive wastes that were regulated in previous LDR rulemakings and whose variances have already expired. Thus, EPA has determined that sufficient alternative treatment capacity is not available, and is proposing to grant a two-year national capacity variance for mixed RCRA/radioactive wastewaters and nonwastewaters contaminated with newly listed and identified wastes whose standards are being proposed today.

E. Required and Available Capacity for High TOC Ignitable, TC Pesticide, and Newly Listed Wastes Injected into Class I Deep Wells

As explained in previous rules concerning land disposal restrictions (see e.g., 52 FR 32450, August 27, 1987; 53 FR 30912, August 16, 1988; 55 FR 22520, June 1, 1990), EPA is allocating available capacity first to those wastes disposed in surface units, second to wastes resulting from CERCLA and RCRA clean ups, and finally to underground injected wastes. Based on this hierarchical approach, the Agency is proposing the following effective dates for injected wastes.

EPA has very limited information which differentiates high TOC D001 ignitable wastes from low TOC D001 ignitable wastes, particularly with reference to the type of Class I injection well (i.e. nonhazardous versus hazardous) the wastes are disposed into. However, the information the Agency does have indicates that both D001 ignitable wastes and D012–D017 TC pesticide wastes are deep well injected into Class I hazardous wells with no-migration petitions. EPA estimates that, based on management practices, little if any diluted high TOC ignitable waste is injected into Class I nonhazardous wells, and no more than 419 tons of D012–D017 pesticide wastes are deep well injected into Class I wells without no-migration petitions.

The following wastes are the newly listed wastes for which numerical standards are being proposed, and which current data indicate are not being underground injected:

Coke Production Wastes: K141, K142, K143, K144, K145, K147, K148

Chlorotoluene Production Wastes: K149, K150, K151

Therefore, EPA is proposing that these wastes be prohibited from underground injection upon the date of final promulgation of this rule. EPA is not proposing to grant a national capacity variance for any of these waste types. The Agency requests further comment on whether any of these wastes are being injected. Comment is also requested on what quantities of wastes are being injected, and on the characteristics of these wastes.

F. Required and Available Capacity for Hazardous Soil and Debris Contaminated With Newly Listed and Identified Wastes

This capacity analysis focuses on hazardous soil and debris contaminated with wastes whose treatment standards are proposed in this rule as well as hazardous soils contaminated with Phase I wastes.

Based on data currently available, EPA estimates that 3 million tons of hazardous soil contaminated with previously regulated wastes are presently disposed in hazardous waste landfills without prior treatment. These wastes were granted a two-year national capacity variance in the Third Third rule (55 FR 22520) which expired in May 1992. However, EPA granted a one-year national case-by-case extension for hazardous soil contaminated with previously regulated wastes requiring treatment by incineration, retorting, or vitrification. This variance expired in May 1993. Consequently, these wastes may undergo treatment prior to land disposal. In order to determine the capacity available to treat newly listed and identified hazardous soil, EPA must consider the impact that the treatment of hazardous soil contaminated with wastes regulated in previous LDR rulemakings will have on available commercial capacity. EPA used several data sources to estimate the total quantity of land-disposed hazardous soil and debris. These sources include: responses to the Advance Notice to the Proposed Rulemaking (ANPRM) for the newly identified wastes (56 FR 55160); the newly developed TC data set discussed earlier; information provided during a series of roundtable meetings held by the Agency in May and June of 1991 with representatives of companies involved in the management and disposal of hazardous debris and soil; the Biennial Reporting System (BRS); Records of Decision (RODs) of Superfund sites; the National Survey of Treatment, Storage, Disposal and Recycling Facilities (TSDR Survey); and the National Survey of Hazardous Waste Generators.[4]

In general, EPA found severe limitations in estimating the total quantity of hazardous soil because the available data are incomplete and poorly defined. The reason for this lack of comprehensive data is several-fold: First, the regulated community reported that their data generally are not classified by soil but rather by waste code and waste description; second, the data from the TSDR and Generator Surveys were not collected and categorized specifically for soil, and soil was often mixed with debris[5] and was frequently contaminated with more than one waste, thereby making the hazardous soil quantity determinations difficult; third, TSDR and Generator Surveys do not include data on hazardous soil contaminated with

[4] EPA conducted the surveys during 1987 and 1988 to obtain comprehensive data on the nation's capacity for managing hazardous waste and the volumes of hazardous waste being land disposed as well as data on waste generation, waste characterization, and hazardous waste treatment capacity in units exempt from RCRA permitting.

[5] Data submitted by TSDFs in roundtable meetings sometimes combine contaminated debris with soil. Furthermore, TSDFs have stated that historical waste data are generally not kept by soil classifications.

newly identified wastes because they were not considered hazardous wastes in 1986; and fourth, the BRS only covers active generators of hazardous waste and therefore may not capture soil volumes generated at inactive sites.

1. Waste Generation

a. *Hazardous soil.* The hazardous soil covered by this proposal includes soil contaminated with D018–D043 organic TC wastes, soils contaminated with coke-by product wastes and chlorinated toluene wastes, mixed radioactive soils contaminated with Phase II wastes, and soils contaminated with Phase I wastes. The largest quantity of hazardous soil in this proposal is from hazardous soil contaminated with D018–D043 organic TC wastes. Based on the results of the TC survey, EPA's current estimate for this quantity that will require off-site treatment is 234,000 tons per year. Table 4 presents the estimated 1993 quantities of soil and debris contaminated with newly identified TC wastes requiring off-site treatment, by waste code and type. The results of the newly developed TC data set discussed in the introductory section of this chapter have been used for these demand estimates and are part of the docket for today's rule. Additional analysis of the survey data will be incorporated in the capacity analysis for the final rule.[6]

One commenter to the ANPRM indicated that as many as 3,000 manufactured gas plants (MGP) may be generating TC-contaminated soil and debris. Most of the soil and debris generated at these plants is expected to be contaminated with benzene. While EPA acknowledges that the quantities of TC-contaminated soil from MGP are potentially large, the Agency expects that most of this quantity will be managed on-site and will not require off-site or commercial treatment capacity. EPA requests updated information on the generation and management of these wastes and on whether there will be sufficient commercial treatment services to treat these wastes on-site.

TABLE 4.—1993 QUANTITIES OF TC-CONTAMINATED SOIL AND DEBRIS REQUIRING OFF-SITE TREATMENT

[Surface Disposed Wastes in Tons]

Code	Soil	Debris
D018	161,166	27,574
D019	184	195
D020	325	16
D021	29,760	212
D022	139	71
D023	31	57
D024	30	50
D025	30	60
D026	111	1,270
D027	1,795	244
D028	976	314
D029	1,831	324
D030	28,938	90
D031	17	13
D032	59	68
D033	60	103
D034	60	29
D035	461	293
D036	113	65
D037	336	227
D038	567	538
D039	2,789	961
D040	3,967	878
D041	17	22
D042	17	22
D043	66	85
Total	233,845	33,781

[6] The total quantity of all TC hazardous soils impacted by LDR regulations may increase as further regulations are developed for TC wastes which are deferred to future rulemakings.

EPA believes mixed radioactive soils contaminated with Phase II wastes are currently generated. For example, DOE informed EPA that mixed radioactive soil contaminated with newly identified TC organic wastes are generated at a rate of 1.5 m^3 per year. Additionally, 23.7 m^3 of TC organic mixed radioactive soils are being stored awaiting treatment. Therefore EPA does not believe there is sufficient treatment capacity for the TC organic mixed radioactive soils generated annually.

Soils for Phase I wastes are being regulated under this rulemaking. The largest source of hazardous soil contaminated with Phase I wastes are F037 and F038 wastes generated at petroleum refining facilities. EPA believes that the quantities of hazardous soil contaminated with other Phase I wastes are relatively small. EPA has received information from petroleum refineries indicating that most facilities that were managing F037 and F038 wastes in surface impoundments are modifying their operations in some way. To the extent that a proportion of surface impoundments will be closed with waste removal, hazardous soil will be generated.

Information submitted to EPA by some petroleum refining facilities indicates that many surface impoundments managing F037 and F038 wastes will be closed with waste removal and that a significant number of these closures will occur during 1994. Closures with waste removal may involve the generation of hazardous soil. Based on assessments of the "typical" quantities of soil excavated during surface impoundment closures, EPA estimates that as much as 90,000 tons of F037- and F038-hazardous soil may be impacted by this rule. EPA stresses that these quantities represent a one-time generation of soil and are not expected to recur after 1994. EPA requests comments on this estimate and the timing.

EPA estimates that approximately 3 million tons of hazardous soil contaminated with previously regulated wastes are land disposed per year. EPA believes these quantities will initially have a significant impact on the capacity available to treat newly listed and identified hazardous soil. EPA solicits comment on this quantity estimate. Comments from the roundtable meetings indicate that decommissioning of large chemical plants and increasing remediation activities can significantly increase the estimated quantity of hazardous soil.

Several commenters to the ANPRM indicated that EPA may have underestimated the annual quantities of hazardous soil generated. Some commenters provided site specific data on the quantities of soil generated during remedial actions. The Agency is incorporating these data in its analysis of the required capacity for hazardous soil. Other commenters indicated that very large quantities of hazardous soil contaminated with wood preserving wastes and with former Bevill wastes will be generated in the near future. The Agency acknowledges these comments. However, hazardous soil contaminated with wood preserving wastes and with former Bevill wastes will be addressed in a future rulemaking.

EPA notes that the promulgation of new soil standards may encourage the development of on-site treatment technologies or the increased use of innovative technologies. EPA requests comments on the use of innovative technologies for hazardous soil. Specifically, EPA requests information on constraints to the use of these technologies both on- and off-site, including physical or chemical characteristics of the wastes, and logistical constraints such as permitting, scheduling, etc.

b. Hazardous debris. This rule covers debris contaminated with the newly listed and identified wastes covered in this proposal. An examination of the data from the TC survey indicates that approximately 34,000 tons of debris

contaminated with D018–D043 wastes may be currently land disposed.

EPA believes mixed radioactive debris contaminated with Phase II wastes are currently generated. For example, DOE informed EPA that mixed radioactive debris contaminated with newly identified TC organic wastes are generated at a rate of 46.36 m^3 per year. Additionally, 957.42 m^3 of TC organic mixed radioactive debris is being stored awaiting treatment. Therefore EPA does not believe there is sufficient treatment capacity for the TC organic mixed radioactive debris generated annually.

2. Current Management Practices

Waste generators and TSDFs report that most of the soils contaminated with D018–D043 newly identified organic TC wastes are currently landfilled without prior treatment. Incineration is the commercial off-site treatment technology reportedly available for these wastes.

Other than incineration for treating organic TC-contaminated soil, EPA has no information on the commercial off-site availability of other treatment technologies (e.g., low temperature thermal desorption, bioremediation, solvent extraction.) Although several commenters to the ANPRM mentioned bioremediation as an alternative to incineration for the treatment of TC-contaminated soils, no commenter provided facility specific information on commercially available off-site treatment capacity for bioremediation. The lack of off-site commercial capacity for technologies other than incineration was confirmed by responses to EPA's request for voluntary information from vendors of innovative technologies provided in the Vendor Information System for Innovative Treatment Technologies (VISITT). Although EPA has received no information that special-handling problems may limit the quantity of hazardous soil that currently can be treated by incineration, EPA is requesting information on special-handling concerns with managing these wastes.

3. Available Capacity and Capacity Implications

a. Hazardous soil. EPA is proposing that hazardous soil be treated prior to land disposal using one or more of the following general methods of soil treatment: Biological treatment, chemical extraction, soil washing, dechlorination, low-temperature thermal desorption, high-temperature distillation, thermal destruction, stabilization, and vitrification. EPA has determined that available destruction (e.g., incineration) capacity is inadequate, although adequate immobilization (e.g., stabilization) capacity exists. Inadequate capacity also exists for many of the proposed technologies in the extraction family (e.g., soil washing, chemical extraction). Much of the capacity of extraction technologies currently used to decontaminate soils, such as soil washing, may not be permitted prior to the effective date of this rule, although EPA is exploring options to expedite the permitting of these technologies. In conclusion, EPA anticipates that the off-site commercial capacity available to treat hazardous soils at the time this rule becomes effective will be limited to incineration and stabilization. EPA recognizes that innovative technologies are also available to treat hazardous soil. EPA requests comments on the practicality and current availability of these technologies.

EPA is proposing to grant a two-year national capacity variance for soils contaminated with newly identified TC organic wastes (D018–D043) and K141–K145, K147, K148, K149, K150, and K151 wastes. The variance is necessary because of the general lack of capacity to treat soil contaminated with organics, and the large quantity of soil contaminated with previously regulated organic wastes, for which the variances have expired. EPA is also proposing to grant a two-year national capacity variance to soils contaminated with newly listed wastes covered in the Phase I rule (i.e., F037 and F038 petroleum refining wastes; U328, U352, and U359; K107–K110; K111 and K112; K117, K118, and K136; and K123–K136.) The quantities of soil contaminated with F037 and F038 generated as a result of surface impoundment closures are estimated to be approximately 90,000 tons. EPA expects the quantities of soil contaminated with other Phase I wastes to be relatively small.

As discussed above, EPA estimates that as much as 3 million tons of hazardous soil contaminated with previously regulated wastes are land disposed per year. Any newly proposed commercial capacity will be needed for soil that is contaminated with wastes regulated in previous LDR rulemakings. The proposed variance may allow sufficient time for the installation and permitting of the treatment systems necessary to handle the quantities of soils contaminated with newly listed wastes covered in the Phase I rule.

The Agency's qualitative argument is based on this need and the lack of solid incineration as well as other capacity for managing hazardous soils. The Agency solicits comments on this approach and on estimates of available treatment capacity.

b. Hazardous debris. EPA estimates that approximately 34,000 tons of debris contaminated with newly identified organic TC wastes are currently land disposed and require off-site commercial treatment capacity. The capacity analysis conducted for debris contaminated with Phase II wastes indicates that insufficient capacity exists to treat debris contaminated with organics.

EPA is proposing to grant a two-year capacity variance for debris contaminated with newly listed and identified wastes covered under this proposal (i.e., newly identified organic TC wastes (D018–D043), K141–K145, and K147–K151 wastes.) The Agency is concerned that there will be insufficient time for facilities generating these debris and for potential treaters to plan for the management of such debris after the expiration of the one-year renewal of the hazardous debris case-by-case capacity variance in May 1994. EPA also realizes that there may be logistical problems associated with the management of hazardous debris cogenerated with hazardous soils contaminated with wastes covered in this proposal. In examining the generation of hazardous debris, EPA has learned that debris and soil are usually cogenerated; therefore, EPA is proposing to grant a two-year national capacity variance to debris contaminated with wastes covered by this proposal. EPA requests comments on this approach.

EPA notes that if soil and debris are contaminated with newly identified organic wastes covered in this rule and also with newly identified inorganic wastes whose treatment standard is based on an available technology, the soil and debris would remain eligible for the national capacity variance. This is because the hazardous soil and debris would still have to be treated by some technologies that EPA has evaluated as being unavailable at present.

XIII. State Authority

A. Applicability of Rules in Authorized States

Under section 3006 of RCRA, EPA may authorize qualified States to administer and enforce the RCRA program within the State. Following authorization, EPA retains enforcement authority under sections 3008, 3013, and 7003 of RCRA, although authorized States have primary enforcement responsibility. The standards and requirements for authorization are found in 40 CFR part 271.

Prior to the Hazardous and Solid Waste Amendments of 1984 (HSWA), a State with final authorization administered its hazardous waste program in lieu of EPA administering the Federal program in that State. The Federal requirements no longer applied in the authorized State, and EPA could not issue permits for any facilities that the State was authorized to permit. When new, more stringent Federal requirements were promulgated or enacted, the State was obliged to enact equivalent authority within specified time frames. New Federal requirements did not take effect in an authorized State until the State adopted the requirements as State law.

In contrast, under RCRA section 3006(g) (42 U.S.C. 6926(g)), new requirements and prohibitions imposed by HSWA take effect in authorized States at the same time that they take effect in nonauthorized States. EPA is directed to carry out these requirements and prohibitions in authorized States, including the issuance of permits, until the State is granted authorization to do so. While States must still adopt HSWA-related provisions as State law to retain final authorization, HSWA is implemented Federally in authorized States in the interim.

Certain portions of today's rule are being proposed pursuant to sections 3004(d) through (k), and (m), of RCRA (42 U.S.C. 6924(d) through (k), and (m)). It is proposed that these be added to Table 1 in 40 CFR 271.1(j), which identifies the Federal program requirements that are promulgated pursuant to HSWA and that take effect in all States, regardless of their authorization status. States may apply for either interim or final authorization for the HSWA provisions in Table 1, as discussed in the following section of this preamble. Table 2 in 40 CFR 271.1(j) is also proposed to be modified to indicate that this rule is a self-implementing provision of HSWA.

B. Effect on State Authorization

As noted above, EPA is today proposing a rule that in part, when final, will be implemented in authorized States until their programs are modified to adopt these rules and the modification is approved by EPA. Because the rule is proposed pursuant to HSWA, a State submitting a program modification may apply to receive either interim or final authorization under RCRA section 3006(g)(2) or 3006(b), respectively, on the basis of requirements that are substantially equivalent or equivalent to EPA's. The procedures and schedule for State program modifications for either interim or final authorization are described in 40 CFR 271.21. It should be noted that HSWA interim authorization expired on January 1, 1993 (see 40 CFR 271.24(c)), although EPA is currently developing a rule which would extend this date.

Section 271.21(e)(2) requires that States that have final authorization must modify their programs to reflect Federal program changes and must subsequently submit the modification to EPA for approval. The deadline by which the State would have to modify its program to adopt these regulations is specified in section 271.21(e). Once EPA approves the modification, the State requirements become Subtitle C RCRA requirements.

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

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

The regulations being proposed today need not affect the State's Underground Injection Control (UIC) primacy status. A State currently authorized to administer the UIC program under the Safe Drinking Water Act (SDWA) could continue to do so without seeking authority to administer the amendments that will be promulgated at a future date. However, a State which wished to implement part 148 and receive authorization to grant exemptions from the land disposal restrictions would have to demonstrate that it had the requisite authority to administer sections 3004(f) and (g) of RCRA. The conditions under which such an authorization may take place are summarized below and are discussed in a July 15, 1985 final rule (50 FR 28728).

XIV. Regulatory Requirements

A. Regulatory Impact Analysis Pursuant to Executive Order 12291

Executive Order No. 12291 requires that a regulatory agency consider for each regulation the potential benefits as compared to the potential costs to society. To this end, for all major rules, a Regulatory Impact Analysis (RIA) must be conducted. An RIA consists in a quantification of the potential benefits, costs and economic impacts of a rule. A major rule is defined as a regulation estimated to result in: (1) An annual effect on the economy of $100 million or more; (2) A major increase in costs or prices for consumers, individuals, industries, Federal, State, and local government agencies, or geographic regions; or (3) Significant adverse effects on competition, employment, investment, productivity, innovation, or on the ability of United States-based enterprises to compete with foreign-based enterprises in domestic or export markets.

The Agency estimated the costs of today's proposed rule to determine if it is a "major" regulation as defined by the Executive Order. Today's rule is estimated to have total annual incremental costs of $330 million; therefore, today's proposed rule is considered a major rule. Because today's proposed rule is a major rule, the Agency has performed an Regulatory Impact Analysis, analyzing the benefits, costs, and economic impacts of today's proposed rule.

More detailed discussions of the methodology and results sections may be found in the background document, "Regulatory Impact Analysis of the Land Disposal Restrictions for the Phase 2 Newly Listed and Identified Wastes and Contaminated Soils," which has been placed in the docket for today's proposed rule.

1. Methodology Section

a. Cost methodology. In today's notice, the Agency is proposing treatment standards for newly identified wastes, consolidating waste stream LDR requirements into a "universal" set of LDR standards, as well as establishing standards for treatment of hazardous soil. The newly identified wastes covered under today's rule include wastes displaying the organic toxicity

characteristic (TC), and pesticide wastes that were not previously hazardous by the EP leaching procedure (see section IV of today's preamble for TC organic and pesticide wastes), as well as Coke Production wastes and Chlorotoluenes (see section V of today's preamble.)

The Agency has not estimated the potential changes in compliance costs for the proposal to adopt the universal LDR requirements. In general, the Agency believes that many standards would not change significantly, and thus not significantly alter current compliance costs. However, the Agency requests comment on the economic impacts of the universal treatment standards proposal. Of the newly regulated hazardous soil in today's rule, the only newly identified wastes contaminating soil are TC wastes. There are some volumes of F037 and F038 listed waste which has been found to contaminate soils, however these volumes are only generated on a non-routine basis, and are believed to be negligible. The volumes of soils which are under existing LDR regulations will receive a potential relief from regulation as the Agency is reducing the treatment standards to which these soils must comply. Finally, the Agency is proposing some new testing and recordkeeping requirements, as well as reducing other recordkeeping requirements.

The cost analysis seeks to estimate the incremental costs which will be incurred as a result of the proposed requirements. The incremental costs are estimated as the costs incurred for management under the post-regulatory requirements minus the costs currently incurred under the baseline practices of management. All dollar estimates are in 1992 dollars (unless otherwise noted.) The potential cost savings estimated for previously regulated hazardous soils has not been subtracted out of the incurred costs to obtain a total, but are presented as a separate cost savings estimate.

The effects of waste minimization have not been thoroughly accounted for in the Phase II RIA. There are two areas of concern.

The first issue is how to account for waste minimization in the future, due to the Phase II rule. To comply with LDR requirements, generators will choose the least costly means to comply: Either pay for treatment and subtitle C disposal costs, or reduce their waste volumes. EPA has not considered waste minimization as a low cost compliance approach in the RIA. To the degree that waste minimization will be employed to comply with the Phase II rule, the costs of the rule would be lower than are estimated in the RIA. However, the costs of the waste minimization activities would then be a part of the compliance costs of this rule.

The second question is how much of the waste minimization indicated in the 1992 TC Census is attributable to the TC Rule and how much is attributable to the Phase II proposed rule. The volumes assigned to waste minimization in the 1992 TC Census database have been removed from those volumes for which compliance costs were estimated in the Phase II RIA. If these waste minimization plans were in anticipation of the TC and the Phase II rule, then at least a portion of the costs for these waste minimization activities should be included in the costs for the rule. If these plans were due to the TC rule, then the costs of the TC rule may have been overestimated, and there would be not waste minimization costs incurred to the Phase II rule.

These waste minimization timing and accounting issues are difficult to evaluate given the data and understanding of facilities compliance practices which currently exist. The uncertainty noted, the EPA requests comment on ways to account for these costs in this rule and in future rulemakings.

i. Organic toxicity characteristic wastes (D018–D043). The treatment standards for the organic TC wastes require the regulation of all underlying hazardous constituents. The TC wastes covered in this analysis can be divided into three groups: TC nonwastewaters, TC soils and TC debris; while TC wastewaters are being regulated in today's rule, EPA believes any affected volumes to be negligible. EPA relied on existing unit costs which have been used in past regulatory analyses to perform the cost analysis of today's rule. EPA describes below the method of estimating the costs incurred in complying with the TC standards proposed in today's notice.

The volumes employed for the TC wastes, taken from the 1992 TC Census Database, differ from those in the capacity section. For the purposes of developing the cost estimates for today's rule, EPA used a different accounting of the reduction in volume due to waste minimization plans, which plans were indicated in the TC Census. This accounting approach used for the cost estimation allowed more waste minimization plans to be included in the long term volumes requiring treatment under today's rule. Approximately 90% of the TC nonwastewaters are estimated to require thermal treatment, either incineration or thermal desorption. The unit cost estimates range from $1850 per ton for off-site incineration, to $213 per ton for on-site thermal desorption.

Organic Toxicity Characteristic Nonwastewaters (D018–D043)

EPA employed the 1992 TC Census Database for the analysis of the TC nonwastewater volumes under regulation in today's proposed rule. As there is no proposed variance for these wastes, the Agency determined costs on an annual basis from the proposal date of the rule.

In establishing a baseline for the TC nonwastewaters, the Agency assumed subtitle C landfilling on-site, for noncommercial (company captive) facilities, and off-site, for commercial facilities. For the post-regulatory case, EPA developed technology assignments for the wastestreams at each facility based on the standards being established in today's rule.

Organic Toxicity Characteristic Hazardous Soil

EPA employed the 1992 TC Census Database, for the cost analysis of the TC hazardous soil volumes under regulation in today's proposed rule. The Agency applied an adjustment factor from the "Regulatory Impact Analysis for the Final Rulemaking on Corrective Action Management Units and Temporary Units" (January 11, 1993, CAMU RIA) to soil volumes from remediation to account for the effects of the CAMU rule on these volumes. In addition, the Agency is proposing a two year national capacity variance for these soils, therefore, costs incurred from these requirements do not begin until two years after the proposal date of the rule.

In establishing a baseline for the TC hazardous soils the Agency assumed subtitle C landfilling on-site, for noncommercial (company captive) facilities, and off-site, for commercial facilities. The Agency presents three options for the post-regulatory case in today's rule: (a) Universal Standards 10, (b) Universal Standards 10, with 90% Removal, and (c) 90% Removal (taking comment on a possible cap for option (c).) EPA modeled the costs for the soil standards under two approaches: Options (a) and (b) as roughly equivalent options, and (c) separately. For each approach, the Agency developed technology assignments for the soils at each facility based on the standards being established in today's rule. In all three options, EPA assumed that thermal desorption and soil vapor extraction (SVE) would be used approximately 90% at a cost between $515 to $213 per ton. The assignments include a treatment technology

residuals management, subsequent disposal, and transportation as needed. The Agency requests comment on the methodology and unit cost estimate.

Organic Toxicity Characteristic Hazardous Debris

EPA employed the 1992 TC Census Database, for the cost analysis of the TC hazardous debris volumes under regulation in today's proposed rule. As for the TC soil, the Agency applied an adjustment factor from the CAMU RIA to debris volumes from remediation, as was done for the soils volumes, to account for the effects of the CAMU rule on these volumes. The CAMU rule is expected to reduce volumes by approximately 54%. In addition, the Agency is proposing a two year national capacity variance for TC debris, therefore, costs incurred from these requirements do not begin until two years after the proposal date of the rule.

In establishing a baseline for the TC hazardous debris the Agency assumed subtitle C landfilling on-site, for noncommercial (company captive) facilities, and off-site, for commercial facilities. For the post-regulatory case, EPA developed technology assignments for the wastestreams at each facility based on the standards being established in today's rule. The assignments include a treatment technology (treatment train where required), subsequent disposal, and transportation as needed.

ii. Remaining wastes. In addition to organic TC wastes, the wastes affected by today's proposed rule include coke by-product wastes and chlorotoluenes. Based on an economic analysis of coke by-product waste management, EPA assumes that generators of these wastes will, for the most part, be recycling these wastes rather than disposing of them in subtitle C landfills. Therefore, EPA estimates that negligible coke by-product wastes will be affected by this rule. For the chlorotoluene waste volumes, EPA conducted a detailed cost analysis using site specific data.

iii. Previously regulated hazardous soil. The hazardous soil regulated under today's rule can be broken into two groups: Hazardous soil which is under existing regulations, and newly regulated hazardous soil. The newly regulated hazardous soil is contaminated with TC wastes, and were described above. The previously regulated hazardous soil represents soil contaminated with listed or Extraction Potential Leaching Procedure (EP) toxicity wastes. Treatment standards were placed on these soils during the scheduled waste rules (First Third LDR, Second Third LDR, etc.) These soils, having existing standards established for their treatment, are being placed under new proposed standards, which are specifically developed for soil treatment. To the degree that these standards are less stringent, there will be an incremental cost savings calculated for the impact from today's rule.

The Agency estimated a volume of previously regulated soil of 2.1 million tons per year which would incur costs under today's rule. This estimate is derived from the capacity analysis work performed for today's rule, applying an adjustment factor to account for a reduction in the volumes being treated due to the recently promulgated CAMU rule. As the Agency is unable to grant a national capacity variance for previously regulated soils, the costs savings is assumed incurred from the date of proposal of today's rule.

The standards being established in today's rule for previously regulated soil are the same three as those being established for newly regulated soil (i.e.: TC soil): (a) Universal Standards x 10, (b) Universal Standards x 10, with 90% Removal, and (c) 90% Removal (comment is taken on a possible cap for this option). The Agency did not have facility specific data to develop a post-regulatory scenario for these volumes. Therefore, for the baseline and post-regulatory alternatives, EPA used professional judgment in interpreting the available data to estimate percentages of treatment for the post-regulatory scenario. To determine these percentages of treatment, the Agency compared existing soil concentration data (1991) from the CERCLA Record of Decision (ROD) database with the universal treatment standards. From these data, the Agency was able to determine baseline and post-regulatory technology percentages for the soil volumes.

iv. Testing and recordkeeping costs. In addition to the costs for treatment of wastes, EPA estimated the incremental costs for the new testing and recordkeeping requirements in today's rule. Testing and recordkeeping costs were developed for organic TC wastes only, using the facility specific data available for these wastes in the 1992 TC Survey.

The Agency employed baseline and post-regulatory scenarios appropriate to the testing requirements for each waste to develop cost estimates for the testing requirements in the rule. The Agency made several assumptions as to how frequent a generator would need to test their wastes, and for how many constituents to test. The "Regulatory Impact Analysis of the Land Disposal Restrictions for the Phase 2 Newly Listed and Identified Wastes and Contaminated Soils," which has been placed in the docket for today's rule, presents these approaches in full.

The Information Collection Request (ICR) for today's rule, being prepared by EPA, estimates that the recordkeeping cost is $41 per wastestream. For the requirements in today's rule, it is estimated to take one hour to develop and submit the required notification and one quarter of an hour to retain copies of the documentation and notification. The Agency requests comment on this estimate.

b. Economic impact methodology. The economic effects of today's proposed rule are defined as the difference between the projections of the likely economic impacts on facilities that result from regulatory compliance and the industrial activity likely in the absence of regulation (i.e., baseline conditions).

The Agency has evaluated the economic impacts for facilities managing organic TC wastes on a facility-specific basis, limited only by the extent that data were available. EPA estimated the economic effects by comparing incremental annual compliance costs to a number of company financial measures, such as revenues, cost of operations, operating income, and net income. Financial data were obtained from Standard & Poor's Corporation Descriptions for the last fiscal year reported.

Since EPA believes that no costs will be associated with the treatment standards for coke by-products in the proposed rule, no economic impacts will be associated with regulation of these wastes. Economic impacts of compliance for facilities currently land disposing chlorotoluenes were evaluated on a facility-specific basis.

c. Benefits methodology. The Agency evaluated three types of benefits for today's standards for newly identified TC wastes: reduction in human health risks via the ground-water pathway, reduction in human health risks via the air pathway, and positive effects on the value of properties adjacent to waste management facilities. EPA's analysis of the benefits of today's rule covers TC wastes only. These wastes dominate the other wastestreams covered by today's rule in terms of volume and costs. Moreover, the Agency had better data available for the TC wastes, in terms of attributes such as constituent concentrations and volumes which are required in an analysis of benefits. The Agency did not conduct a quantitative benefits estimate of the universal LDR proposal or the previously regulated soil

standards. EPA believes that these proposals could potentially greatly reduce compliance costs, with negligible change in protection of human health and the environment. However, the Agency requests comment on this finding. If commenters believe the Agency should perform a quantified estimate of the change in benefits of this proposal, commenters should suggest appropriate methods and approaches.

i. Human health risk reduction—ground water pathway. The fundamental concept underlying EPA's approach for assessing ground-water risk reduction is that subtitle C containment is completely effective in the short-term, i.e., over a period of about 30 years. However, the Agency assumes that over the longer term, containment systems and monitoring will fail. The benefits analysis performed for today's rule captures this long-term risk which could be avoided under today's rule. EPA analyzed the baseline risks, i.e., risks posed by TC wastes in the absence of today's rule, as well as post-regulatory risks under two options. In the baseline, TC wastes are untreated, shipped off-site, and placed in subtitle C landfills. In the post-regulatory scenario, TC wastes are treated and placed in subtitle D landfills. The difference in risks from the baseline to the post-regulatory condition is a measure of the benefit of an option.

The basic approach involves the following steps (which are elaborated on in the RIA background document, which has been placed in the docket for today's rule):

(1) The Agency employed waste concentration data from the 1992 TC survey to represent waste concentrations.

(2) Where surveys reported total waste concentrations, rather than TCLP concentrations, the Agency used the Organic Leaching Model (OLM) to estimate leachate concentrations.

(3) EPA calculated the mean concentration of each constituent at each facility, weighted across the volume of all TC wastes managed at that facility.

(4) EPA calculated the risk that would be posed by consumption of leachate, for both cancer and non-cancer effects, at each facility.

(5) EPA developed a set of dilution/attenuation factors (DAF) to represent the effect of fate and transport processes in a ground-water system. For each facility, the Agency divided the risk posed by the consumption of leachate by the DAF (expressed as a probability distribution) to yield predicted concentration at an exposure well.

(6) EPA then summed the 1800 predicted risks across all facilities (i.e., 36 facility leachate risks times 50 DAFs) to develop an estimate of the distribution of risk at facilities managing untreated TC wastes. The Agency summed the risks across the distribution to obtain a total population risk estimate. The Agency employed standard assumptions of a 70 kg person drinking 2 liters of water per day over 70 years.

(7) To simulate the regulatory options, the Agency reset the leachate concentrations in Steps 2 through 4 with the universal standard concentrations. EPA then replaced the DAF distribution for subtitle C facilities (from Step 5) with a DAF distribution for subtitle D facilities, because the treated TC residues will not need to be managed as hazardous wastes.

ii. Human health risk reduction—Air pathway. Constituents contained in TC waste, soil, and debris may be emitted to air through volatilization and dust entrainment. Reducing the concentrations of TC constituents through the treatment standards set in today's rule significantly reduces the potential for air emissions, and the risks posed by those air emissions. The goal of the air pathway risk analysis was to characterize baseline (pre-LDR) risk and the reduction in baseline risk resulting from regulatory options.

In the baseline, untreated TC wastes are placed in subtitle C landfills. In the post-regulatory scenario, treated wastes are placed in subtitle C or D landfills. In this analysis, EPA assumed that any air emissions due to additional transportation, storage or treatment in the post-regulatory scenario are negligible.

The Agency's basic approach involves the following steps (which are elaborated on in the RIA background document, which has been placed in the docket for today's rule):

(1) EPA used bulk waste concentration data from the TC survey to represent waste concentrations.

(2) In cases where respondents reported TCLP concentrations, rather than bulk concentrations, the Organic Leaching Model (OLM) was used to "back-calculate" bulk concentrations.

(3) The Agency calculated the mean concentration of each constituent at each facility, weighted across the volume of all TC wastes managed at that facility.

(4) EPA calculated the unit area managing TC wastes.

(5) EPA estimated annual average emissions due to volatilization and dust entrainment for each constituent at each facility.

(6) Using the same meteorologic conditions assumed for the Corrective Action RIA (CARIA),[7] atmospheric transport for each constituent was evaluated. EPA then calculate concentrations at several downwind points corresponding to potential exposure locations.

(7) The Agency calculated individual cancer risk and non-cancer risk, using exposure assumptions from the CARIA.

(8) EPA calculated population risk for exposed populations.

(9) The Agency simulated the regulatory options.

2. Results Section

a. Cost results. In total, today's proposed rule would have an incremental annual cost of $330 million. Seventy percent of this cost would be for the treatment of organic TC nonwastewaters, and 18 percent and 12 percent would be for the treatment of organic TC contaminated soil and debris, respectively. In a separate analysis, EPA estimates that the regulatory options proposed for all previously regulated contaminated soil could represent a potential annual savings of approximately $250 million to $560 million.

i. Organic TC wastes and other newly regulated wastes. As described above, EPA conducted a facility-specific cost analysis for those facilities managing organic TC waste.

Since EPA believes no coke by-product wastes will be landfilled as a result of the coke by-product listing rule (August 18, 1992, at 57 FR 37284), EPA estimates that no cost impact will be associated with the treatment standards for coke production wastes. The incremental cost for chlorinated toluenes is estimated to be less than $0.1 million annually.

ii. Previously regulated hazardous soil. As described above, EPA relied on available soil concentration data and professional judgment to determine the effect of the proposed rule on previously regulated hazardous soil. Exhibit XIV–1 presents the percentages estimated by EPA for the post-regulatory scenario for the previously regulated soil.

EXHIBIT XIV–1.—BREAKDOWN OF PERCENTAGES OF TREATMENT TECHNOLOGIES FOR THE PREVIOUSLY REGULATED SOILS POST-REGULATORY SCENARIO

	90 percent only	UTS only	UTS+90 percent
Incineration	0%–10%	5%–15%	5%–15%
Stabilization	10%	10%	10%
Soil Washing	80%	55%	70%
Thermal Desorption	10%–20%	15%–25%	15%–25%
Total	110%	95%	110%

—For the UTS Only option, the total sums to 95% because 15% of the soil requires no treatment at all under this option.
—Technology assignments assume a small amount of treatment trains are required.
—Soil washing is assigned as a low cost technology where minimum treatment is required.

Both the data and the methodologies used for the cost analysis have limitations. The main limitations are addressed in the background RIA document which has been placed in the docket for today's rule. The Agency has limited unit cost data for these treatment technologies. The Agency requests additional data and comment on the assumptions in this analysis.

b. Economic Impact Results. For non-commercial companies (company captives) in the TC capacity database, only one company would have a ratio of incremental compliance cost to cost of operations greater than one-half percent. Looking at the ratio of net income (i.e., after tax) to the incremental compliance cost, five companies would have a ratio less than 20; four of these five companies, however, reported a net loss in the last fiscal year. Of these five companies, only one would have a ratio of operating income to the incremental compliance cost less than 20.

For the commercial companies in the TC capacity database, only one has a ratio of incremental annual cost to cost of operations greater than five percent.

Since no costs are associated with the treatment standards for coke by-products, no economic impacts are expected. Economic impacts for facilities that generate chlorinated toluene wastes are calculated based on the before-tax annualized incremental costs. The results of the analysis, however, are aggregated since the data used in the analysis are propriety. Based on a ratio analysis of incremental cost to total sales, none of the facilities that generate these wastes is expected to experience significant impacts as a result of the proposed rule.

Both the data used for the economic impact analysis and the methodologies developed have limitations. The main limitations are addressed in the background RIA document which has been placed in the docket for today's rule.

c. Benefit Estimate—i. Results—Groundwater Pathway. This section presents results for the baseline risks and two regulatory approaches. For each case, results for individual cancer and non-cancer risk are presented for both high end and central tendency approaches. The section concludes with population risk estimates for cancer risks.

The results, presented in full in the RIA background document which is included in the docket for today's rule, show about eight percent of the population having an individual lifetime excess cancer risk above 10^{-6} in the high end baseline, and four percent between 10^{-6} and 10^{-4}, and approximately four percent above 10^{-4} in the high end baseline. For the central tendency baseline, the individual excess lifetime cancer risk is approximately six percent above 10^{-6}, five percent between 10^{-6} and 10^{-4}, and two percent above 10^{-4}. For both regulatory options, EPA assumed that all constituents would be directly (option 1) or indirectly (option 2) treated to universal standards. For the post-regulatory cases, about five percent of the population has an individual lifetime excess cancer risk level above 10^{-6}.

Using the distribution of individual risks, the Agency calculated baseline cancer population risk. EPA used data from the Corrective Action RIA on the proportion of subtitle C facilities with potentially exposed populations through ground water (23 percent), and the mean size of the potentially exposed population (6,870 people per facility). Using the facility/risk distribution of 1800 points (i.e., 36 facilities times 50 DAFs) the Agency multiplied the individual risk for a certain percentile of the distribution by the number of people represented by each percentile (i.e., 6,870 people per facility divided by the percentile represented by a single facility. A single facility represents 100 percent divided by 48 facilities, or 2.08 percent per facility. Therefore, there are about 3,300 people per percentile.) The population risks were then converted to annual values by assuming an average life span of 70 years. Based on these assumptions, EPA estimates the baseline population cancer risk to be 0.33 cases per year for the central tendency baseline. The post-regulatory population cancer risk is about 0.031 cases per year in the central tendency. In other words, the regulatory option reduces 0.30 cases per year in the central tendency.

An approach which would render the same result would be to compute the mean individual risk across the distribution and multiply it by the total number of people potentially exposed across all facilities (i.e., 6,870 people per facility times 48 facilities times 23 percent with down gradient wells equals 75,800 people).

The analysis shows that the 99th percentile baseline exposure level is less than the reference dose. Because the riskiest facility has an expected value for non-cancer exposure that is below the reference dose, the Agency is assuming no significant non-cancer risk in the baseline. Post-regulatory non-cancer risk is also insignificant for both regulatory options.

Assumptions for the second regulatory option produced cancer risks identical to those of the first option. For non-cancer risks, however, the two options produced somewhat different results.

ii. Results—Air Pathway. This section provides results for the air pathway, for the baseline and post-regulatory options. The Agency used two methods to calculate potential emissions. Method 1 for limiting mass flux from volatilization was never triggered; Method 2 limited emissions for 30 of the 141 constituent/facility combinations modeled for the baseline, which accounts for the difference between the baseline risks in the two approaches. For both post-regulatory options, the two methods produced virtually identical results.

Using Method 1, approximately 27 (75 percent) of the 36 facilities modeled have individual cancer risk exceeding

10^{-6} at the 140 m distance in the baseline, 16 facilities (45 percent) are between 10^{-6} and 10^{-4}, and 11 facilities (30 percent) have individual cancer risk exceeding 10^{-4} at the 140 m, with the peak value at 2 times 10^{-3}. In the post-regulatory scenario, the individual cancer risk is reduced so that approximately 5 facilities (15 percent) have individual cancer risk over 10^{-6}.

At the 600 m distance, using Method 1, approximately 18 facilities (50 percent) of the 36 facilities have individual cancer risk exceeding 10^{-6} in the baseline, 16 facilities (45 percent) are between 10^{-6} and 10^{-4}, and about 2 facilities (5 percent) have individual cancer risk exceeding 10^{-4}. In the post-regulatory scenario, the individual cancer risk is reduced so that no facilities have an individual cancer risk over 10^{-6}.

Using Method 2, approximately 27 facilities (75 percent) of the 36 facilities modeled have individual cancer risks exceeding 10^{-6} at the 140 m distance in the baseline, 22 facilities (60 percent are between 10^{-6} and 10^{-4}, and 5 facilities (15 percent) have individual cancer risk exceeding 10^{-4} at the 140 m, with the peak value at 2 times 10^{-4}. In the post-regulatory scenario, the individual cancer risk is reduced so that approximately 5 facilities (15 percent) have individual cancer risk over 10^{-6}.

At the 600 m distance, using Method 2, approximately 14 facilities (40 percent) have individual cancer risks exceeding 10^{-6}, and no facilities have individual cancer risk exceeding 10^{-4}, with the peak value at 2 times 10^{-5}. In the post-regulatory scenario, the individual cancer risk is reduced so that approximately no facilities have individual cancer risk over 10^{-6}.

Using both sets of emission rates, non-cancer dose exceeds the reference dose at only one facility; this occurs at both distances with Method 1, and only at 140 m using Method 2. For the post-regulatory scenario, for both options, the highest individual risk is six times 10^{-6}. Doses of all non-carcinogens are well below reference doses under both options.

For the population risk estimates, the Agency determined that the central tendency incremental benefits are 0.033 (Method 1) and 0.0065 (Method 2).

3. Regulatory Impact Analysis—Underground Injected Wastes

The Agency has completed a separate regulatory impact analysis for underground injected wastes affected by the Phase II proposed rule.

This analysis describes and evaluates the regulatory impacts only to the Class I injection well universe. The Agency does not believe that many Class V injection well owners and operators will be affected by the proposed Phase II requirements. The Agency believes that the new proposed Phase II LDRs for injected wastes cover either listed wastes or distinctly industrial wastes that would be injected by owners and operators of only Class I injection wells. EPA has no data which definitively indicates that any volumes of Phase II wastes are being injected in Class V wells, but reiterates that we are soliciting any and all comments and information which will affect the regulatory impact analysis.

According to the available data, the RIA indicates that up to 43 Class I injection facilities will be potentially affected by the new Phase II Land Ban requirements. These Class I injection facilities will now be required to either treat wastes, or file "no migration" petitions as outlined in 40 part CFR 148 (See 53 FR 28118 preamble for a more thorough discussion of the no migration petition review process). Up to 21 formerly non-hazardous Class I facilities may become newly hazardous due to the additional restrictions, whereas 22 facilities already have no migration exemptions approved by EPA, but may face additional requirements requiring some modification of their petitions due to the proposed Phase II rule.

The additional facilities affected by Phase II rulemaking contributes to overall compliance costs already incurred by Class I injection well owners and operators managing hazardous wastes regulated by previous rulemaking. The Agency analyzed costs and benefits for today's rule by using the same approach and methodology developed in the Regulatory Impact Analysis of the Underground Injection Control Program: Proposed Hazardous Waste Disposal Injection Restrictions used for the July 26, 1988, final rule (53 FR 28118) and subsequent rulemaking. An analysis was performed to assess the economic effect of associated compliance costs for the additional volumes of injected wastes attributable to this proposed rule.

In general, Class I injection facilities affected by the Phase II rule will have several options. Some facilities will modify existing no migration petitions already approved by the Agency, other facilities may submit entirely new petitions, and still others may accept the prohibitions and either continue to inject wastes after treatment or cease injection operations all together.

The total annual no migration petition costs for facilities affected by the new Phase II prohibitions is estimated to be $858,000. The annual cost for affected facilities employing alternative treatment is estimated to range from $3.9 million to $58 million annually. The range of costs for alternative treatment is the result of applying a sensitivity analysis. Only the incremental treatment costs for the new waste listings are calculated in this RIA.

The total cost to industry of petitions and alternative treatment arising from the proposed Phase II revisions for deep well injection is estimated to range from $4.8 million to $58.9 million annually. All of these costs will be incurred by Class I injection well owners and operators.

The Agency did not perform a quantified risk assessment for this proposal. However, the benefits to human health and the environment in the RIA are generally defined as reduced human health risk resulting from fewer instances of ground water contamination. In general, potential health risks from Class I injection wells are extremely low. However, injection is not without risks. In isolated cases, potential risks to human health and the environment may be greater due to abandoned, unplugged wells near the injection well site. Other cases involve possible grout seal failure around the protective casing of an injection well, but cancer risks from such a failure are insignificant. Of studies conducted to describe Class I well problems, only six wells, or less than two percent of all Class I wells, were reported to have experienced malfunctions that contributed to any contamination of the surface or of an underground source of drinking water. No health-related problems attributed to Class I injection were reported in the same study.

The economic analysis estimates that none of the twenty-six publicly traded companies affected by the rule will be significantly economically impacted. The limited data available for the 17 privately held companies suggests, however, that they may face significant impacts. Overall, the RIA assumes that none of the companies affected will close as a result of the proposed Phase II rule.

B. Regulatory Flexibility Analysis

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

Under the Agency's Revised Guidelines for Implementing the Regulatory Flexibility Act, dated May 4, 1992, the Agency committed to considering regulatory alternatives in rulemakings when there were any economic impacts estimated on any small entities. Previous guidance required regulatory alternatives to be examined only when significant economic effects were estimated on a substantial number of small entities.

In assessing the regulatory approach for dealing with small entities in today's rule, for both surface disposal of wastes and underground injection control, the Agency considered two factors. First, data on potentially affected small entities are unavailable. And second, due to the statutory requirements of the RCRA LDR program, no legal avenues exist for the Agency to provide relief from the LDR's for small entities. The only relief available for small entities is the existing small quantity generators and conditionally exempt small quantity generator exemptions found in 40 CFR 262.11–12, and 261.5, respectively. These exemptions basically prescribe 100 kilograms (kg) per calendar month generation of hazardous waste as the limit below which one is exempted from complying with the RCRA standards.

Given these two factors, the Agency was unable to frame a series of small entity options from which to select the lowest cost approach; rather, the Agency was legally bound to regulate the land disposal of the hazardous wastes covered in today's rule without regard to the size of the entity being regulated.

C. Paperwork Reduction Act

The information collection requirements in today's proposed rule have been submitted for approval to the Office of Management and Budget (OMB) under the Paperwork Reduction Act, 44 U.S.C. 3501 *et seq.* An Information Collection Request (ICR) document has been prepared by EPA (ICR No. 1442.06) and a copy may be obtained from Sandy Farmer, Information Policy Branch (PM–223Y); U.S. Environmental Protection Agency; 401 M St., SW.; Washington, DC 20406 or by calling (202) 260–2740.

The annual public reporting burden for this collection of information is estimated to average 2 hours per treatment facility and 1 to 52 hours per generator, including time for reviewing instructions, searching existing data sources, gathering and maintaining the required data, and completing and reviewing the collection of information. The annual recordkeeping burden for generators and treatment facilities is estimated to be 15 minutes per respondent.

Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Chief, Information Policy Branch (PM–223Y); U.S. Environmental Protection Agency; 401 M St., SW.; Washington, DC 20406; and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington DC 20503, marked "Attention: Desk Officer for EPA." The final rule will respond to any OMB or public comments on the information collection requirements contained in this proposal.

List of Subjects

40 CFR Part 148

Administrative practice and procedure, Hazardous waste, Reporting and recordkeeping requirements, Water supply.

40 CFR Part 260

Administrative practice and procedure, Hazardous waste.

40 CFR Part 261

Hazardous waste, Recycling, Reporting and recordkeeping requirements.

40 CFR Part 268

Hazardous waste, Reporting and recordkeeping requirements.

40 CFR Part 271

Administrative practice and procedure, Hazardous materials transportation, Hazardous waste, Penalties, Reporting and recordkeeping requirements.

Dated: August 31, 1993.

Carol M. Browner,

Administrator.

Appendix A to the Preamble: Description of Hazardous Soil Treatment Technologies and Performance Standards

1. *Biological Treatment*

Biological treatment is a destruction technology that uses microorganisms to degrade and transform hazardous organic compounds into compounds of reduced toxicity. Bacteria, fungi, and yeasts are the microorganisms most frequently employed for biodegradation of hazardous compounds. Under aerobic conditions (in the presence of oxygen), microorganisms biodegrade organic contaminants to carbon dioxide, water, nitrate, sulfate, and cell protein. Under anaerobic conditions (in the absence of oxygen), microorganisms can biodegrade organic contaminants into methane, carbon dioxide, and cell protein.

Aerobic bioslurry treatment involves mixing contaminated material with water to form a slurry in an enclosed container. Nutrients and oxygen are added to the water to provide microorganisms with the proper environment to facilitate biodegradation, and the slurry is mixed to keep the solids in suspension. Bioslurry treatment has the advantage of providing for careful process control, and increased contact between microorganisms and contaminants in the slurry.

Aerobic biological treatment may also be conducted in the solid-phase. Solid-phase treatment activities include composting and prepared bed treatment. Optimized conditions for solid-phase treatment are maintained by tilling the soil regularly for aeration and contaminant mixing, addition of required nutrients for microbial metabolism, and supplemental irrigation for moisture control.

Anaerobic biological treatment may be conducted in either a solid- or a slurry-phase, using equipment similar to that used for aerobic treatment. Anaerobic treatment typically requires more time than aerobic treatment, due to the slow growth rate of the methanogenic (methane producing) bacteria. Anaerobic treatment is most effective on soils with a moderate to high Ph, containing contaminants that are nonhalogenated hydrocarbons, and soils with low biochemical oxygen demand.

2. *Chemical Extraction*

Extraction technologies are used to treat wastes containing a variety of organic constituents and a broad range of total organic content. This method of treatment is accomplished using an organic solvent in the liquid phase to solubilize contaminants for removal and can be used on many solvent-soluble contaminants. The effectiveness of this technology depends on the solvent-contaminant match. Two general extraction technologies are leaching and immersion extraction.

In its most typical form, leaching is a batch extraction operation in which an organic solvent is sprayed onto soil in a tank, causing the contaminant to leach from the soil. The solvent, containing the contaminant(s), is collected at the bottom of the tank after percolating through the soil. In the absence of agitation, the liquid-solid extraction is a slow and inefficient process. Channeling of the liquid solvent through the soil can result in untreated

portions of soil in the tank, further lowering the efficiency. Further, the presence of fines can stop the percolation process while the presence of coarse agglomerates with well-imbedded contaminants often can only be treated at the surface.

In immersion extraction, soil is suspended and thoroughly mixed in solvent baths operated at elevated or ambient temperatures to optimize treatment. Secondary treatment (e.g., distillation) is performed to separate the solvent from the contaminant. After treatment, it is sometimes possible to reuse the solvent in the treatment system.

A wide variety of organic solvents are commonly used, depending on the soil contaminant being treated. The choice of suitable solvent depends primarily on chemical structures of the contaminant, solubility of contaminants in the solvent, soil type, and equilibrium characteristics. Chemical extraction treatment systems rely on differences between the boiling points of the contaminant and the solvent to facilitate post-treatment separation (distillation).

A primary advantage of chemical extraction is the wide range of applicability for treating hazardous soil. If the proper solvent is selected, treatment of many soil contaminants is possible. Typical treatment times can range from several hours to several days.

3. *Dechlorination*

Dechlorination is a soil treatment process whereby contaminants in the soil are chemically reacted to form less toxic compounds. The soil is mixed with a chemical reagent and agitated to increase the contact of reagent with the soil contaminant. The reaction that takes place in the soil is a substitution reaction, in which chlorine is removed from the contaminant and substituted with a less toxic element (usually hydrogen). The contaminant and residual reagents that remain in the soil following the substitution reaction can be removed in a subsequent step using an extraction process.

Another type of dechlorination treatment technology that is available (although not commonly used) to dechlorinate chlorinated organic compounds in soil is photochemical degradation. This type of treatment technology uses photochemical energy in the form of ultraviolet (UV) radiation, usually artificial, to degrade halogenated contaminants such as polychlorinated biphenyls (PCBs), and polychlorinated dibenzodioxins (PCDDs), and polychlorinated dibenzofurans (PCDFs). These compounds are quite reactive in the presence of UV radiation. The photoreduction mechanism involves the substitution of hydrogen for chlorine, leading to the formation of detoxified substances.

4. *High-Temperature Metals Recovery*

High temperature metals recovery (HTMR) is a technology applicable to materials containing substantive amounts of metal oxides and metal salts (including cadmium, chromium, lead, nickel, and zinc compounds) at concentrations ranging up to 70 percent with low levels (i.e., below 5 percent) of organics and water in the wastes. There are a number of different types of HTMR systems, which generally differ from one another in source of energy used and the method of recovery. These HTMR systems include the rotary kiln process, the plasma arc reactor, the rotary hearth electric furnace system, the molten slag reactor, and the flame reactor.

The basic principle of operation for HTMR is that metal oxides and salts are separated from a waste through a high temperature thermal reduction process that uses carbon, limestone, and silica as raw materials. The carbon acts as a reducing agent and reacts with metal oxides to generate carbon dioxide and free metal. The silica and limestone serve as fluxing agents. This process yields a metal product for reuse and reduces the concentration of metals in the residuals. The HTMR process consists of a mixing unit, a high temperature processing unit (kiln, furnace, etc.), a product collection system, and a residual treatment system.

5. *Soil Washing*

Soil washing is used to describe a number of techniques where contaminants are either separated or removed from soil with an aqueous process. Soil washing has the potential to be applicable to many different types of contamination, including both organic and metallic contaminants.

In soil washing, soil is mixed with water and the resulting solution is augmented with a basic or surfactant agent that increases the solubility of the contaminant(s) in water. This is usually done to remove organics. Soil washing may be done with an acidic solution or a chelating agent that chemically reacts with metal ions and promotes their solubility.

6. *Solidification/Stabilization*

Solidification/stabilization is used to convert soil into a matrix that prevents contaminants from leaching. Stabilization techniques are most commonly used for hazardous wastes with treatment standards expressed as a concentration of constituents in an extract of the waste. (Stabilization of wastes (or hazardous soil) that have treatment standards expressed solely as specific concentrations of constituents in the entire waste stream is not appropriate.)

Three types of solidification/stabilization processes are used for treatment of soil. The first involves mixing the soil with cement, lime, fly ash, kiln dust, silicates, or other pozzolanic-type materials, and water; the mixture then goes through a curing process. The second process involves mixing the soil with asphalt and/or plastic. In this process, the mixture is heated to slightly above the melting point of the plastic or asphalt, which causes the soil to be covered with a polymeric or asphalt coating. The mixture is then cooled and allowed to cure prior to disposal. The third type of solidification/stabilization technologies use proprietary additives. These processes are fixation technologies that involve the addition of chemicals (reagents) to the contaminated matrix changing the form of the contaminant so that it is no longer soluble in water. Solidification/stabilization processes increase the volume of treated material, but leave no additional residuals.

To obtain a uniform stabilized material, the particle size of the soil being stabilized should be kept fairly small. Vendors of various solidification/stabilization processes have different size requirements, but the particular sizes generally range in diameter from 6.35 to 100 mm. Sizing equipment, such as ball mills or hammer mills, is commercially available to size most soil particles to meet the requirements for microencapsulation processes. Currently, shredding equipment may be used to process debris-like materials such as large stones or rocks that may be found in the soil.

7. *Thermal Desorption*

Thermal desorption systems employ either a direct or an indirectly-fired oven or heating chamber to volatilize organic contaminants. Usually soil is placed into the system and heated by convection using heating fuel or an electric heating element, or heated by radiation using infrared radiation or microwaves. For continuous operations, screw augers or rotary kilns are used to mix the soil while moving the hazardous soil through the system. To transfer heat to the soil in an auger system, a heating fluid is passed through the center of the auger. Heat transferred to the soil volatilizes the contaminants from the soil. Treatment

systems have an oxygen deficient atmosphere in order to prevent contaminants and soil from combusting or exploding. Volatilized contaminants can be separated from the gaseous effluent by scrubbing or absorption, or it may be incinerated. Thermal desorption systems can be designed to be run in either a batch or continuous mode.

8. *Thermal Destruction*

Thermal destruction includes treatment in an incinerator operated in accordance with the technical operating requirements of 40 CFR part 264 subpart O and 40 CFR part 265 subpart O, in boilers or industrial furnaces operating under either interim status or a RCRA permit in accordance with the requirements of 40 CFR part 266, subpart H, or in other RCRA permitted thermal treatment devices, such as pyrolysis units operating under interim status in accordance with the requirements of 40 CFR part 265, subpart P.

Thermal destruction uses heat to cause contaminants to chemically react to form nonhazardous chemicals. Thermal destruction units may use either an oxidizing or a nonoxidizing atmosphere. Units in which an oxidizing atmosphere is employed cause combustible contaminants to oxidize to carbon dioxide and water. Units that employ a non-oxidizing atmosphere frequently employ a nitrogen atmosphere in the combustion chamber. In these units, contaminants are reacted to form carbon monoxide and methane gas.

Many incinerators require size-reduction of soil or soil agitation during incineration in order to ensure that all of the soil being treated reaches the operating temperature of the unit. Units can be run under a slightly negative pressure to prevent emissions of volatilized or incompletely combusted contaminants. Thermal destruction units must also employ emission control devices to prevent emissions of a variety of combustion products including particulate matter, oxides of sulfur and nitrogen (SO_x and NO_x), and products of incomplete combustion.

Treatment residuals from thermal destruction units include effluent gas, wastewater and sludges from air pollution scrubbers, and residual ash, which consists of the noncombustible portion of soil and contaminants.

9. *Vitrification*

This technology uses heat to transform wastes into a glass and crystalline mass. The heat causes soil to be broken down into its mineral components and oxides, which then do not reform upon cooling. At the high temperatures associated with vitrification, most inorganic constituents fuse and become chemically incorporated into the molten mass or simply become immobilized in the mass without chemically changing form. The exceptions include the more volatile heavy metals (e.g., Hg) which may not enter the molten liquid, but may be removed with the other off-gases. The organics are generally pyrolyzed or oxidized and come out of the process in the off-gases. Vitrification can be performed in a treatment reactor at temperatures of up to 2000°C. This treatment is effective for soil containing most RCRA hazardous constituents.

The temperatures required for vitrification (up to 2000°C) can be generated a number of ways. These include: Joule heating by passing an electric current through the waste; heating in an electric furnace; heating by introduction of a plasma torch to the waste reactor; and heating in an incinerator operating in a slagging mode. With each of these methods, the waste stream (and additives, if necessary) is heated until a molten liquid is formed. Additional wastes may be introduced to the molten mass and treated with the heat transferred from the liquid. The molten glass can be either quenched or allowed to cool more slowly. In either case, an obsidian-like glass is generated which can be in the form of a large monolith or any number of smaller sizes down to small granules. Off-gases from vitrification may require further treatment.

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

PART 148—HAZARDOUS WASTE INJECTION RESTRICTIONS

1. The authority citation for part 148 continues to read as follows:

Authority: Sec. 3004, Resource Conservation and Recovery Act, 42 U.S.C. 6901, et seq.

2. Section 148.17 is amended by redesignating paragraphs (b) and (c) as (c) and (d) and by adding paragraph (b) to read as follows:

§ 148.17 Waste specific prohibitions—Newly Listed Wastes.

* * * * *

(b) Effective [Insert date three months from date of publication], the wastes specified in 40 CFR 261.24 as EPA Hazardous waste numbers D012, D013, D014, D015, D016, D017 that are Toxicity Characteristic toxic halogenated pesticide wastes, and the wastes specified in 40 CFR 261.32 as EPA Hazardous waste numbers K141, K142, K143, K144, K145, K147, K148, K149, K150, and K151, are prohibited from underground injection.

* * * * *

PART 260—HAZARDOUS WASTE MANAGEMENT SYSTEM: GENERAL

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

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

4. In § 260.30, the introductory text and paragraph (b) are revised to read as follows:

§ 260.30 Variances from classification as a solid waste.

In accordance with the standards and criteria in § 260.31 and the procedures in § 260.33, the Administrator may determine on a case-by-case basis that the following recycled materials are not solid wastes:

* * * * *

(b) Materials that are reclaimed and then reused within the original production process in which they were generated; and

* * * * *

5. In § 260.31, paragraph (a) introductory text, and paragraph (b) is revised to read as follows:

§ 260.31 Standards and criteria for variances from classification as a solid waste.

(a) The Administrator may grant requests for a variance from classifying as a solid waste those materials that are accumulated speculatively without sufficient amounts being recycled if the applicant demonstrates that sufficient amounts of the material will be recycled or transferred for recycling in the following year. If a variance is granted, it is valid only for the following year, but can be renewed, on an annual basis, by filing a new application. The Administrator's decision will be based on the following criteria:

* * * * *

(b) The Administrator may grant requests for a variance from classifying as a solid waste those materials that are reclaimed and then reused as feedstock within the original production process in which the materials were generated if the reclamation operation is an essential part of the production process. This determination will be based on the following criteria:

(1) How economically viable the production process would be if it were

to use virgin materials, rather than reclaimed materials;

(2) The prevalence of the practice, on an industry-wide basis;

(3) The extent to which the material is handled before reclamation to minimize loss;

(4) The time periods between generating the material and its reclamation, and between reclamation and return to the original production process;

(5) The location of the reclamation operation in relation to the production process;

(6) Whether the reclaimed material is used for the purpose for which it was originally produced when it is returned to the original process, and whether it is returned to the process in substantially its original form;

(7) Whether the person who generates the material also reclaims it;

(8) In cases where the original process to which the material is returned is a secondary process, the extent to which materials are managed before return in a protective manner such that there will be little potential for release of the material or its hazardous constituents to the environment (e.g., storage in tanks, containers, and indoors such as containment buildings); and

(9) Other relevant factors.

* * * * *

6. In § 260.32, the introductory text is revised to read as follows:

§ 260.32 Variance to be classified as a boiler.

In accordance with the standards and criteria in § 260.10 (definition of "boiler"), and the procedures in § 260.33, the Administrator may determine on a case-by-case basis that certain enclosed devices using controlled flame combustion are boilers, even though they do not otherwise meet the definition of boiler contained in § 260.10, after considering the following criteria:

* * * * *

7. Section 260.33 is revised to read as follows:

§ 260.33 Procedures for variances from classification as a solid waste or to be classified as a boiler.

The Administrator will use the following procedures in evaluating applications for variances from classification as a solid waste or applications to classify particular enclosed controlled flame combustion devices as boilers:

(a) The applicant must apply to the Administrator for the variance. The application must address the relevant criteria contained in § 260.31 or § 260.32.

(b) The Administrator will evaluate the application and issue a draft notice tentatively granting or denying the application. Notification of this tentative decision will be provided by newspaper advertisement or radio broadcast in the locality where the recycler is located. The Administrator will accept comment on the tentative decision for 30 days, and may also hold a public hearing upon request or at his discretion. The Administrator will issue a final decision after receipt of comments and after the hearing (if any).

8. Section 260.42 is added to read as follows:

§ 260.42 Procedures for contained-in determinations for hazardous debris, hazardous soil and other environmental media.

(a) Any person may petition the Regional Administrator to exclude, under § 261.3(f)(2) or § 261.3(g) of this chapter, hazardous debris and hazardous soil or other environmental media, including but not limited to, ground water, surface water, and sediments, from regulation as hazardous waste. (Such a petition is not necessary for remedial actions conducted pursuant to RCRA or CERCLA authorities provided that a similar determination is made by the Regional Administrator based on information substantially equivalent to the information listed below including public notice and comment requirements.) The petition for a contained-in determination must include information sufficient to demonstrate that specific constituent concentrations in the hazardous debris, hazardous soil, or other environmental media to be excluded do not pose a hazard to human health and the environment at that site. Each petition must be submitted to the Regional Administrator and must include:

(1) The petitioner's name and address.

(2) An explanation, to the extent possible, of the circumstances by which the affected debris, soil, or other media became contaminated with hazardous wastes.

(3) Information on waste and site characteristics and conditions, to include at a minimum, the type of information listed in paragraph (c) of this section.

(4) After receiving a petition, the Regional Administrator may request additional information which may be required in making a determination.

(b) The Regional Administrator will make a tentative decision to grant or deny a petition for a contained-in determination after receipt of a complete petition, and will publish a newspaper notice of such tentative decision, and provide the opportunity for the petitioner and the public to submit written comments within 30 days of the publication of the notice. After consideration of the comments, the Regional Administrator will issue a final determination denying or approving the petition.

(c) The Regional Administrator will consider waste- and site-specific information in making such determinations. Such information may include, but is not limited to:

(1) Characteristics of the debris, soil, or other media;

(2) Waste constituent characteristics, such as solubility, mobility, toxicity, and interactive effects of constituents present in the contaminated debris, soil, or other media that may affect those properties;

(3) All possible exposure pathways, such as potential for direct human contact with the contaminated medium, and potential adverse ecological impacts;

(4) An "acceptable" risk range of 10^{-4} to 10^{-6};

(5) Surface and subsurface characteristics such as topography, hydraulic conductivity, permeability and porosity of soil, aquifer thickness, and other geologic and hydrogeologic characteristics that may influence constituent mobility and migration potential at the surface and in the unsaturated and saturated zones.

(6) Climatic conditions; and

(7) Other site or waste-specific characteristics or conditions that may affect the potential for constituents present in the contaminated medium to migrate and/or pose a hazard to human health or the environment.

PART 261—IDENTIFICATION AND LISTING OF HAZARDOUS WASTE

9. The authority citation for part 261 continues to read as follows:

Authority: 42 U.S.C. 6905, 6912(a), 6921, 6922, and 6938.

10. Section 261.2 is amended by revising paragraph (e)(1)(iii) to read as follows:

§ 261.2 Definition of solid waste.

* * * * *

(e) * * *

(1) * * *

(iii) Returned to the original process from which they are generated, without first being reclaimed. The material must be returned as a substitute for feedstock materials. In cases where the original process to which the material is returned is a secondary process, the materials must be managed before return in a protective manner (e.g.,

storage in tanks, containers, and indoors such as containment buildings) such that there will be little potential for release of the material or its hazardous constituents to the environment.

* * * * *

11. Section 261.3 is amended by revising paragraph (f)(2) and adding paragraph (g) to read as follows:

§ 261.3 Definition of hazardous waste.

* * * * *

(f) * * *

(2) Debris as defined in part 266 of this chapter that the Regional Administrator determines under § 260.42 of this chapter is no longer contaminated with hazardous waste.

(g) Notwithstanding paragraphs (a) through (d) of this section, soil and other environmental media including, but not limited to, ground water, surface water, and sediments, that is contaminated or mixed with one or more wastes listed in subpart D of this part, or that exhibits a hazardous waste characteristic in subpart C of this part, are not subject to regulation under 40 CFR parts 260, 261 to 266, or 270 provided that:

(1) The Regional Administrator determines under § 260.42 of this chapter that the soil or other environmental media is no longer contaminated with hazardous waste; and

(2) The soil or other environmental media does not exhibit a hazardous waste characteristic in subpart C of this part.

12. In § 261.4, paragraph (a)(13) is added to read as follows:

§ 261.4 Exclusions.

(a) * * *

(13) Environmental media, including, but not limited to soils, ground water, surface water, and sediments, that exhibit a hazardous waste characteristic in subpart C of this part, or that is contaminated or mixed with one or more wastes listed in subpart D of this part, or with residuals derived from the treatment, storage, or disposal of a waste listed in subpart D of this part with constituent concentrations below those that are determined by the Regional Administrator to represent minimized threats to human health and the environment. Such determinations will be made in accordance with § 260.42 of this chapter.

* * * * *

PART 268—LAND DISPOSAL RESTRICTIONS

13. The authority citation for part 268 continues to read as follows:

Authority: 42 U.S.C. 6905, 6912(a), 6921, and 6924.

Subpart A—General

14. In § 268.1, paragraphs (c)(3)(ii), (e)(4) and (e)(5) are revised and paragraph (c)(3)(iii) is added to read as follows:

§ 268.1 Purpose, scope and applicability.

* * * * *

(c) * * *

(3) * * *

(ii) Do not exhibit any prohibited characteristic of hazardous waste at the point of injection; and

(iii) If the injected wastes are D001 High TOC subcategory wastes or D012–D017 pesticide wastes, they have been treated to meet the treatment standards of § 268.40 before the point of injection, or they are disposed in an approved no-migration injection well as demonstrated pursuant to § 148.20 of this chapter.

* * * * *

(e) * * *

(4) *De minimis* losses to wastewater treatment systems of commercial chemical product or chemical intermediates that are ignitable (D001), corrosive (D002), or are organic constituents that exhibit the characteristic of toxicity (D012–D043) and that contain underlying hazardous constituents as defined in § 268.2, are not considered to be prohibited wastes. *De minimis* is defined as losses from normal material handling operations (e.g. spills from the unloading or transfer of materials from bins or other containers, leaks from pipes, valves or other devices used to transfer materials); minor leaks of process equipment, storage tanks or containers; leaks from well-maintained pump packings and seals; sample purgings; and relief device discharges.

(5) Land disposal prohibitions do not apply to laboratory wastes displaying the characteristic of ignitability (D001), corrosivity (D002), or are organic constituents that exhibit the characteristic of toxicity (D012–D043), that are commingled with other plant wastewaters under designated circumstances: ignitable, corrosive, and TC organic laboratory wastes containing underlying hazardous constituents from laboratory operations, that are mixed with other plant wastewaters at facilities whose ultimate discharge is subject to regulation under the CWA (including wastewaters at facilities which have eliminated the discharge of wastewater), provided that the annualized flow of laboratory wastewater into the facility's headwork does not exceed one percent, or provided that the laboratory wastes' combined annualized average concentration does not exceed one part per million in the facility's headwork.

15. Section 268.2 is amended by redesignating paragraphs (i) as (j), (e) as (i), (h) as (e), (d) as (h), (b) as (d), (g) as (b), (c) as (g), (a) as (c) and (f) as (k) and by adding paragraphs (a) and (f) to read as follows:

§ 268.2 Definitions applicable in this part.

* * * * *

(a) Constituents subject to regulation means those constituents for which treatment standards are established in § 268.48 at levels above the universal treatment standards.

* * * * *

(f) Hazardous soil means soil that contains RCRA hazardous waste(s) listed in 40 CFR part 261, subpart D, or that exhibits one or more of the characteristics of a hazardous waste as defined in 40 CFR part 261, subpart C.

* * * * *

16. In § 268.7, paragraphs (a) introductory text, (a)(1)(ii), and (a)(8) are revised, paragraph (a)(9) is removed, paragraph (a)(10) is redesignated as paragraph (a)(9), paragraphs (a)(10) and (a)(11) are added, paragraphs (b)(4)(ii) and (d) introductory text are revised, and paragraph (e) is added to read as follows:

§ 268.7 Waste analysis and recordkeeping.

(a) Except as specified in § 268.32, if a generator's waste is listed in 40 CFR part 261, subpart D, the generator must test his waste, or test an extract using test method 1311, the Toxicity Characteristic Leaching Procedure, described in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication SW 846 as incorporated by reference in § 260.11, or use knowledge of the waste, to determine if the waste is restricted from land disposal under this part. Except as specified in § 268.32, if a generator's waste exhibits one or more of the characteristics set out at 40 CFR part 261, subpart C, the generator must test an extract using test method 1311, the Toxicity Characteristic Leaching Procedure, described in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (SW–846), or use knowledge of the waste, to determine if the waste is restricted from land disposal under this part. If the generator determines that his waste exhibits:

(1) The characteristic of ignitability (D001) (and is not in the High TOC Ignitable Liquids Subcategory or is not treated by INCIN, FSUBS, or RORGS of § 268.42, Table 1), or the characteristic

of corrosivity (D002), and is prohibited under § 268.37; and/or

(2) The characteristic of toxicity, and is prohibited under § 268.38, the generator must determine what underlying hazardous constituents (as defined in § 268.2), are reasonably expected to be present in the D001, D002, or TC waste.

* * * * *

(1) * * *

(ii) The waste constituents for wastes F001–F005, F039, wastes prohibited pursuant to § 268.32 or RCRA section 3004(d), and for underlying hazardous constituents (as defined in § 268.2), in D001 and D002 wastes if those wastes are prohibited under § 268.37, and constituents subject to treatment in TC wastes that are prohibited under § 268.38. Also included must be the applicable wastewater (as defined in § 268.2(f)) or nonwastewater (as defined in § 268.2(d)) form and the applicable subcategories made within a waste code based on waste-specific criteria (such as D003 reactive cyanides).

* * * * *

(8) If a generator is managing a lab pack that contains prohibited wastes, and does not include any wastes found at § 268.42(c)(2), and wishes to use the alternative treatment standard under § 268.42, with each shipment of waste the generator must submit a notice to the treatment facility in accordance with paragraph (a)(1) of this section. The generator must also comply with the requirements in paragraphs (a)(5) through (a)(7) of this section, and must submit the following certification, which must be signed by an authorized representative:

I certify under penalty of law that I personally have examined and am familiar with the waste and that the lab pack does not contain any waste found at § 268.42(c)(2). I am aware that there are significant penalties for submitting a false certification, including the possibility of fine or imprisonment.

* * * * *

(10) If a generator determines that he is managing hazardous soil that does not meet the treatment standards established in § 268.47, then with each shipment of hazardous soil, the generator must notify the treatment or storage facility in writing of the constituents subject to treatment and the appropriate treatment standards as described in §§ 268.47. If the treatment standards specified on the notification indicate that 90% treatment of the initial concentrations of the constituents subject to treatment has been performed, the generator must maintain documentation, in the facility operating record, supporting the treatment standard by documenting the initial concentrations and the treated concentrations of constituents subject to treatment.

(11) If a generator determines that he is managing hazardous soil that is restricted under this part, and determines that the hazardous soil can be land disposed without further treatment, then, with each shipment of hazardous soil, the generator must certify and notify the treatment, storage, or land disposal facility in writing as described in paragraph (a)(2) of this section. To meet the requirements of paragraph (a)(2)(i)(B) of this section, the generator must specify the appropriate treatment standard for the hazardous soil. If the universal treatment standards are not specified as the appropriate treatment standards, the generator must maintain documentation, in their files, supporting the treatment standard specified to the treatment facility. In lieu of the certification in paragraph (a)(2)(ii) of this section, the following certification must be signed by an authorized representative:

I certify under penalty of law that I personally have examined and am familiar with the hazardous soil through analysis and testing or through knowledge of the hazardous soil to support this certification that the waste complies with the regulations and requirements that apply to hazardous soil as specified in 40 CFR parts 260 through 268. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.

* * * * *

(b) * * *

(4) * * *

(ii) The waste constituents for wastes F001–F005, F039, wastes prohibited pursuant to § 268.32 or RCRA section 3004(d), and for underlying hazardous constituents (as defined in § 268.2), in D001 and D002 wastes if those wastes are prohibited under § 268.37, and constituents subject to treatment in TC wastes that are prohibited under § 268.38. Also included must be the applicable wastewater (as defined in § 268.2(f)) or nonwastewater (as defined in § 268.2(d)) form and the applicable subcategories made within a waste code based on waste-specific criteria (such as D003 reactive cyanides).

* * * * *

(d) Generators or treaters who determine that hazardous debris is excluded from the definition of hazardous waste under § 261.3(f)(1) of this chapter (i.e., debris treated by an extraction or destruction technology provided by Table 1, § 268.45) are subject to the following notification and certification requirement:

* * * * *

(e) Generators or treaters who first claim that hazardous debris or hazardous media is excluded from the definition of hazardous waste under § 261.3(f)(2) or § 261.3(g) of this chapter, must place a one-time notice stating the applicable exclusion and the disposition of the waste in the facility's files, and must retain such notices for at least five years.

17. In § 268.9, paragraphs (a), (d)(1) introductory text, (d)(1)(i) and (d)(1)(ii) are revised and (d)(1)(iii) is removed to read as follows:

§ 268.9 Special rules regarding wastes that exhibit a characteristic.

(a) The initial generator of a solid waste must determine each EPA Hazardous Waste Number (waste code) applicable to the waste in order to determine the applicable treatment standards under subpart D of this part. For purposes of part 268, the waste will carry the waste code for any applicable listing under 40 CFR part 261, subpart D. In addition, the waste will carry one or more of the waste codes under 40 CFR part 261, subpart C, where the waste exhibits a characteristic, except in the case when the treatment standard for the waste code listed in 40 CFR part 261, subpart D operates in lieu of the standard for the waste code under 40 CFR part 261, subpart C, as specified in paragraph (b) of this section. If the generator determines that his waste displays the characteristic of ignitability (D001) (and is not in the High TOC Ignitable Liquids Subcategory or is not treated by INCIN, FSUBS, or RORGS of § 268.42, Table 1), or the characteristic of corrosivity (D002), and is prohibited under § 268.37; or if the generator determines that his waste displays the characteristic of toxicity (D011–D043), and is prohibited under § 268.38; or if the generator has characteristic hazardous soil prohibited under § 268.39, the generator must determine what underlying hazardous constituents (as defined in § 268.2), are reasonably expected to be present in the D001, D002, or TC waste.

* * * * *

(d) * * *

(1) The notification must include the following information:

(i) Name and address of the Subtitle D facility receiving the waste shipment; and

(ii) A description of the waste as initially generated, including the applicable EPA Hazardous Waste Number(s), treatability group(s), and

underlying hazardous constituents in D001, D002, TC wastes, or characteristic hazardous soil (if applicable).

* * * * *

Subpart C—Prohibitions on Land Disposal

18. In Subpart C, § 268.38 is added to read as follows:

§ 268.38 Waste specific prohibitions—newly listed and identified wastes.

(a) Effective [insert date 90 days from date of publication], the following wastes specified in 40 CFR 261.24, Table 1 as EPA Hazardous Waste numbers D012, D013, D014, D015, D016, D017, D018, and D019, D020, D021, D022, D023, D024, D025, D026, D027, D028, D029, D030, D031, D032, D033, D034, D035, D036, D037, D038, D039, D040, D041, D042, D043 nonwastewaters; and the wastes specified in 40 CFR 261.32 as EPA Hazardous Waste numbers K141, K142, K143, K144, K145, K147, K148, K149, K150, and K151 are prohibited from land disposal.

(b) Effective [insert date two years from date of publication], radioactive wastes that are mixed with D018–D043 nonwastewaters, D012–D017 wastes that pass the EP toxicity test but fail the TCLP test, K141–K145, and K147–K151 are prohibited from land disposal.

(c) Between [insert date of publication] and [insert date two years from date of publication], the wastes included in paragraph (c) of this section may be disposed of in a landfill or surface impoundment, only if such unit is in compliance with the requirements specified in § 268.5(h)(2).

(d) The requirements of paragraphs (a), (b), and (c) of this section do not apply if:

(1) The wastes meet the applicable standards specified in subpart D of this part;

(2) Persons have been granted an exemption from a prohibition pursuant to a petition under § 268.6, with respect to those wastes and units covered by the petition;

(3) The wastes meet the applicable alternate standards established pursuant to a petition granted under § 268.44;

(4) Persons have been granted an extension to the effective date of a prohibition pursuant to § 268.5, with respect to these wastes covered by the extension.

(e) To determine whether a hazardous waste identified in this section exceeds the applicable treatment standards specified in § 268.40, the initial generator must test a representative sample of the waste extract or the entire waste, depending on whether the treatment standards are expressed as concentrations in the waste extract or the waste, or the generator may use knowledge of the waste. If the waste contains constituents in excess of the applicable subpart D of this part levels, the waste is prohibited from land disposal, and all requirements of 40 CFR part 268 are applicable, except as otherwise specified.

19. Section 268.39 is added to read as follows:

§ 268.39 Waste specific prohibitions—Hazardous soil, and debris contaminated with certain newly listed wastes.

(a) Effective [insert date two years from date of publication], soils that are contaminated with F037, F038, K107–K112, K117, K118, K123–K126, K131, K132, K136, U328, U353, U359, D018–D043, K141–145 and K147–151 wastes, soils that are contaminated with D012–D017 that pass the EP toxicity test but fail the TCLP test are prohibited from land disposal.

(b) Effective [insert date two years from date of publication], debris that are contaminated with D018–D043, K141–K145, or K147–K151 wastes, and debris that are contaminated with D012–D017 wastes that pass the EP toxicity test but fail the TCLP test are prohibited from land disposal.

(c) Between [insert date of publication] and [insert date two years from date of publication], the wastes included in paragraphs (a) and (b) of this section may be disposed of in a landfill or surface impoundment only if such unit is in compliance with the requirements specified in § 268.5(h)(2).

(d) The requirements of paragraphs (a) and (b) of this section do not apply if:

(1) The wastes meet the applicable standards specified in subpart D of this part;

(2) Persons have been granted an exemption from a prohibition pursuant to a petition under § 268.6, with respect to those wastes and units covered by the petition;

(3) The wastes meet the applicable alternate standards established pursuant to a petition granted under § 268.44;

(4) Persons have been granted an extension to the effective date of a prohibition pursuant to § 268.5, with respect to those wastes covered by the extension.

(e) To determine whether a hazardous waste identified in this section exceeds the applicable treatment standards specified in §§ 268.40 and 268.48, the initial generator must test a representative sample of the waste extract or the entire waste, depending on whether the treatment standards are expressed as concentrations in the waste extract or the waste, or the generator may use knowledge of the waste. If the waste contains constituents in excess of the applicable subpart D of this part levels, the waste is prohibited from land disposal, and all requirements of 40 CFR part 268 are applicable, except as otherwise specified.

Subpart D—Treatment Standards

20. Section 268.40 is revised to read as follows:

§ 268.40 Applicability of treatment standards.

(a) A waste identified in the Table Treatment Standards for Hazardous Wastes in this section may be land disposed only if it meets the requirements found in the table. For each waste, the table identifies one of three types of requirements ("treatment standards"):

(1) All hazardous constituents in the waste or in the treatment residue must be at or below the values found in the table for that waste ("total waste standards"); or

(2) The hazardous constituents in the extract of the waste or in the extract of the treatment residue must be at or below the values found in the table ("waste extract standards"); or

(3) The waste must be treated using the technology specified in the table ("technology standard").

(b) For waste covered by the total waste standards and waste extract standards, compliance is based upon grab samples, unless otherwise noted in the table. For wastes covered by the waste extract standards, the test Method 1311, the Toxicity Characteristic Leaching Procedure, must be used. An exception is made for D004, D008, K031, K084, K101, K102, P010, P011, P012, P036, P038, and U136, for which either of two test methods may be used: Method 1311, or Method 1310, the Extraction Procedure Toxicity Test, both found in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", EPA Publication SW 846 as incorporated by reference in § 260.11 of this chapter. For wastes covered by a technology standard, the wastes may be land disposed after it is treated using that specified technology or an equivalent treatment technology approved by the Administrator under the procedures set forth in § 268.42(b).

(c) When wastes with differing treatment standards for a constituent of concern are combined for purposes of treatment, the treatment residue must meet the lowest treatment standard for the constituent of concern.

(d) Notwithstanding the prohibitions specified in paragraph (a) of this section, treatment and disposal facilities may demonstrate (and certify pursuant to § 268.7(b)(5)) compliance with the treatment standards for organic constituents specified by a footnote in the Table Treatment Standards for Hazardous Wastes in this section, provided the following conditions are satisfied:

(1) The treatment standards for the organic constituents were established based on incineration in units operated in accordance with the technical requirements of 40 CFR part 264, subpart O, or 40 CFR part 265, subpart O, or based on combustion in fuel substitution units operating in accordance with applicable technical requirements;

(2) The treatment or disposal facility has used the methods referenced in paragraph (c)(1) of this section to treat the organic constituents; and

(3) The treatment or disposal facility has been unable to detect the organic constituents despite using its best good-faith efforts as defined by applicable Agency guidance or standards. Until such guidance or standards are developed, the treatment or disposal facility may demonstrate such good-faith efforts by achieving detection limits for the regulated organic constituents that do not exceed the treatment standards specified in this section by an order of magnitude.

(e) If a treatment standard has been established in the Table Treatment Standards for Hazardous Wastes for a hazardous waste that is itself hazardous debris, the waste is subject to those standards rather than the standards for hazardous debris under § 268.45.

(f) Hazardous soil may be land disposed in a subtitle C unit only if all constituents subject to treatment in the hazardous soil are equal to or less than applicable total (for organics) or leachate (for metals) concentrations found in § 268.47.

(g) Soils that are hazardous solely because they exhibit the characteristics of ignitability, corrosivity, or reactivity, must be treated by deactivation technologies which eliminate these characteristics. If other constituents subject to treatment are also present, they must be treated to achieve the technology-based treatment standards found in § 268.48.

TREATMENT STANDARDS FOR HAZARDOUS WASTES

Waste code	Waste description and/or treatment subcategory	Regulated hazardous constituent		Wastewaters		Nonwastewaters	
		Common name	CAS No.	Concentration (mg/l) or technology code	Sampling basis	Concentration or technology code	Sampling basis and units
D001	All descriptions based on 40 CFR 261.21, except for the §261.21(a)(1) High TOC subcategory, managed in non-CWA/non-CWA-equivalent/non-Class I SDWA systems.	NA	NA	DEACT, and meet F039; or FSUBS; RORGS; or INCIN.	NA	DEACT, and meet F039; or FSUBS; RORGS; or INCIN.	NA.
D001	All descriptions based on 40 CFR 261.21, except for the §261.21(a)(1) High TOC subcategory, managed in CWA/CWA-equivalent/Class I SDWA systems.	NA	NA	DEACT	NA	DEACT	NA.
D001	All descriptions based on 40 CFR 261.21(a)(1)—High TOC Ignitable Liquids Subcategory-Greater than or equal to 10% total organic carbon.	NA	NA	NA	NA	FSUBS; RORGS; or INCIN.	NA.
D002	Radioactive High Level Wastes Generated During the Reprocessing of Fuel Rods Subcategory.	NA	NA	NA	NA	HLVIT	NA.
D002	Acid, alkaline, and other subcategory based on 261.22 managed in non-CWA/non-CWA equivalent/non-Class I SDWA systems.	NA	NA	DEACT and meet F039.	NA	DEACT and meet F039.	NA.
D002	Acid, alkaline, and other subcategory based on 261.22 managed in CWA, CWA-equivalent, or Class I SDWA systems.	NA	NA	DEACT	NA	DEACT	NA.
D003	Reactive sulfides based on 261.23(a)(5). Dilution is not allowed per 58 FR 14317, March 17, 1993.	NA	NA	DEACT	NA	DEACT	NA.
D003	Explosives based on 261.23(a) (6), (7), and (8).	NA	NA	DEACT	NA	DEACT	NA.
D003	Water reactives based on 261.23(a) (2), (3), and (4).	NA	NA	NA	NA	DEACT	NA.
D003	Other reactives based on 261.23(a)(1)..	NA	NA	DEACT	NA	DEACT	NA.
D003	Reactive cyanides subcategory (Total) based on 261.23(a)(5).	Cyanides (Total)	57–12–5	Reserved	NA	590	Total (mg/kg).
D003	Reactive cyanides subcategory (Amenable) based on 261.23(a)(5).	Cyanides (Amenable)	57–12–5	0.86	Grab	30	Total (mg/kg).
D004		Arsenic	7440–38–2	5.0	Grab	5.0	TCLP (mg/l).
D004	Radioactive High Level Wastes Generated During the Reprocessing of Fuel Rods Subcategory.	NA	NA	NA	NA	HLVIT	NA.
D005		Barium	7440–39–3	100	Grab	100	TCLP (mg/l).

D005	Radioactive High Level Wastes Generated During the Reprocessing of Fuel Rods Subcategory.	NA	NA	NA	NA	HLVIT	NA.
D006		Cadmium	7440–43–9	1.0	Grab	1.0	TCLP (mg/l).
D006	Cadmium containing batteries	Cadmium	7440–43–9	NA	NA	RTHRM	NA.
D006	Radioactive High Level Wastes Generated During the Reprocessing of Fuel Rods Subcategory.	NA	NA	NA	NA	HLVIT	NA.
D007		Chromium (Total)	7440–47–32	5.0	Grab	5.0	TCLP (mg/l).
D007	Radioactive High Level Wastes Generated During the Reprocessing of Fuel Rods Subcategory.	NA	NA	NA	NA	HLVIT	NA.
D008		Lead	7439–92–1	5.0	Grab	5.0	TCLP (mg/l).
D008	Lead acid batteries (Note: This standard only applies to lead acid batteries that are identified as RCRA hazardous wastes and that are not excluded elsewhere from regulation under the land disposal restrictions of 40 CFR 268 or exempted under other EPA regulations (see 40 CFR 266.80).).	Lead	7439–92–1	NA	NA	RLEAD	NA.
D008	Radioactive Lead Solids Subcategory (Note: these lead solids include, but are not limited to, all forms of lead shielding and other elemental forms of lead. These lead solids do not include treatment residuals such as hydroxide sludges, other wastewater treatment residuals, or incinerator ashes that can undergo conventional pozzolanic stablization, nor do they include organo-lead materials that can be incinerated and stablized as ash.).	Lead-Radioactive	7439–92–1	NA	NA	MACRO	NA.
D008	Radioactive High Level Wastes Generated During the Reprocessing of Fuel Rods Subcategory.	NA	NA	NA	NA	HLVIT	NA.
D009	Low Mercury Subcategory—less than 260 mg/kg Mercury.	Mercury	7439–97–6	0.20	Grab	0.20	TCLP (mg/l).
D009	High Mercury Subcategory—greater than or equal to 260 mg/kg total Mercury—contains mercury and organics (and are not incinerator residues).	Mercury	7439–97–6	NA	NA	IMERC; OR RMERC.	NA.
D009	High Mercury Subcategory—greater than or equal to 260 mg/kg total Mercury—Inorganics (including incinerator residues and residues from RMERC).	Mercury	7439–97–6	NA	NA	RMERC	NA.
D009	Elemental mercury contaminated with radioactive materials.	Mercury-Radioactive	7439–97–6	NA	NA	AMLGM	NA.
D009	Hydraulic oil contaminated with Mercury Radioactive Materials Subcategory.	Mercury-Radioactive	7439–97–6	NA	NA	IMERC	NA.

TREATMENT STANDARDS FOR HAZARDOUS WASTES—Continued

Waste code	Waste description and/or treatment subcategory	Regulated hazardous constituent		Wastewaters		Nonwastewaters	
		Common name	CAS No.	Concentration (mg/l) or technology code	Sampling basis	Concentration or technology code	Sampling basis and units
D009	Radioactive High Level Wastes Generated During the Reprocessing of Fuel Rods Subcategory.	NA	NA	NA	NA	HLVIT	NA.
D010		Selenium	7782-49-2	1.0	Grab	5.7	TCLP (mg/l).
D010	Radioactive High Level Wastes Generated During the Reprocessing of Fuel Rods Subcategory.	NA	NA	NA	NA	HLVIT	NA.
D011		Silver	7440-22-4	5.0	Grab	5.0	TCLP (mg/l).
D011	Radioactive High Level Wastes Generated During the Reprocessing of Fuel Rods Subcategory.	NA	NA	NA	NA	HLVIT	NA.
D012		Endrin	72-20-8	BIODG or INCIN	NA	0.13	Total (mg/kg).
D012	Managed in non-CWA/non-CWA equivalent/non-Class I SDWA systems.	Endrin	72-20-8	BIODG or INCIN	NA	0.13 (and meet §268.48 standards).	Total (mg/kg).
D013		Lindane	58-89-9	CARBN or INCIN	NA	0.066	Total (mg/kg).
D013	Managed in non-CWA/non-CWA equivalent/non-Class I SDWA systems.	Lindane	58-89-9	CARBN or INCIN	NA	0.066 (and meet §268.48 standards).	Total (mg/kg).
D014		Methoxychlor	72-43-5	WETOX or INCIN	NA	0.18	Total (mg/kg).
D014	Managed in non-CWA/non-CWA equivalent/non-Class I SDWA systems.	Methoxychlor	72-43-5	WETOX or INCIN	NA	0.18 (and meet §268.48 standards).	Total (mg/kg).
D015		Toxaphene	8001-35-2	BIODG or INCIN	NA	2.6	Total (mg/kg).
D015	Managed in non-CWA-/non-CWA equivalent/non-Class I SDWA systems.	Toxaphene	8001-35-2	BIODG or INCIN	NA	2.6 (and meet §268.48 standards).	Total (mg/kg).
D016		2,4-D	94-75-7	CHOXD, BIODG, or INCIN.	NA	10	Total (mg/kg).
D016	Managed in non-CWA/non-CWA equivalent/non-Class I SDWA systems.	2,4-D	94-75-7	CHOXD, BIODG, or INCIN.	NA	10 (and meet §268.48 standards).	Total (mg/kg).
D017		2,4,5-TP (Silvex)	93-72-1	CHOXD or INCIN	NA	7.9	Total (mg/kg).
D017	Managed in non-CWA/non-CWA equivalent/non-Class I SDWA systems.	2,4,5-TP (Silvex)	93-72-1	CHOXD or INCIN	NA	7.9 (and meet §268.48 standards).	Total (mg/kg).
D018	Managed in non-CWA/non-CWA equivalent/non-Class I SDWA systems.	Benzene	71-43-2	0.14	Grab	10 (and meet §268.48 standards.	Total (mg/kg).
D019	Managed in non-CWA/non-CWA equivalent/non-Class I SDWA systems.	Carbon tetrachloride	56-23-5	0.057	Grab	6.0 (and meet §268.48 standards).	Total (mg/kg).
D020	Managed in non-CWA/non-CWA equivalent/non-Class I SDWA systems.	Chlordane	57-74-9	0.033	Grab	0.26 (and meet §268.48 standards).	Total (mg/kg).
D021	Managed in non-CWA/non-CWA equivalent/non-Class I SDWA systems.	Chlorobenzene	108-90-7	0.057	Grab	6.0 (and meet §268.48 standards).	Total (mg/kg).
D022	Managed in non-CWA/non-CWA equivalent/non-Class I SDWA systems.	Chloroform	67-66-3	0.046	Grab	6.0 (and meet §268.48 standards).	Total (mg/kg).

D023	Managed in non-CWA/non-CWA equivalent/non-Class I SDWA systems.	o-Cresol	95–48–7	0.11	Grab	5.6 (and meet §268.48 standards).	Total (mg/kg).
D024	Managed in non-CWA/non-CWA equivalent/non-Class I SDWA systems.	m-Cresol	108–39–4	0.77	Grab	3.2 (and meet §268.48 standards).	Total (mg/kg).
D025	Managed in non-CWA/non-CWA equivalent/non-Class I SDWA systems.	p-Cresol	106–44–5	0.77	Grab	3.2 (and meet §268.48 standards).	Total (mg/kg).
D026	Managed in non-CWA/non-CWA equivalent/non-Class I SDWA systems.	Cresol	NA	0.77	Grab	8.8 (and meet §268.48 standards).	Total (mg/kg).
D027	Managed in non-CWA/non-CWA equivalent/non-Class I SDWA systems.	1,4-Dichlorobenzene	106–46–7	0.09	Grab	6.0 (and meet §268.48 standards).	Total (mg/kg).
D028	Managed in non-CWA/non-CWA equivalent/non-Class I SDWA systems.	1,2–Dichloroethane	107–06–2	0.21	Grab	6.0 (and meet §268.48 standards).	Total (mg/kg).
D029	Managed in non-CWA/non-CWA equivalent/non-Class I SDWA systems.	1,1-Dichloroethylene	75–35–4	0.025	Grab	6.0 (and meet §268.48 standards).	Total (mg/kg).
D030	Managed in non-CWA/non-CWA equivalent/non-Class I SDWA systems.	2,4-Dinitrotoluene	121–14–2	0.32	Grab	140 (and meet §268.48 standards).	Total (mg/kg).
D031	Managed in non-CWA/non-CWA equivalent/non-Class I SDWA systems.	Heptachlor	76–44–8	0.0012	Grab	0.066 (and meet §268.48 standards).	Total (mg/kg).
D031	Managed in non-CWA/non-CWA equivalent/non-Class I SDWA systems.	Heptachlor epoxide	76–44–8	0.016	Grab	0.066 (and meet §268.48 standards).	Total (mg/kg).
D032	Managed in non-CWA/non-CWA equivalent/non-Class I SDWA systems.	Hexachlorobenzene	118–74–1	0.055	Grab	10 (and meet §268.48 standards).	Total (mg/kg).
D033	Managed in non-CWA/non-CWA equivalent/non-Class I SDWA systems.	Hexachloro-1,3-butadiene	87–68–3	0.055	Grab	5.6 (and meet §268.48 standards).	Total (mg/kg).
D034	Managed in non-CWA/non-CWA equivalent/non-Class I SDWA systems.	Hexachloroethane	67–72–1	0.055	Grab	30 (and meet §268.48 standards).	Total (mg/kg).
D035	Managed in non-CWA/non-CWA equivalent/non-Class I SDWA systems.	Methyl ethyl ketone	78–93–3	0.28	Grab	36 (and meet §268.48 standards).	Total (mg/kg).
D036	Managed in non-CWA/non-CWA equivalent/non-Class I SDWA systems.	Nitrobenzene	98–95–3	0.068	Grab	14 (and meet §268.48 standards).	Total (mg/kg).
D037	Managed in non-CWA/non-CWA equivalent/non-Class I SDWA systems.	Pentachlorophenol	87–86–5	0.89	Grab	7.4 (and meet §268.48 standards).	Total (mg/kg).
D038	Managed in non-CWA/non-CWA equivalent/non-Class I SDWA systems.	Pyridine	110–86–1	0.014	Grab	16 (and meet §268.48 standards).	Total (mg/kg).
D039	Managed in non-CWA/non-CWA equivalent/non-Class I SDWA systems.	Tetrachloroethylene	127–18–4	0.056	Grab	6.0 (and meet §268.48 standards).	Total (mg/kg).
D040	Managed in non-CWA/non-CWA equivalent/non-Class I SDWA systems.	Trichloroethylene	79–01–6	0.054	Grab	6.0 (and meet §268.48 standards).	Total (mg/kg).

TREATMENT STANDARDS FOR HAZARDOUS WASTES—Continued

Waste code	Waste description and/or treatment subcategory	Regulated hazardous constituent		Wastewaters		Nonwastewaters	
		Common name	CAS No.	Concentration (mg/l) or technology code	Sampling basis	Concentration or technology code	Sampling basis and units
D041	Managed in non-CWA/non-CWA equivalent/non-Class I SDWA systems.	2,4,5-Trichlorophenol	95-95-4	0.18	Grab	7.4 (and meet §268.48 standards).	Total (mg/kg).
D042	Managed in non-CWA/non-CWA equivalent/non-Class I SDWA systems.	2,4,6-Trichlorophenol	88-06-2	0.035	Grab	7.4 (and meet §268.48 standards).	Total (mg/kg).
D043	Managed in non-CWA/non-CWA equivalent/non-Class I SDWA systems.	Vinyl chloride	75-01-4	0.27	Grab	6.0 (and meet §268.48 standards).	Total (mg/kg).
F001-F005	Spent solvents	Acetone	67-64-1	0.28	Grab	160	Total (mg/l)
		Benzene	71-43-2	0.070	Grab	3.7	Total (mg/kg).
		n-Butyl alcohol	71-36-3	5.6	Grab	2.6	Total (mg/l).
		Carbon disulfide	75-15-0	NA	Grab	4.8	TCLP (mg/l).
		Carbon tetrachloride	56-23-5	0.057	Grab	5.6	Total (mg/l).
		Chlorobenzene	108-90-7	0.057	Grab	5.7	Total (mg/l).
		Cresols (and cresylic acid)	NA	0.77	Grab	3.2	Total (mg/l).
		o-Cresol	95-48-7	0.11	Grab	5.6	Total (mg/l).
		Cyclohexanone	108-94-1	NA	Grab	0.75	TCLP (mg/l).
		o-Dichlorobenzene	95-50-1	0.088	Grab	6.2	Total (mg/l).
		Ethyl acetate	141-7-6	0.34	Grab	33	Total (mg/l).
		Ethyl benzene	100-41-4	0.057	Grab	6.0	Total (mg/l).
		Ethyl ether	60-29-7	0.12	Grab	160	Total (mg/l).
		Isobutyl Alcohol	78-83-1	5.6	Grab	170	Total (mg/l).
		Methanol	67-56-1	NA	Grab	0.75	TCLP (mg/l).
		Methylene chloride	75-9-2	0.069	Grab	33	Total (mg/l).
		Methyl ethyl ketone	78-93-3	0.28	Grab	36	Total (mg/l).
		Methyl isobutyl ketone	108-10-1	0.14	Grab	33	Total (mg/l).
		Nitrobenzene	98-95-3	0.068	Grab	14	Total (mg/l).
		Pyridine	110-86-1	0.014	Grab	16	Total (mg/l).
		Tetrachloroethylene	127-18-4	0.056	Grab	5.6	Total (mg/l).
		Toluene	108-88-3	0.06	Grab	28	Total (mg/l).
		1,1,1-Trichloroethane	71-55-6	0.054	Grab	5.6	Total (mg/l).
		1,1,2-Trichloroethane	79-00-5	0.030	Grab	7.6	Total (mg/kg).
		1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	0.057	Grab	28	Total (mg/l).
		Trichloroethylene	79-01-6	0.054	Grab	5.6	Total (mg/l).
		Trichlorofluoromethane	75-69-4	0.02	Grab	33	Total (mg/l).
		Xylenes (total)	1330-20-7	0.32	Grab	28	Total (mg/l).
F001-F005	(Pharmaceutical industry wastewater subcategory).	Methylene chloride	75-09-2	0.44	Grab	NA	NA.
F005		2-Nitropropane	79-46-9	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
F005		2-Ethoxyethanol	110-80-5	BIODG: or INCIN	NA	INCIN	NA.
F006		Cadmium	7440-43-9	1.6	Grab	0.066	TCLP (mg/l).
		Chromium (Total)	7440-47-3	NA	NA	5.2	TCLP (mg/l).
		Chromium	7440-47-3	0.32	Grab	NA	NA.
		Cyanides (Total)	57-12-5	1.2	Grab	590	Total (mg/kg).
		Cyanides (Amenable)	57-12-5	0.86	Grab	30	Total (mg/kg).
		Lead	7439-92-1	0.040	Grab	0.51	TCLP (mg/l).

		Nickel	7440–02–0	0.44	Grab	0.32	TCLP (mg/l).
		Silver	7440–22–4	NA	NA	0.072	TCLP (mg/l).
F007		Cadmium	7440–43–9	NA	NA	0.066	TCLP (mg/l).
		Chromium (Total)	7440–47–3	0.32	Grab	5.2	TCLP (mg/l).
		Cyanides (Total)	57–12–5	1.2	Grab	590	Total (mg/kg).
		Cyanides (Amenable)	57–12–5	0.86	Grab	30	Total (mg/kg).
		Lead	7439–92–1	0.04	Grab	0.51	TCLP (mg/l).
		Nickel	7440–02–0	0.44	Grab	0.32	TCLP (mg/l).
		Silver	7440–22–4	NA	NA	0.072	TCLP (mg/l).
F008		Cadmium	7440–43–9	NA	NA	0.066	TCLP (mg/l).
		Chromium (Total)	7440–47–3	NA	NA	5.2	TCLP (mg/l).
		Chromium	7440–47–3	0.32	Grab	NA	NA.
		Cyanides (Total)	57–12–5	1.2	Grab	590	Total (mg/kg).
		Cyanides (Amenable)	57–12–5	0.86	Grab	30	Total (mg/kg).
		Lead	7439–92–1	0.04	Grab	0.51	TCLP (mg/l).
		Nickel	7440–02–0	0.44	Grab	0.32	TCLP (mg/l).
		Silver	7440–22–4	NA	NA	0.072	TCLP (mg/l).
F009		Cadmium	7440–43–9	NA	NA	0.066	TCLP (mg/l).
		Chromium (Total)	7440–47–3	NA	NA	5.2	TCLP (mg/l).
		Chromium	7440–47–3	0.32	Grab	NA	NA.
		Cyanides (Total)	57–12–5	1.2	Grab	590	Total (mg/kg).
		Cyanides (Amenable)	57–12–5	0.86	Grab	30	Total (mg/kg).
		Lead	7439–92–1	0.04	Grab	0.51	TCLP (mg/l).
		Nickel	17440–02–0	0.44	Grab	0.32	TCLP (mg/l).
		Silver	7440–22–4	NA	NA	0.072	TCLP (mg/l).
F010		Cyanides (Total)	57–12–5	1.2	Grab	1.5	Total (mg/kg).
		Cyanides (Amenable)	57–12–5	0.86	Grab	NA	NA.
F011		Cadmium	7440–43–9	NA	NA	0.066	TCLP (mg/l).
		Chromium (Total)	7440–47–3	0.32	Grab	5.2	TCLP (mg/l).
		Cyanides (Total)	57–12–5	1.2	Grab	110	Total (mg/kg).
		Cyanides (Amenable)	57–12–5	0.1	Grab	9.1	Total (mg/kg).
		Lead	7439–92–1	0.04	Grab	0.51	TCLP (mg/l).
		Nickel	7440–02–0	0.44	Grab	0.32	TCLP (mg/l).
		Silver	7440–22–4	NA	NA	0.072	TCLP (mg/l).
F012		Cadmium	7440–43–9	NA	NA	0.066	TCLP (mg/l).
		Chromium (Total)	7440–47–3	0.32	Grab	5.2	TCLP (mg/l).
		Cyanides (Total)	57–12–5	1.2	Grab	110	Total (mg/kg).
		Cyanides (Amenable)	57–12–5	0.1	Grab	9.1	Total (mg/kg).
		Lead	7439–92–1	0.04	Grab	0.51	TCLP (mg/l).
		Nickel	7440–02–0	0.44	Grab	0.32	TCLP (mg/l).
		Silver	7440–22–4	NA	NA	0.072	TCLP (mg/l).
F019		Chromium (Total)	7440–47–3	0.32	Grab	5.2	TCLP (mg/l).
		Cyanides (Total)	57–12–5	1.2	Grab	590	Total (mg/kg).
		Cyanides (Amenable)	57–12–5	0.86	Grab	30	Total (mg/kg).
F020–F023, and F026–F028	Dioxin containing wastes (these waste codes are not subcategorized into wastewater and nonwastewaters).	HxCDD—All Hexachlorodibenzo-p-dioxins.	NA	<1 ppb	Grab	<1	TCLP (ppb).
		HxCDF—All Hexachlorodibenzofurans.	NA	<1 ppb	Grab	<1	TCLP (ppb).
		PeCDD—All Pentachlorodibenzo-p-dioxins.	NA	<1 ppb	Grab	<1	TCLP (ppb).
		PeCDF—All Pentachlorodibenzofurans.	NA	<1 ppb	Grab	<1	TCLP (ppb).
		TCDD—All Tetrachlorodibenzo-p-dioxins.	NA	<1 ppb	Grab	<1	TCLP (ppb).
		TCDF—All Tetrachlorodibenzofurans.	NA	<1 ppb	Grab	<1	TCLP (ppb).

TREATMENT STANDARDS FOR HAZARDOUS WASTES—Continued

Waste code	Waste description and/or treatment subcategory	Regulated hazardous constituent		Wastewaters		Nonwastewaters	
		Common name	CAS No.	Concentration (mg/l) or technology code	Sampling basis	Concentration or technology code	Sampling basis and units
		2,4,5-Trichlorophenol	95-95-4	<0.05 ppm	Grab	<0.05	TCLP (ppm).
		2,4,6-Trichlorophenol	88-06-2	<0.05 ppm	Grab	<0.05	TCLP (ppm).
		2,3,4,6-Tetrachlorophenol	58-90-2	<0.05 ppm	Grab	<0.05	TCLP (ppm).
		Pentachlorophenol	87-86-5	<0.01 ppm	Grab	<0.01	TCLP (ppm).
F024		All F024 organic standards	NA	INCIN	NA	INCIN	NA.
F024		2-Chloro-1,3-butadiene	126-99-8	0.28	Grab	0.28	Total (mg/kg).
		3-Chloropropene	107-05-1	0.28	Grab	0.28	Total (mg/kg).
		1,1-Dichloroethane	75-34-3	0.014	Grab	0.014	Total (mg/kg).
		1,2-Dichloroethane	107-06-2	0.014	Grab	0.014	Total (mg/kg).
		1,2-Dichloropropane	78-87-5	0.014	Grab	0.014	Total (mg/kg).
		cis-1,3-Dichloropropene	10061-01-5	0.014	Grab	0.014	Total (mg/kg).
		trans-1,3-Dichloropropene	10061-02-6	0.014	Grab	0.014	Total (mg/kg).
		Bis(2-ethylhexyl)phthalate	117-81-7	0.036	Grab	1.8	Total (mg/kg).
		Hexachloroethane	67-72-1	0.036	Grab	1.8	Total (mg/kg).
		Chromium (Total)	7440-47-32	0.35	Grab	0.073	TCLP (mg/l).
		Lead	7439-92-1	NA	NA	0.021	TCLP (mg/l).
		Nickel	7440-02-0	0.47	Grab	0.088	TCLP (mg/l).
F025	Light ends subcategory	Chloroform	67-66-3	0.046	Composite	6.2	Total (mg/kg).
		1,2-Dichloroethane	107-06-2	0.21	Composite	6.2	Total (mg/kg).
		1,1-Dichloroethylene	75-35-4	0.025	Composite	6.2	Total (mg/kg).
		Methylene chloride	75-9-2	0.089	Composite	31	Total (mg/kg).
		Carbon tetrachloride	56-23-5	0.057	Composite	6.2	Total (mg/kg).
		1,1,2-Trichloroethane	79-00-5	0.054	Composite	6.2	Total (mg/kg).
		Trichloroethylene	79-01-6	0.054	Composite	5.6	Total (mg/kg).
		Vinyl chloride	75-01-4	0.27	Composite	33	Total (mg/kg).
F025	Spent filters/aids and desiccants subcategory.	Chloroform	67-66-3	0.046	Composite	6.2	Total (mg/kg).
		Methylene chloride	75-9-2	0.089	Composite	31	Total (mg/kg).
		Carbon tetrachloride	56-23-5	0.057	Composite	6.2	Total (mg/kg).
		1,1,2-Trichloroethane	79-00-5	0.054	Composite	6.2	Total (mg/kg).
		Trichloroethylene	79-01-6	0.054	Composite	5.6	Total (mg/kg).
		Vinyl chloride	75-01-4	0.27	Composite	33	Total (mg/kg).
		Hexachlorobenzene	118-74-1	0.055	Composite	37	Total (mg/kg).
		Hexachlorobutadiene	87-68-3	0.055	Composite	28	Total (mg/kg).
		Hexachloroethane	67-72-1	0.055	Composite	30	Total (mg/kg).
F037		Acenaphthene	83-32-9	0.059	Composite	NA	NA.
		Anthracene	120-12-7	0.059	Composite	28	Total (mg/kg).
		Benzene	71-43-2	0.14	Composite	14	Total (mg/kg).
		Benzo (a) anthracene	56-55-3	0.059	Composite	20	Total (mg/kg).
		Benzo (a) pyrene	50-32-8	0.061	Composite	12	Total (mg/kg).
		Bis(2-ethylhexyl) phthalate	117-81-7	0.28	Composite	7.3	Total (mg/kg).
		Chrysene	218-01-9	0.059	Composite	15	Total (mg/kg).
		Di-n-butyl phthalate	84-74-2	0.057	Composite	3.6	Total (mg/kg).
		Ethylbenzene	100-41-4	0.057	Composite	14	Total (mg/kg).
		Fluorene	86-73-7	0.059	Composite	NA	NA
		Naphthalene	91-20-3	0.059	Composite	42	Total (mg/kg).
		Phenanthrene	85-01-8	0.059	Composite	34	Total (mg/kg).
		Phenol	108-95-2	0.039	Composite	3.6	Total (mg/kg).
		Pyrene	129-00-0	0.067	Composite	36	Total (mg/kg).
		Toluene	108-88-3	0.08	Composite	14	Total (mg/kg).
		Xylene(s)	1330-20-7	0.32	Composite	22	Total (mg/kg).

		Cyanides (Total)	57-12-5	0.028	grab	1.8	Total (mg/kg).
		Chromium (Total)	7440-47-3	0.2	grab	1.7	TCLP (mg/l).
		Lead	7439-92-1	0.037	grab	NA	NA
		Nickel	7440-02-0	NA	NA	0.20	TCLP (mg/l).
F038		Benzene	71-43-2	0.14	Composite	14	Total (mg/kg).
		Benzo(a) pyrene	50-32-8	0.061	Composite	12	Total (mg/kg).
		Bis(2-ethylhexyl) phthalate	117-81-7	0.28	Composite	7.3	Total (mg/kg).
		Chrysene	218-01-9	0.059	Composite	15	Total (mg/kg).
		Di-n-butyl phthalate	84-74-2	0.057	Composite	3.6	Total (mg/kg).
		Ethylbenzene	100-41-4	0.057	Composite	14	Total (mg/kg).
		Fluorene	86-73-7	0.059	Composite	NA	NA.
		Naphthalene	91-20-3	0.059	Composite	42	Total (mg/kg).
		Phenanthrene	85-01-8	0.059	Composite	34	Total (mg/kg).
		Phenol	108-95-2	0.039	Composite	3.6	Total (mg/kg).
		Pyrene	129-00-0	0.067	Composite	36	Total (mg/kg).
		Toluene	108-88-3	0.080	Composite	14	Total (mg/kg).
		Xylene(s)	1330-20-7	0.32	Composite	22	Total (mg/kg).
		Cyanides (Total)	57-12-5	0.028	grab	1.8	Total (mg/kg).
		Chromium (Total)	7440-47-3	0.2	grab	1.7	TCLP (mg/l).
		Lead	7439-92-1	0.037	grab	NA	NA.
		Nickel	7440-02-0	NA	NA	0.20	TCLP (mg/l).
(1)		Acetone	67-64-1	0.28	Composite	160	Total (mg/kg).
		Acenaphthalene	208-96-8	0.059	Composite	3.4	Total (mg/kg).
		Acenaphthene	83-32-9	0.059	Composite	4.0	Total (mg/kg).
		Acetonitrile	75-05-8	0.17	Composite	NA	NA.
		Acetophenone	96-86-2	0.010	Composite	9.7	Total (mg/kg).
		2-Acetyl-aminofluorene	53-96-3	0.059	Composite	140	Total (mg/kg).
		Acrolein	107-02-8	0.29	Composite	NA	NA.
		Acrylonitrile	107-13-1	0.24	Composite	84	Total (mg/kg).
		Aldrin	309-00-2	0.021	Composite	0.066	Total (mg/kg).
		4-Aminobiphenyl	192-67-1	0.13	Composite	NA	NA.
		Aniline	62-53-3	0.810	Composite	14	Total (mg/kg).
		Anthracene	120-12-7	0.059	Composite	4.0	Total (mg/kg).
		Aramite	140-57-8	0.36	Composite	NA	NA.
		Aroclor 1016	12674-11-2	0.013	Composite	0.92	Total (mg/kg).
		Aroclor 1221	11104-28-2	0.014	Composite	0.92	Total (mg/kg).
		Aroclor 1232	211141-16-5	0.013	Composite	0.92	Total (mg/kg).
		Aroclor 1242	53469-21-9	0.017	Composite	0.92	Total (mg/kg).
		Aroclor 1248	12672-29-6	0.013	Composite	0.92	Total (mg/kg).
		Aroclor 1254	11097-69-1	0.014	Composite	1.8	Total (mg/kg).
		Aroclor 1260	11096-82-5	0.014	Composite	1.8	Total (mg/kg).
		alpha-BHC	319-84-6	0.00014	Composite	0.066	Total (mg/kg).
		beta-BHC	319-85-7	0.00014	Composite	0.066	Total (mg/kg).
		delta-BHC	319-86-8	0.023	Composite	0.066	Total (mg/kg).
		gamma-BHC	58-89-9	0.0017	Composite	0.066	Total (mg/kg).
		Benzene	71-43-2	0.140	Composite	36	Total (mg/kg).
		Benz(a) anthracene	56-55-3	0.059	Composite	8.2	Total (mg/kg).
		Benzo(b) fluoranthene	205-99-2	0.055	Composite	3.4	Total (mg/kg).
		Benzo(k) fluoranthene	207-08-9	0.059	Composite	3.4	Total (mg/kg).
		Benzo(g,h,i) perylene	191-24-2	0.0055	Composite	1.5	Total (mg/kg).
		Benzo(a) pyrene	50-32-8	0.061	Composite	8.2	Total (mg/kg).
		Bromodi chloromethane	75-27-4	0.35	Composite	15	Total (mg/kg).
		Bromoform	75-25-2	0.63	Composite	15	Total (mg/kg).
		Bromomethane (methylbromide)	74-83-9	0.11	Composite	15	Total (mg/kg).
		4-Bromophenyl phenyl ether	101-55-3	0.055	Composite	15	Total (mg/kg).
		n-Butyl alcohol	171-36-3	5.6	Composite	2.6	Total (mg/kg).
		Butyl benzyl phthalate	85-68-7	0.017	Composite	7.9	Total (mg/kg).
		2-sec-Butyl-4,6-dinitrophenol	88-85-7	0.066	Composite	2.5	Total (mg/kg).

TREATMENT STANDARDS FOR HAZARDOUS WASTES—Continued

Waste code	Waste description and/or treatment subcategory	Regulated hazardous constituent		Wastewaters		Nonwastewaters	
		Common name	CAS No.	Concentration (mg/l) or technology code	Sampling basis	Concentration or technology code	Sampling basis and units
		Carbon tetrachloride	56–23–5	0.057	Composite	5.6	Total (mg/kg).
		Carbon disulfide	75–15–0	0.014	Composite	NA	NA.
		Chlordane	57–74–9	0.0033	Composite	0.13	Total (mg/kg).
		p-Chloroaniline	106–47–8	0.46	Composite	16	Total (mg/kg).
		Chlorobenzene	108–90–7	0.057	Composite	5.7	Total (mg/kg).
		Chlorobenzilate	510–15–6	0.10	Composite	NA	NA.
		2-chloro-1,3-butadiene	126–99–8	0.057	Composite	NA	NA.
		Chloro dibromomethane	124–48–1	0.057	Composite	15	Total (mg/kg).
		Chloroethane	75–00–3	0.27	Composite	6.0	Total (mg/kg).
		bis(2-Chloro ethoxy) methane	111–91–1	0.036	Composite	7.2	Total (mg/kg).
		bis(2-Chloroethyl)ether	111–44–4	0.033	Composite	7.2	Total (mg/kg).
		Chloroform	67–66–3	0.046	Composite	5.6	Total (mg/kg).
		bis(2-Chloroisopropyl) ether	39638–32–9	0.055	Composite	7.2	Total (mg/kg).
		p-Chloro-m-cresol	59–50–7	0.018	Composite	14	Total (mg/kg).
		Chloromethane (Methyl chloride)	74–87–3	0.19	Composite	33	Total (mg/kg).
		2-Chloronaphthalene	91–58–7	0.055	Composite	5.6	Total (mg/kg).
		2-Chlorophenol	95–57–8	0.044	Composite	5.7	Total (mg/kg).
		3-Chloropropene	107–05–1	0.036	Composite	28	Total (mg/kg).
		Chrysene	218–01–9	0.059	Composite	8.2	Total (mg/kg).
		o-Cresol	95–48–7	0.11	Composite	5.6	Total (mg/kg).
		Cresol (m- and p-isomers)	NA	0.77	Composite	3.2	Total (mg/kg).
		Cyclo hexanone	108–94–1	0.36	Composite	NA	NA.
		1,2-Dibromo-3- chloropropane	96–12–8	0.11	Composite	15	Total (mg/kg).
		1,2-Dibro moethane (Ethylene dibromide).	106–93–4	0.028	Composite	15	Total (mg/kg).
		Dibromo methane	74–95–3	0.11	Composite	15	Total (mg/kg).
		2,4-Dichloro pheno xyacetic acid (2,4-D).	94–75–7	0.72	Composite	10	Total (mg/kg).
		o,p'-DDD	53–19–0	0.023	Composite	0.087	Total (mg/kg).
		p,p'-DDD	72–54–8	0.023	Composite	0.087	Total (mg/kg).
		o,p'-DDE	3424–82–6	0.031	Composite	0.087	Total (mg/kg)
		p,p'-DDE	72–55–9	0.031	Composite	0.087	Total (mg/kg)
		o,p'-DDT	789–02–6	0.0039	Composite	0.087	Total (mg/kg)
		p,p'-DDT	50–29–30.0	039	Composite	0.087	Total (mg/kg).
		Dibenz(a,h) anthracene	53–70–3	0.055	Composite	8.2	Total (mg/kg).
		Dibenzo(a,e) pyrene	192–65–4	0.061	Composite	NA	NA.
		m-Dichlorobenzene	541–73–1	0.036	Composite	6.2	Total (mg/kg).
		o-Dichlorobenzene	95–50–1	0.088	Composite	6.2	Total (mg/kg).
		p-Dichlorobenzene	106–46–7	0.090	Composite	6.2	Total (mg/kg).
		Dichlorodifluoromethane	75–71–8	0.23	Composite	7.2	Total (mg/kg).
		1,1-Dichloroethane	75–34–3	0.059	Composite	7.2	Total (mg/kg).
		1,2-Dichloroethane	107–06–2	0.21	Composite	7.2	Total (mg/kg).
		1,1-Dichloroethylene	75–35–4	0.025	Composite	33	Total (mg/kg).
		trans-1,2-Dichloroethene	NA	0.054	Composite	33	Total (mg/kg).
		2,4-Dichlorophenol	120–83–2	0.044	Composite	14	Total (mg/kg).
		2,6-Dichlorophenol	87–65–0	0.044	Composite	14	Total (mg/kg).
		1,2-Dichloropropane	78–87–5	0.85	Composite	18	Total (mg/kg).
		cis-1,3-Dichloropropene	10061–01–5	0.036	Composite	18	Total (mg/kg).
		trans-1,3-Dichloropropene	10061–02–6	0.036	Composite	18	Total (mg/kg).
		Dieldrin	60–57–1	0.017	Composite	0.13	Total (mg/kg).
		Diethylphthalate	84–66–2	0.20	Composite	28	Total (mg/kg).

2,4-Dimethylphenol	105-67-9	0.036	Composite	14	Total	(mg/kg).
Dimethylphthalate	131-11-3	0.047	Composite	28	Total	(mg/kg).
Di-n-butylphthalate	84-74-2	0.057	Composite	28	Total	(mg/kg).
1,4-Dinitrobenzene	100-25-4	0.32	Composite	2.3	Total	(mg/kg).
4,6-Dinitro-o-cresol	534-52-1	0.28	Composite	160	Total	(mg/kg).
2,4-Dinitrophenol	51-28-5	0.12	Composite	160	Total	(mg/kg).
2,4-Dinitrotoluene	121-14-2	0.32	Composite	140	Total	(mg/kg).
2,6-Dinitrotoluene	606-20-2	0.55	Composite	28	Total	(mg/kg).
Di-n-octylphthalate	117-84-0	0.017	Composite	28	Total	(mg/kg).
Di-n-propylnitrosoamine	621-64-7	0.40	Composite	14	Total	(mg/kg).
Diphenylamine	122-39-4	0.52	Composite	NA	NA.	
1,2-Diphenylhydrazine	122-66-7	0.087	Composite	NA	NA.	
Diphenylnitrosanine	621-64-7	0.40	Composite	NA	NA.	
1,4-Dioxane	123-91-1	0.12	Composite	170	Total	(mg/kg).
Disulfoton	298-04-4	0.017	Composite	6.2	Total	(mg/kg).
Endosulfan I	939-98-8	0.023	Composite	0.066	Total	(mg/kg).
Endosulfan II	33213-6-5	0.029	Composite	0.13	Total	(mg/kg).
Endosulfansulfate	1031-07-8	0.029	Composite	0.13	Total	(mg/kg).
Endrin	72-20-8	0.0028	Composite	0.13	Total	(mg/kg).
Endrinaldehyde	7421-93-4	0.025	Composite	0.13	Total	(mg/kg).
Ethylacetate	141-78-6	0.34	Composite	33	Total	(mg/kg).
Ethylcyanide	107-12-0	0.24	Composite	360	Total	(mg/kg).
Ethylbenzene	100-41-4	0.057	Composite	6.0	Total	(mg/kg).
Ethylether	60-29-7	0.12	Composite	160	Total	(mg/kg).
bis(2-Ethylhexyl) phthalate	117-81-7	0.28	Composite	28	Total	(mg/kg).
Ethylmethacrylate	97-63-2	0.14	Composite	160	Total	(mg/kg).
Ethyleneoxide	75-21-8	0.12	Composite	NA	NA.	
Famphur	52-85-7	0.017	Composite	15	Total	(mg/kg).
Fluoranthene	206-44-0	0.068	Composite	8.2	Total	(mg/kg).
Fluorene	86-73-7	0.059	Composite	4.0	Total	(mg/kg).
Fluorotrichloromethane	75-69-4	0.020	Composite	33	Total	(mg/kg).
Heptachlor	76-44-8	0.0012	Composite	0.066	Total	(mg/kg).
Heptachlorepoxide	1024-57-3	0.016	Composite	0.066	Total	(mg/kg).
Hexachlorobenzene	118-74-1	0.055	Composite	37	Total	(mg/kg).
Hexachlorobutadiene	87-68-3	0.055	Composite	28	Total	(mg/kg).
Hexachlorocyclopentadiene	77-47-4	0.057	Composite	3.6	Total	(mg/kg).
Hexachlorodibenzo furans	NA	0.000063	Composite	0.001	Total	(mg/kg).
Hexachlorodibenzo pdioxins	NA	0.000063	Composite	0.001	Total	(mg/kg).
Hexachloroethane	67-72-1	0.055	Composite	28	Total	(mg/kg).
Hexachloropropene	1888-71-7	0.035	Composite	28	Total	(mg/kg).
Indeno (1,2,3,-c,d) pyrene	193-39-5	0.0055	Composite	8.2	Total	(mg/kg).
Iodomethane	74-88-4	0.19	Composite	65	Total	(mg/kg).
Isobutanol	78-83-1	5.6	Composite	170	Total	(mg/kg).
Isodrin	465-73-6	0.021	Composite	0.066	Total	(mg/kg).
Isosafrole	120-58-1	0.081	Composite	2.6	Total	(mg/kg).
Kepone	143-50-8	0.0011	Composite	0.13	Total	(mg/kg).
Methacrylonitrile	126-98-7	0.24	Composite	84	Total	(mg/kg).
Methanol	67-56-1	5.6	Composite	NA	NA.	
Methapyrilene	91-80-5	0.081	Composite	1.5	Total	(mg/kg).
Methoxychlor	72-43-5	0.25	Composite	0.18	Total	(mg/kg).
3-Methylcholanthrene	56-49-5	0.0055	Composite	15	Total	(mg/kg).
4,4-Methylenebis(2-chloroaniline)	101-14-4	0.50	Composite	35	Total	(mg/kg).
Methylenechloride	75-09-2	0.089	Composite	33	Total	(mg/kg).
Methylethylketone	78-93-3	0.28	Composite	36	Total	(mg/kg).
Methylisobutylketone	108-10-1	0.14	Composite	33	Total	(mg/kg).
Methylmethacrylate	80-62-6	0.14	Composite	160	Total	(mg/kg).
Methylmethansulfonate	66-27-3	0.018	Composite	NA	NA.	
Methylparathion	298-00-0	0.014	Composite	4.6	Total	(mg/kg).
Naphthalene	91-20-3	0.059	Composite	3.1	Total	(mg/kg).

TREATMENT STANDARDS FOR HAZARDOUS WASTES—Continued

Waste code	Waste description and/or treatment subcategory	Regulated hazardous constituent		Wastewaters		Nonwastewaters	
		Common name	CAS No.	Concentration (mg/l) or technology code	Sampling basis	Concentration or technology code	Sampling basis and units
		2-Naphthylamine	91–59–8	0.52	Composite	NA	NA.
		p-Nitroaniline	100–01–6	0.028	Composite	28	Total (mg/kg).
		Nitrobenzene	98–95–3	0.068	Composite	14	Total (mg/kg).
		5-Nitrotoluidine	99–55–8	0.32	Composite	28	Total (mg/kg).
		4-Nitrophenol	100–02–7	0.12	Composite	29	Total (mg/kg).
		N-Nitrosodiethylamine	55–18–5	0.40	Composite	28	Total (mg/kg).
		N-Nitrosodimethylamine	62–75–9	0.40	Composite	NA	NA
		N-Nitroso-di-n-butylamine	924–16–3	0.40	Composite	17	Total (mg/kg).
		N-Nitrosomethyl-ethylamine	10595–95–6	0.40	Composite	2.3	Total (mg/kg).
		N-Nitrosomorpho-line	59–89–2	0.40	Composite	2.3	Total (mg/kg).
		N-Nitrosopiperidine	100–75–4	0.013	Composite	35	Total (mg/kg).
		N-Nitrosopyrrolidine	930–55–2	0.013	Composite	35	Total (mg/kg).
		Parathion	56–38–2	0.014	Composite	4.6	Total (mg/kg).
		Pentachlorobenzene	608–93–5	0.055	Composite	37	Total (mg/kg).
		Pentachlorodibenzo-furans	NA	0.000063	Composite	0.001	Total (mg/kg).
		Pentachlorodibenzo-p-dioxins	NA	0.000063	Composite	0.001	Total (mg/kg).
		Pentachloronitro benzene	82–68–8	0.055	Composite	4.8	Total (mg/kg).
		Pentachlorophenol	87–86–5	0.089	Composite	7.4	Total (mg/kg).
		Phenacetin	62–44–2	0.081	Composite	16	Total (mg/kg).
		Phenanthrene	85–01–8	0.059	Composite	3.1	Total (mg/kg).
		Phenol	108–95–2	0.039	Composite	6.2	Total (mg/kg).
		Phorate	298–02–2	0.021	Composite	4.6	Total (mg/kg).
		Phthalic Anhydride	85–44–9	0.069	Composite	NA	NA.
		Pronamide	23950–58–5	0.093	Composite	1.5	Total (mg/kg).
		Pyrene	129–00–0	0.067	Composite	8.2	Total (mg/kg).
		Pyridine	110–86–1	0.014	Composite	16	Total (mg/kg).
		Safrole	94–59–7	0.081	Composite	22	Total (mg/kg).
		Silvex (2,4,5–TP)	93–72–1	0.72	Composite	7.9	Total (mg/kg).
		2,4,5–T	93–76–5	0.72	Composite	7.9	Total (mg/kg).
		1,2,4,5,-Tetrachlorobenzene	95–94–3	0.055	Composite	19	Total (mg/kg).
		Tetrachlorodibenzo-furans	NA	0.000063	Composite	0.001	Total (mg/kg).
		Tetrachlorodibenzo-p-dioxins	NA	0.000063	Composite	0.01	Total (mg/kg).
		1,1,1,2-Tetrachloroethane	630–20–6	0.057	Composite	42	Total (mg/kg).
		1,1,2,2,-Tetrachloroethane	79–34–6	0.057	Composite	42	Total (mg/kg).
		Tetrachloroethylene	127–18–4	0.056	Composite	5.6	Total (mg/kg).
		2,3,4,6-Tetrachlorophenol	58–90–2	0.030	Composite	37	Total (mg/kg).
		Toluene	108–88–3	0.080	Composite	28	Total (mg/kg).
		Toxaphene	8001–35–1	0.0095	Composite	1.3	Total (mg/kg).
		1,2,4-Trichlorobenzene	120–82–1	0.055	Composite	19	Total (mg/kg).
		1,1,1,-Trichloroethane	71–55–6	0.054	Composite	5.6	Total (mg/kg).
		1,1,2-Trichloroethane	79–00–5	0.054	Composite	5.6	Total (mg/kg).
		Trichloroethylene	79–01–6	0.054	Composite	5.6	Total (mg/kg).
		2,4,5-Trichlorophenol	95–95–4	0.18	Composite	37	Total (mg/kg).
		2,4,6-Trichlorophenol	88–06–2	0.035	Composite	37	Total (mg/kg).
		1,2,3-Trichloropropane	96–18–4	0.85	Composite	28	Total (mg/kg).
		1,1,2-Trichloro-1,2,2-trifluoroethane	76–13–1	0.057	Composite	28	Total (mg/kg).
		Tris(2,3-dibromopropyl)	126–72–7	0.11	Composite	NA	NA.
		Vinylchloride	75–01–4	0.27	Composite	33	Total (mg/kg).
		Xylene(s)	1330–20–7	0.32	Composite	28	Total (mg/kg).
		Cyanides (Total)	57–12–5	1.2	Composite	1.8	Total (mg/kg).
		Cyanides (Amenable)	57–12–5	0.86	Composite	NA	NA.

		Fluoride	16964-48-8	35	Composite	NA	NA.
		Sulfide	8496-25-8	14	Composite	NA	NA.
		Antimony	7440-36-0	1.9	Composite	0.23	TCLP (mg/l).
		Arsenic	7440-38-2	1.4	Composite	5.0	TCLP (mg/l).
		Barium	7440-39-3	1.2	Composite	52	TCLP (mg/l).
		Beryllium	7440-41-7	0.82	Composite	NA	NA.
		Cadmium	7440-43-9	0.20	Composite	0.066	TCLP (mg/l).
		Chromium (Total)	7440-47-3	0.37	Composite	5.2	TCLP (mg/l).
		Copper	7440-50-8	1.3	Composite	NA	NA.
		Lead	7439-92-1	0.28	Composite	0.51	TCLP (mg/l).
		Mercury	7439-97-6	0.15	Composite	0.025	TCLP (mg/l).
		Nickel	7440-02-0	0.55	Composite	0.32	TCLP (mg/l).
		Selenium	7782-49-2	0.82	Composite	5.7	TCLP (mg/l).
		Silver	7440-22-4	0.29	Composite	0.072	TCLP (mg/l).
		Thallium	7440-28-0	1.4	Composite	NA	NA.
		Vanadium	7440-62-2	0.042	Composite	NA	NA.
		Zinc	7440-66-6	1.0	Composite	NA	NA.
K001		Naphthalene	91-20-3	0.031	Grab	1.5	Total (mg/kg).
		Pentachloro phenol	87-86-5	0.18	Grab	7.4	Total (mg/kg).
		Phenan threne	85-01-8	0.031	Grab	1.5	Total (mg/kg).
		Pyrene	129-00-0	0.028	Grab	1.5	Total (mg/kg).
		Toluene	108-88-3	0.028	Grab	28	Total (mg/kg).
		Xylenes (Total)	1330-20-7	0.032	Grab	33	Total (mg/kg).
		Lead	7439-92-1	0.037	Grab	0.51	TCLP (mg/l).
K002		Chromium (Total)	7440-47-3	0.9	Composite	0.094	TCLP (mg/l).
		Lead	7439-92-1	3.4	Composite	0.37	TCLP (mg/l).
K003		Chromium (Total)	7440-47-3	0.9	Composite	0.094	TCLP (mg/l).
		Lead	7439-92-1	3.4	Composite	0.37	TCLP (mg/l).
K004		Chromium (Total)	7440-47-3	0.9	Composite	0.094	TCLP (mg/l).
		Lead	7439-92-1	3.4	Composite	0.37	TCLP (mg/l).
K005		Chromium (Total)	7440-47-3	0.9	Composite	0.094	TCLP (mg/l).
		Lead	7439-92-1	3.4	Composite	0.37	TCLP (mg/l).
		Cyanides (Total)	57-12-5	0.74	Composite	Reserved	NA.
K006	Anhydrous	Chromium (Total)	7440-47-3	0.9	Composite	0.094	TCLP (mg/l).
		Lead	7439-92-1	3.4	Composite	0.37	TCLP (mg/l).
K006	Hydrated	Chromium (Total)	7440-47-3	0.9	Composite	5.2	TCLP (mg/l).
		Lead	7439-92-1	3.4	Composite	NA	NA.
K007		Chromium (Total)	7440-47-3	0.9	Composite	0.094	TCLP (mg/l).
		Lead	7439-92-1	3.4	Composite	0.37	TCLP (mg/l).
		Cyanides (Total)	57-12-5	0.74	Composite	Reserved	NA.
K008		Chromium (Total)	7440-47-3	0.9	Composite	0.094	TCLP (mg/l).
		Lead	7439-92-1	3.4	Composite	0.37	TCLP (mg/l).
K009		Chloroform	67-66-3	0.1	Grab	6.0	Total (mg/kg).
K010		Chloroform	67-66-3	0.1	Grab	6.0	Total (mg/kg).
K011		Acetonitrile	75-05-8	38	Grab	1.8	Total (mg/kg).
		Acrylonitrile	107-13-1	0.06	Grab	1.4	Total (mg/kg).
		Acrylamide	79-06-1	19	Grab	23	Total (mg/kg).
		Benzene	71-43-2	0.02	Grab	0.03	Total (mg/kg).
		Cyanide (Total)	57-12-5	21	Grab	57	Total (mg/kg).
K013		Acetonitrile	75-05-8	38	Grab	1.8	Total (mg/kg).
		Acrylonitrile	107-13-1	0.06	Grab	1.4	Total (mg/kg).
		Acrylamide	79-06-1	19	Grab	23	Total (mg/kg).
		Benzene	71-43-2	0.02	Grab	0.03	Total (mg/kg).
		Cyanide (Total)	57-12-5	21	Grab	57	Total (mg/kg).
K014		Acetonitrile	75-05-8	38	Grab	1.8	Total (mg/kg).
		Acrylonitrile	107-13-1	0.06	Grab	1.4	Total (mg/kg).
		Acrylamide	79-06-1	19	Grab	23	Total (mg/kg).
		Benzene	71-43-2	0.02	Grab	0.03	Total (mg/kg).
		Cyanide (Total)	57-12-5	21	Grab	57	Total (mg/kg).

TREATMENT STANDARDS FOR HAZARDOUS WASTES—Continued

Waste code	Waste description and/or treatment subcategory	Regulated hazardous constituent		Wastewaters		Nonwastewaters	
		Common name	CAS No.	Concentration (mg/l) or technology code	Sampling basis	Concentration or technology code	Sampling basis and units
K015		Anthracene	120–12–7	0.059	Grab	3.4	Total (mg/kg).
		Benzal chloride	98–87–3	0.28	Grab	6.2	Total (mg/kg).
		Sum of Benzo (b) fluoranthene and Benzo (k) fluoranthene.	205–08–9 207–08–09.	0.055	Grab	3.4	Total (mg/kg).
		Phenanthrene	85–01–8	0.059	Grab	3.4	Total (mg/kg).
		Toluene	108–88–3	0.06	Grab	6.0	Total (mg/kg).
		Chromium (Total)	7440–47–3	0.32	Grab	1.7	TCLP (mg/l).
		Nickel	7440–02–0	0.44	Grab	0.2	TCLP (mg/l).
K016		Hexachlorobenzene	118–74–1	0.055	Grab	28	Total (mg/kg).
		Hexachlorobutadiene	87–68–3	0.055	Grab	5.6	Total (mg/kg).
		Hexachlorocyclopentadiene	77–47–4	0.057	Grab	5.6	Total (mg/kg).
		Hexachloroethane	67–72–1	0.055	Grab	28	Total (mg/kg).
		Tetrachloroethene	127–18–4	0.056	Grab	6.0	Total (mg/kg).
K017		1,2-Dichloropropane	78–87–5	0.85	Composite	18	Total (mg/kg).
		1,2,3-Trichloropropane	96–18–4	0.85	Composite	28	Total (mg/kg).
		Bis(2-chloroethyl)ether	111–44–4	0.033	Composite	7.2	Total (mg/kg).
K018		Chloroethane	75–00–3	0.27	Grab	6.0	Total (mg/kg).
		Chloromethane	74–87–3	0.19	Grab	NA	NA
		1,1-Dichloro thane	75–34–3	0.059	Grab	6.0	Total (mg/kg).
		1,2-Dichloroethane	107–06–2	0.21	Grab	6.0	Total (mg/kg).
		Hexachlorobenzene	118–74–1	0.055	Grab	28	Total (mg/kg).
		Hexachlorobutadiene	87–68–3	0.055	Grab	5.6	Total (mg/kg).
		Hexachloroethane	67–72–1	0.055	Grab	28	Total (mg/kg).
		Pentachloroethane	76–01–7	NA	NA	5.6	Total (mg/kg).
		1,1,1-Trichloroethane	71–55–6	0.054	Grab	6.0	Total (mg/kg).
K019		Bis(2-chloroethyl)ether	111–44–4	0.033	Grab	5.6	Total (mg/kg).
		Chlorobenzene	108–90–7	0.057	Grab	6.0	Total (mg/kg).
		Chloroform	67–66–3	0.046	Grab	6.0	Total (mg/kg).
		p-Dichlorobenzene	106–46–7	0.09	Grab	NA	NA
		1,2-Dichloroethane	107–06–2	0.21	Grab	6.0	Total (mg/kg).
		Fluorene	86–73–7	0.059	Grab	NA	NA
		Hexachloroethane	67–72–1	0.055	Grab	28	Total (mg/kg).
		Naphthalene	91–20–3	0.059	Grab	5.6	Total (mg/kg).
		Phenanthrene	85–01–8	0.059	Grab	5.6	Total (mg/kg).
		1,2,4,5-Tetrachlorobenzene	95–94–3	0.055	Grab	NA	NA
		Tetrachloroethene	127–18–4	0.056	Grab	6.0	Total (mg/kg).
		1,2,4-Trichlorobenzene	120–82–1	0.055	Grab	19	Total (mg/kg).
		1,1,1-Trichloroethane	71–55–6	0.054	Grab	6.0	Total (mg/kg).
K020		1,2-Dichloroethane	107–06–2	0.21	Grab	6.0	Total (mg/kg)
		1,1,2,2-Tetrachloroethane	79–34–6	0.057	Grab	5.6	Total (mg/kg).
		Tetrachloroethene	127–18–4	0.056	Grab	6.0	Total (mg/kg).
K021		Chloroform	67–66–3	0.046	Composite	6.2	Total (mg/kg)
		Carbon tetrachloride	56–23–5	0.057	Composite	6.2	Total (mg/kg).
		Antimony	7440–36–0	0.60	Composite	0.23	TCLP (mg/l).
K022		Toluene	108–88–3	0.080	Composite	0.034	Total (mg/kg).
		Acetophenone	96–86–2	0.010	Grab	19	Total (mg/kg).
		Diphenylamine	22–39–4	0.52	Composite	NA	NA.
		Diphenylnitrosamine	86–30–6	0.40	Composite	NA	NA.
		Sum of Diphenylamine and Diphenylnitrosamine.	NA	NA	NA	13	Total (mg/kg).
		Phenol	108–95–2	0.039	Grab	12	Total (mg/kg).

		Chromium (Total)	7440–47–3	0.35	Grab	5.2	TCLP (mg/l).
		Nickel	7440–02–0	0.47	Grab	0.32	TCLP (mg/l).
K023		Phthalic anhydride (measured as Phthalic acid).	85–44–9	0.069	Grab	28	Total (mg/kg).
K024		Phthalic anhydride (measured as Phthalic acid).	85–44–9	0.069	Grab	28	Total (mg/kg).
K025	Distillation bottoms from the production of nitrobenzene by the nitration of benzene.	NA	NA	LLEXT fb SSTRP fb CARBN; or INCIN.	NA	INCIN	NA
K026	Stripping still tails from the production of methyl ethyl pyridines.	NA	NA	INCIN	NA	INCIN	NA
K027	Centrifuge and distillation residues from toluene diisocyanate production.	NA	NA	CARBN; or INCIN	NA	FSUBS; or INCIN	NA
K028		1,1-Dichloroethane	75–34–3	0.059	Grab	6.0	Total (mg/kg).
		trans-1,2-Dichloroethane	NA	0.054	Grab	6.0	Total (mg/kg).
		Hexachlorobutadiene	87–68–3	0.055	Grab	5.6	Total (mg/kg).
		Hexachloroethane	67–72–1	0.055	Grab	28	Total (mg/kg).
		Pentachloroethane	76–01–7	NA	NA	5.6	Total (mg/kg).
		1,1,1,2-Tetrachloroethane	630–20–6	0.057	Grab	5.6	Total (mg/kg).
		1,1,2,2-Tetrachloroethane	79–34–6	0.057	Grab	5.6	Total (mg/kg).
		1,1,1-Trichloroethane	71–55–6	0.054	Grab	6.0	Total (mg/kg).
		1,1,2-Trichlorethane	79–00–5	0.054	Grab	6.0	Total (mg/kg).
		Tetrachloroethylene	127–18–4	0.056	Grab	6.0	Total (mg/kg).
		Cadmium	7440–43–9	6.4	Grab	NA	NA.
		Chromium (Total)	7440–47–3	0.35	Grab	0.073	TCLP (mg/l).
		Lead	7439–92–1	0.037	Grab	0.021	TCLP (mg/l).
		Nickel	7440–02–0	0.47	Grab	0.088	TCLP (mg/l)
K029		Chloroform	67–66–3	0.046	Grab	6.0	Total (mg/kg).
		1,2-Dichloroethane	107–06–2	0.21	Grab	6.0	Total (mg/kg).
		1,1,-Dichloroethylene	75–35–4	0.025	Grab	6.0	Total (mg/kg).
		1,1,1-Trichloroethane	71–55–6	0.054	Grab	6.0	Total (mg/kg).
		Vinyl chloride	75–01–4	0.27	Grab	6.0	Total (mg/kg).
K030		o-Dichlorobenzene	95–50–1	0.088	Grab	NA	NA.
		p-Dichlorobenzene	106–46–7	0.09	Grab	NA	NA.
		Hexachlorobutadiene	87–68–3	0.055	Grab	5.6	Total (mg/kg).
		Hexachloroethane	67–72–1	0.055	Grab	28	Total (mg/kg).
		Hexachloropropene	1888–71–7	NA	NA	19	Total (mg/kg).
		Pentachlorobenzene	608–93–5	NA	NA	28	Total (mg/kg).
		Pentachloroethane	76–01–7	NA	NA	5.6	Total (mg/kg).
		1,2,4,5-Tetrachlorobenzene	95–94–3	0.055	Grab	14	Total (mg/kg).
		Tetrachloroethene	127–18–4	0.056	Grab	6.0	Total (mg/kg).
		1,2,4-Trichlorobenzene	120–82–1	0.055	Grab	19	Total (mg/kg).
K031		Arsenic	7440–38–2	0.79	Grab	5.6	TCLP (mg/l).
K032		Hexachloropentadiene	77–47–4	0.057	Composite	2.4	Total (mg/kg).
		Chlordane	57–74–9	0.0033	Composite	0.26	Total (mg/kg).
		Heptachlor	76–44–8	0.0012	Composite	0.066	Total (mg/kg).
		Heptachlor epoxide	1024–57–3	0.016	Composite	0.066	Total (mg/kg).
K033		Hexachlorocyclopentadiene	77–47–4	0.057	Composite	2.4	Total (mg/kg).
K034		Hexachlorocyclopentadiene	77–47–4	0.057	Composite	2.4	Total (mg/kg).
K035		Acenaphthene	83–32–9	NA	NA	3.4	Total (mg/kg).
		Anthracene	120–12–7	NA	NA	3.4	Total (mg/kg).
		Benz(a)anthracene	56–55–3	0.059	Composite	3.4	Total (mg/kg).
		Benzo(a)pyrene	50–32–8	NA	NA	3.4	Total (mg/kg).
		Chrysene	218–01–9	0.059	Composite	3.4	Total (mg/kg).
		Dibenz(a,h)anthracene	53–70–3	NA	NA	3.4	Total (mg/kg).
		Fluoranthene	206–44–0	0.068	Composite	3.4	Total (mg/kg).
		Fluorene	86–73–7	NA	NA	3.4	Total (mg/kg).
		Indeno(1,2,3-cd)pyrene	193–39–5	NA	NA	3.4	Total (mg/kg).

TREATMENT STANDARDS FOR HAZARDOUS WASTES—Continued

Waste code	Waste description and/or treatment subcategory	Regulated hazardous constituent		Wastewaters		Nonwastewaters	
		Common name	CAS No.	Concentration (mg/l) or technology code	Sampling basis	Concentration or technology code	Sampling basis and units
		Cresols(m- and p-isomers)	NA	0.77	Composite	NA	NA
		Naphthalene	91-20-3	0.059	Composite	3.4	Total (mg/kg).
		o-cresol	95-48-7	0.11	Composite	NA	NA.
		Phenanthrene	85-01-8	0.059	Composite	3.4	Total (mg/kg).
		Phenol	108-95-2	0.039	Composite	NA	NA.
		Pyrene	129-00-0	0.067	Composite	8.2	Total (mg/kg).
K036		Disulfoton	298-04-4	0.025	Composite	0.1	Total (mg/kg).
K037		Disulfoton	298-04-4	0.025	Composite	0.1	Total (mg/kg).
		Toluene	108-88-3	0.080	Composite	28	Total (mg/kg).
K038		Phorate	298-02-2	0.025	Composite	0.1	Total (mg/kg).
K039	Filter cake from the filtration of diethylphosphorodithioc acid in the production of phorate.	NA	NA	CARBN; or INCIN	NA	FSUBS; or INCIN	NA.
K040		Phorate	298-02-2	0.025	Composite	0.1	Total (mg/kg).
K041		Toxaphene	8001-35-1	0.0095	Composite	2.6	Total (mg/kg).
K042		1,2,4,5-Tetrachlorobenzene	95-94-3	0.055	Composite	4.4	Total (mg/kg).
		o-Dichlorobenzene	95-50-1	0.088	Composite	4.4	Total (mg/kg).
		p-Dichlorobenzene	106-46-7	0.090	Composite	4.4	Total (mg/kg).
		Pentachlorobenzene	608-93-5	0.055	Composite	4.4	Total (mg/kg).
		1,2,4-Trichlorobenzene	120-82-1	0.055	Composite	4.4	Total (mg/kg).
K043		2,4-Dichlorophenol	120-83-2	0.044	Grab	0.38	Total (mg/kg).
		2,6-Dichlorophenol	87-65-0	0.044	Grab	0.34	Total (mg/kg).
		2,4,5-Trichlorophenol	95-95-4	0.18	Grab	8.2	Total (mg/kg).
		2,4,6-Trichlorophenol	88-06-2	0.035	Grab	7.6	Total (mg/kg).
		Tetrachlorophenols (Total)	NA	NA	Grab	0.68	Total (mg/kg).
		Pentachlorophenol	87-86-5	0.089	Grab	1.9	Total (mg/kg).
		Tetrachloroethene	79-01-6	0.056	Grab	1.7	Total (mg/kg).
		Hexachlorodibenzo-p-dioxins	NA	0.000063	Grab	0.001	Total (mg/kg).
		Hexachlorodibenzo-furans	NA	0.000063	Grab	0.001	Total (mg/kg).
		Pentachlorodibenzo-p-dioxins	NA	0.000063	Grab	0.001	Total (mg/kg).
		Pentachlorodibenzofurans	NA	0.000063	Grab	0.001	Total (mg/kg).
		Tetrachlorodibenzo-p-dioxins	NA	0.000063	Grab	0.001	Total (mg/kg).
		Tetrachlorodibenzofurans	NA	0.000063	Grab	0.001	Total (mg/kg).
K044	Wastewater treatment sludges from the manufacturing and processing of explosives.	NA	NA	DEACT	NA	DEACT	NA.
K045	Spent carbon from the treatment of wastewater containing explosives.	NA	NA	DEACT	NA	DEACT	NA.
K046		Lead	7439-92-1	0.037	Grab	0.18	TCLP (mg/l).
K047	Pink/red water form TNT operations	NA	NA	DEACT	NA	DEACT	NA.
K048		Benzene	71-43-2	0.14	Composite	14	Total (mg/kg).
		Benzo(a)pyrene	50-32-8	0.061	Composite	12	Total (mg/kg).
		Bis(2-ethylhexyl)phthalate	117-81-7	0.28	Composite	7.3	Total (mg/kg).
		Chrysene	218-01-9	0.059	Composite	15	Total (mg/kg).
		Di-n-butyl phthalate	84-74-2	0.057	Composite	3.6	Total (mg/kg).
		Ethylbenzene	100-41-4	0.057	Composite	14	Total (mg/kg).
		Fluorene	86-73-7	0.059	Composite	NA	NA.
		Naphthalene	91-20-3	0.059	Composite	42	Total (mg/kg).
		Phenanthrene	85-01-8	0.059	Composite	34	Total (mg/kg.
		Phenol	108-95-2	0.039	Composite	3.6	Total (mg/kg).
		Pyrene	129-00-0	0.067	Composite	36	Total (mg/kg).

		Toluene	108-88-33	0.080	Composite	14	Total (mg/kg).
		Xylene(s)	1330-20-7	0.032	Composite	22	Total (mg/kg).
		Cyanides (Total)	57-12-5	0.028	Grab	1.8	Total (mg/kg).
		Chromium (Total)	7440-47-3	0.2	Grab	1.7	TCLP (mg/l).
		Lead	7439-92-1	0.037	Grab	NA	NA.
		Nickel	7440-02-0	NA	NA	0.20	TCLP (mg/l).
K049		Anthracene	120-12-7	0.059	Composite	28	Total (mg/kg).
		Benzene	71-43-2	0.14	Composite	14	Total (mg/kg).
		Benzo(a)pyrene	50-32-8	0.061	Composite	12	Total (mg/kg).
		Bis(2-ethylhexyl)phthalate	117-81-7	0.28	Composite	7.3	Total (mg/kg).
		Carbon disulfide	75-15-0	0.014	Composite	NA	NA.
		Chrysene	2218-01-9	0.059	Composite	15	Total (mg/kg).
		2,4-Dimethylphenol	105-67-9	0.036	Composite	NA	NA.
		Ethylbenzene	100-41-4	0.057	Composite	14	Total (mg/kg).
		Naphthalene	91-20-3	0.059	Composite	42	Total (mg/kg).
		Phenanthrene	85-01-8	0.059	Composite	34	Total (mg/kg).
		Phenol	108-95-2	0.039	Composite	3.6	Total (mg/kg).
		Pyrene	129-00-0	0.067	Composite	36	Total (mg/kg).
		Toluene	108-88-3	0.080	Composite	14	Total (mg/kg).
		Xylene(s)	1330-20-7	0.32	Composite	22	Total (mg/kg).
		Cyanides (Total)	57-12-5	0.028	Grab	1.8	Total (mg/kg).
		Chromium (Total)	7440-47-3	0.2	Grab	1.7	TCLP (mg/l).
		Lead	7439-92-1	0.037	Grab	NA	NA.
		Nickel	7440-02-0	NA	NA	0.20	TCLP (mg/l).
K050		Benzo(a)pyrene	50-32-8	0.061	Composite	12	Total (mg/kg).
		Phenol	108-95-2	0.039	Composite	3.6	Total (mg/kg).
		Cyanides (Total)	57-12-5	0.028	Grab	1.8	Total (mg/kg).
		Chromium (Total)	7440-47-3	0.2	Grab	1.7	TCLP (mg/l).
		Lead	7439-92-1	0.037	Grab	NA	NA.
		Nickel	7440-02-0	NA	NA	0.20	TCLP (mg/l).
K051		Acenaphthene	83-32-9	0.059	Composite	NA	NA.
		Anthracene	120-12-7	0.059	Composite	28	Total (mg/kg).
		Benzene	71-43-2	0.14	Composite	14	Total (mg/kg).
		Benzo(a) anthracene	56-55-3	0.059	Composite	20	Total (mg/kg).
		Benzo(a)pyrene	50-32-8	0.061	Composite	12	Total (mg/kg).
		Bis(2-ethylhexyl)- phthalate	117-81-7	0.28	Composite	7.3	Total (mg/kg).
		Chrysene	2218-01-9	0.059	Composite	15	Total (mg/kg).
		Di-n-butyl phthalate	105-67-9	0.057	Composite	3.6	Total (mg/kg).
		Ethylbenzene	100-41-4	0.057	Composite	14	Total (mg/kg).
		Fluorene	86-73-7	0.059	Composite	NA	NA.
		Naphthalene	91-20-3	0.059	Composite	42	Total (mg/kg).
		Phenanthrene	85-01-8	0.059	Composite	34	Total (mg/kg).
		Phenol	108-95-2	0.039	Composite	3.6	Total (mg/kg).
		Pyrene	129-00-0	0.067	Composite	36	Total (mg/kg).
		Toluene	108-88-3	0.080	Composite	14	Total (mg/kg).
		Xylene(s)	1330-20-7	0.32	Composite	22	Total (mg/kg).
		Cyanides (Total)	57-12-5	0.028	Grab	1.8	Total (mg/kg).
		Chromium (Total)	7440-47-3	0.2	Grab	1.7	TCLP (mg/l).
		Lead	7439-92-1	0.037	Grab	NA	NA.
		Nickel	7440-02-0	NA	NA	0.20	TCLP (mg/l).
K052		Benzene	71-43-2	0.14	Composite	14	Total (mg/kg).
		Benzo(a)pyrene	50-32-8	0.061	Composite	12	Total (mg/kg).
		o-Cresol	95-48-7	0.011	Composite	6.2	Total (mg/kg).
		p-Cresol	106-44-5	0.77	Composite	6.2	Total (mg/kg).
		2,4,-Dimethylphenol	105-67-9	0.036	Composite	NA	NA.
		Ethylbenzene	100-41-4	0.057	Composite	14	Total (mg/kg).
		Naphthalene	91-20-3	0.059	Composite	42	Total (mg/kg).
		Phenanthrene	85-01-8	0.059	Composite	34	Total (mg/kg).
		Phenol	108-95-2	0.039	Composite	3.6	Total (mg/kg).

TREATMENT STANDARDS FOR HAZARDOUS WASTES—Continued

Waste code	Waste description and/or treatment subcategory	Regulated hazardous constituent		Wastewaters		Nonwastewaters	
		Common name	CAS No.	Concentration (mg/l) or technology code	Sampling basis	Concentration or technology code	Sampling basis and units
		Toluene	108-88-3	0.080	Composite	14	Total (mg/kg).
		Xylene(s)	1330-20-7	0.32	Composite	22	Total (mg/kg).
		Cyanides (Total)	57-12-5	0.028	Grab	1.8	Total (mg/kg).
		Chromium (Total)	7440-47-3	0.2	Grab	1.7	TCLP (mg/l).
		Lead	7439-92-1	0.037	Grab	NA	NA.
		Nickel	7440-02-0	NA	NA	0.20	TCLP (mg/l).
K060		Benzene	71-43-2	0.17	Composite	0.071	Total (mg/kg).
		Benzo(a)pyrene	50-32-8	0.035	Composite	3.6	Total (mg/kg).
		Naphthalene	91-20-3	0.028	Composite	3.4	Total (mg/kg).
		Phenol	108-95-2	0.042	Composite	3.4	Total (mg/kg).
		Cyanides (Total)	57-12-5	1.9	Grab	1.2	Total (mg/kg).
K061		Antimony	7440-36-0	NA	NA	2.1	TCLP (mg/l).
		Arsenic	7440-38-2	NA	NA	0.055	TCLP (mg/l).
		Barium	7440-39-3	NA	NA	7.6	TCLP (mg/l).
		Beryllium	7440-41-7	NA	NA	0.014	TCLP (mg/l).
		Cadmium	7440-43-9	1.61	Grab	0.19	TCLP (mg/l).
		Chromium (Total)	7440-47-3	0.32	Grab	0.33	TCLP (mg/l).
		Lead	7439-92-1	0.51	Grab	0.37	TCLP (mg/l).
		Mercury	7439-97-6	NA	NA	0.009	TCLP (mg/l).
		Nickel	7440-02-0	0.44	Grab	5.0	TCLP (mg/l).
		Selenium	7782-49-2	NA	NA	0.16	TCLP (mg/l).
		Silver	7440-22-4	NA	NA	0.3	TCLP (mg/l).
		Thallium	7440-28-0	NA	NA	0.078	TCLP (mg/l).
		Zinc	7440-66-6	NA	NA	5.3	TCLP (mg/l).
K062		Chromium (Total)	7440-47-3	0.32	Grab	0.094	TCLP (mg/l).
		Lead	7439-92-1	0.04	Grab	0.37	TCLP (mg/l).
		Nickel	7440-02-0	0.44	Grab	NA	NA.
K069	Calcium Sulfate Subcategory	Cadmium	7440-43-9	1.6	Grab	0.14	TCLP (mg/l).
		Lead	7439-92-1	0.51	Grab	0.24	TCLP (mg/l).
K069	Emission control dust/sludge from secondary lead smelting: Non-Calcium Sulfate Subcategory.	NA	NA	NA	NA	RLEAD	NA.
K071		Mercury	7439-97-6	0.030	Grab	0.025	TCLP (mg/l).
K073		Carbon tetrachloride	56-23-5	0.057	Composite	6.2	Total (mg/kg).
		Chloroform	67-66-3	0.046	Composite	6.2	Total (mg/kg).
		Hexachloroethane	67-72-1	0.055	Composite	30	Total (mg/kg).
		Tetrachloroethene	127-18-4	0.056	Composite	6.2	Total (mg/kg).
		1,1,1-Trichloroethane	71-55-6	0.054	Composite	6.2	Total (mg/kg).
K083		Benzene	71-43-2	0.14	Composite	6.6	Total (mg/kg).
		Aniline	62-53-3	0.81	Composite	14	Total (mg/kg).
		Diphenylamine	22-39-4	0.52	Composite	NA	NA.
		Diphenylnitrosamine	86-30-6	0.40	Composite	NA	NA
		Sum of Diphenylamine and Diphenylnitrosamine.	NA	NA	NA	14	Total (mg/kg).
		Nitrobenzene	98-95-3	0.068	Composite	14	Total (mg/kg).
		Phenol	108-95-2	0.039	Grab	5.6	Total (mg/kg).
		Cyclohexanone	108-94-1	0.36	Grab	NA	NA.
		Nickel	7440-02-0	0.47	Grab	0.088	TCLP (mg/l).
K084		Arsenic	7440-38-2	0.79	Grab	5.6	TCLP (mg/l).
K085		Benzene	71-43-2	0.14	Composite	4.4	Total (mg/kg).
		Chlorobenzene	108-90-7	0.057	Composite	4.4	Total (mg/kg).

		o-Dichlorobenzene	95-50-1	0.088	Composite	4.4	Total (mg/kg).
		m-Dichlorobenzene	541-73-1	0.036	Composite	4.4	Total (mg/kg).
		p-Dichlorobenzene	106-46-7	0.090	Composite	4.4	Total (mg/kg).
		1,2,4,-Trichlorobenzene	120-82-1	0.055	Composite	4.4	Total (mg/kg).
		1,2,4,5-Tetrachlorobenzene	95-94-3	0.055	Composite	4.4	Total (mg/kg).
		Pentachlorobenzene	608-93-5	0.055	Composite	4.4	Total (mg/kg).
		Hexachlorobenzene	118-74-1	0.055	Composite	4.4	Total (mg/kg).
		Aroclor 1016	12674-11-2	0.013	Composite	0.92	Total (mg/kg).
		Aroclor 1221	11104-28-2	0.014	Composite	0.92	Total (mg/kg).
		Aroclor 1232	11141-16-5	0.013	Composite	0.92	Total (mg/kg).
		Aroclor 1242	53469-21-9	0.017	Composite	0.92	Total (mg/kg).
		Aroclor 1248	12672-29-6	0.013	Composite	0.92	Total (mg/kg).
		Aroclor 1254	11097-69-1	0.014	Composite	1.8	Total (mg/kg).
		Aroclor 1260	11096-82-5	0.014	Composite	1.8	Total (mg/kg).
K086		Acetone	67-64-1	0.28	Grab	160	Total (mg/kg).
		Acetophenone	96-86-2	0.010	Grab	9.7	Total (mg/kg).
		Bis(2-ethylhexyl)phthalate	117-81-7	0.28	Composite	28	Total (mg/kg).
		n-Butyl alcohol	71-36-3	5.6	Grab	2.6	Total (mg/kg).
		Butylbenzylphthalate	85-68-7	0.017	Composite	7.9	Total (mg/kg).
		Cyclohexanone	108-94-1	0.36	Grab	NA	NA.
		1,2-Dichlorobenzene	95-50-1	0.088	Grab	6.2	Total (mg/kg).
		Diethyl phthalate	84-66-2	0.20	Composite	28	Total (mg/kg).
		Dimethyl phthalate	131-11-3	0.047	Composite	28	Total (mg/kg).
		Di-n-butyl phthalate	84-74-2	0.057	Composite	28	Total (mg/kg).
		Di-n-octyl phthalate	117-84-0	0.017	Composite	28	Total (mg/kg).
		Ethyl acetate	141-78-6	0.34	Composite	33	Total (mg/kg).
		Ethylbenzene	100-41-4	0.057	Composite	6.0	Total (mg/kg).
		Methanol	67-56-1	5.6	Composite	NA	NA.
		Methyl isobutyl ketone	108-10-1	0.14	Grab	33	Total (mg/kg).
		Methyl ethyl ketone	78-93-3	0.28	Grab	36	Total (mg/kg).
		Methylene chloride	75-09-2	0.089	Composite	33	Total (mg/kg).
		Naphthalene	91-20-3	0.059	Composite	3.1	Total (mg/kg).
		Nitrobenzene	98-95-3	0.068	Composite	14	Total (mg/kg).
		Toluene	108-88-3	0.080	Composite	28	Total (mg/kg).
		1,1,1-Trichloroethane	71-55-6	0.054	Composite	5.6	Total (mg/kg).
		Trichloroethylene	79-01-6	0.054	Composite	5.6	Total (mg/kg).
		Xylenes (Total)	1330-20-7	0.32	Composite	28	Total (mg/kg).
		Cyanides (Total)	57-12-5	1.2	Grab	1.5	Total (mg/kg).
		Chromium (Total)	7440-47-3	0.32	Grab	0.094	TCLP (mg/l).
		Lead	7439-92-1	0.037	Grab	0.37	TCLP (mg/l).
K087		Acenaphthalene	208-96-8	0.059	Composite	3.4	Total (mg/kg).
		Benzene	71-43-2	0.14	Composite	0.071	Total (mg/kg).
		Chrysene	218-01-9	0.059	Composite	3.4	Total (mg/kg).
		Fluoranthene	206-44-0	0.068	Composite	3.4	Total (mg/kg).
		Indeno(1,2,3-cd)pyrene	193-39-5	0.0055	Composite	3.4	Total (mg/kg).
		Naphthalene	91-20-3	0.059	Composite	3.4	Total (mg/kg).
		Phenanthrene	85-01-8	0.059	Composite	3.4	Total (mg/kg).
		Toluene	108-88-3	0.06	Composite	0.65	Total (mg/kg).
		Xylene(s)	1330-20-7	0.32	Composite	0.07	Total (mg/kg).
		Lead	7439-92-1	0.037	Grab	0.51	TCLP (mg/l).
K093		Phthalic anhydride (measured as Phthalic acid).	85-44-9	0.069	Grab	28	Total (mg/kg).
K094		Phthalic anhydride (measured as Phthalic acid).	85-44-9	0.069	Grab	28	Total (mg/kg).
K095		1,1,1,2-Tetrachloroethane	630-20-6	0.057	Grab	5.6	Total (mg/kg).
		1,1,2,2-Tetrachloroethane	79-34-6	0.057	Grab	5.6	Total (mg/kg).
		Tetrachloroethene	127-18-4	0.056	Grab	6.0	Total (mg/kg).
		1,1,2-Trichloroethane	79-00-5	0.054	Grab	6.0	Total (mg/kg).
		Trichloroethylene	79-01-6	0.054	Grab	5.6	Total (mg/kg).

TREATMENT STANDARDS FOR HAZARDOUS WASTES—Continued

Waste code	Waste description and/or treatment subcategory	Regulated hazardous constituent		Wastewaters		Nonwastewaters	
		Common name	CAS No.	Concentration (mg/l) or technology code	Sampling basis	Concentration or technology code	Sampling basis and units
		Hexachloroethane	67-72-1	0.055	Grab	28	Total (mg/kg).
		Pentachloroethane	76-01-7	0.055	Grab	5.6	Total (mg/kg).
K096		1,1,1,2-Tetrachloroethane	630-20-6	0.057	Grab	5.6	Total (mg/kg).
		1,1,2,2-Tetrachloroethane	79-34-6	0.057	Grab	5.6	Total (mg/kg).
		Tetrachloroethene	127-18-4	0.056	Grab	6.0	Total (mg/kg).
		1,1,2-Trichloroethane	79-00-5	0.054	Grab	6.0	Total (mg/kg).
		Trichloroethene	79-01-6	0.054	Grab	5.6	Total (mg/kg).
		1,3-Dichlorobenzene	541-73-1	0.036	Grab	5.6	Total (mg/kg).
		Pentachloroethane	76-01-7	0.055	Grab	5.6	Total (mg/kg).
		1,2,4-Trichlorobenzene	120-82-1	0.055	Grab	19	Total (mg/kg).
K097		Hexachlorocyclopentadiene	77-47-4	0.057	Composite	2.4	Total (mg/kg).
		Chlordane	57-74-9	0.0033	Composite	0.26	Total (mg/kg).
		Heptachlor	76-44-8	0.0012	Composite	0.066	Total (mg/kg).
		Heptachlor epoxide	1024-57-3	0.016	Composite	0.066	Total (mg/kg).
K098		Toxaphene	8001-35-1	0.0095	Composite	2.6	Total (mg/kg).
K099		2,4-Dichlorophenoxyacetic acid	94-75-7	1.0	Grab	1.0	Total (mg/kg).
		Hexachlorodibenzo-p-dioxins	NA	0.001	Grab	0.001	Total (mg/kg).
		Hexachlorodibenzo-furans	NA	0.001	Grab	0.001	Total (mg/kg).
		Pentachlorodibenzo-p-dioxins	NA	0.001	Grab	0.001	Total (mg/kg).
		Pentachlorodibenzo-furans	NA	0.001	Grab	0.001	Total (mg/kg).
		Tetrachlorodibenzo-p-dioxins	1746-01-6	0.001	Grab	0.001	Total (mg/kg).
		Tetrachlorodibenzo-furans	NA	0.001	Grab	0.001	Total (mg/kg).
K100		Cadmium	7440-43-9	1.6	Grab	0.066	TCLP (mg/l).
		Chromium (Total)	7440-47-3	0.32	Grab	5.2	TCLP (mg/l).
		Lead	7439-92-1	0.51	Grab	0.51	TCLP (mg/l).
K101		o-Nitroaniline	NA	0.27	Grab	14	Total (mg/kg).
		Arsenic	7440-38-2	0.79	Grab	5.6	TCLP (mg/l).
		Cadmium	7440-43-9	0.24	Grab	NA	NA.
		Lead	7439-92-1	0.17	Grab	NA	NA.
		Mercury	7439-97-6	0.082	Grab	NA	NA.
K102		o-Nitrophenol	88-75-5	0.028	Grab	13	Total (mg/kg).
		Arsenic	7440-38-2	0.79	Grab	5.6	TCLP (mg/l).
		Cadmium	7440-43-9	0.24	Grab	NA	NA.
		Lead	7439-92-1	0.17	Grab	NA	NA.
		Mercury	7439-97-6	0.082	Grab	NA	NA.
K103		Aniline	62-53-3	4.5	Grab	5.6	Total (mg/kg).
		Benzene	71-43-2	0.15	Grab	6.0	Total (mg/kg).
		2,4-Dinitrophenol	51-28-5	0.61	Grab	5.6	Total (mg/kg).
		Nitrobenzene	98-95-3	0.073	Grab	5.6	Total (mg/kg).
		Phenol	108-95-2	1.4	Grab	5.6	Total (mg/kg).
K104		Aniline	62-53-3	4.5	Grab	5.6	Total (mg/kg).
		Benzene	71-43-2	0.15	Grab	6.0	Total (mg/kg).
		2,4-Dinitrophenol	51-28-5	0.61	Grab	5.6	Total (mg/kg).
		Nitrobenzene	98-95-3	0.073	Grab	5.6	Total (mg/kg).
		Phenol	108-95-2	1.4	Grab	5.6	Total (mg/kg).
		Cyanides (Total)	57-12-5	2.7	Grab	1.8	Total (mg/kg).
K105		Benzene	71-43-2	0.14	Grab	4.4	Total (mg/kg).
		Chlorobenzene	108-90-7	0.057	Grab	4.4	Total (mg/kg).
		o-Dichlorobenzene	95-50-1	0.088	Grab	4.4	Total (mg/kg).
		p-Dichlorobenzene	106-46-7	0.090	Grab	4.4	Total (mg/kg).
		2,4,5-Trichlorophenol	95-95-4	0.18	Grab	4.4	Total (mg/kg).

		2,4,6-Trichlorophenol	88–06–2	0.035	Grab	4.4	Total (mg/kg).
		2—Chlorophenol	95–57–8	0.044	Grab	4.4	Total (mg/kg).
		Phenol	108–95–2	0.039	Grab	4.4	Total (mg/kg).
K106	Low Mercury Subcategory—less than 260 mg/kg Mercury—residues from RMERC.	Mercury	7439–97–6	0.030	Grab	0.20	TCLP (mg/l).
K106	Low Mercury Subcategory—less than 260 mg/kg Mercury—that are not residues from RMERC.	Mercury	7439–97–6	0.030	Grab	0.025	TCLP (mg/l).
K106	Wastewater treatment sludge from the mercury cell process in chlorine production: (High Mercury Subcategory—greater than or equal to 260 mg/kg total mercury).	NA	NA	NA	NA	RMERC	NA.
K107	Column bottoms from product separation from the production of 1,1-dimethylhydrazine (UDMH) form carboxylic acid hydrazides.	NA	NA	INCIN; or CHOXD fb, CARBN; or BIODG fb CARBN.	NA	INCIN	NA.
K108	Condensed column overheads from product separation and condensed reactor vent gases from the production of 1,1-dimethylhydrazine (UDMH) from carboxylic acid hydrazides.	NA	NA	INCIN; or CHOXD fb, CARBN; or BIODG fb CARBN.	NA	INCIN	NA.
K109	Spent filter cartridges from product purification from the production of 1,1-dimethylhydrazine (UDMH) from carboxylic acid hydrazides.	NA	NA	INCIN; or CHOXD fb, CARBN; or BIODG fb CARBN.	NA	INCIN	NA.
K110	Condensed column overheads from intermediate separation from the production of 1,1-dimethylhydrazine (UDMH) from carboxylic acid hydrazides.	NA	NA	INCIN; or CHOXD fb, CARBN; or BOIDG fb CARBN.	NA	INCIN	NA.
K111		2,4-Dinitrotoluene	121–1–2	0.32	Grab	140	Total (mg/kg).
		2,6-Dinitrotoluene	606–20–2	0.55	Grab	28	Total (mg/kg).
K112	Reaction by-product water from the drying column in the production of toluenediamine via hydrogenation of dinitrotoluene.	NA	NA	INCIN; or CHOXD fb, CARBN; or BIODG fb CARBN.	NA	INCIN	NA.
K113	Condensed liquid light ends from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene.	NA	NA	CARBN; OR INCIN.	NA	FSUBS; or INCIN	NA.
K114	Vicinals from the purification of toluenediame in the production of toluenediamine via hydrogenation of dinitrotolune.	NA	NA	CARBN; or INCIN	NA	FSUBS; or INCIN	NA.
K115		Nickel	7440–02–0	0.47	Grab	0.32	TCLP (mg/l).
K115	Heavy ends from the purification of toluenediame in the production of toluenediamine via hydrogenation of dinitrotoluene.	NA	NA	CARBN; or INCIN	NA	FSUBS; or INCIN	NA.
K116	Organic condensate from the solvent recovery column in the production of toluene diisocyanate via phosgenation of toluenediamine.	NA	NA	CARBN; or INCIN	NA	FSUBS; or INCIN	NA.

TREATMENT STANDARDS FOR HAZARDOUS WASTES—Continued

Waste code	Waste description and/or treatment subcategory	Regulated hazardous constituent		Wastewaters		Nonwastewaters	
		Common name	CAS No.	Concentration (mg/l) or technology code	Sampling basis	Concentration or technology code	Sampling basis and units
K117		Ethylene dibromide	106-93-4	0.028	Grab	15	Total (mg/kg).
		Methyl bromide	74-83-9	0.11	Grab	15	Total (mg/kg).
		Chloroform	67-66-3	0.046	Grab	5.6	Total (mg/kg).
K118		Ethylene dibromide	106-93-4	0.028	Grab	15	Total (mg/kg).
		Methyl bromide	74-83-9	0.11	Grab	15	Total (mg/kg).
		Chloroform	67-66-3	0.046	Grab	5.6	Total (mg/kg).
K123	Process wastewater (including supernates, filtrates, and washwaters) from the production of ethylenebisdithiocarbamic acid and its salts.	NA	NA	INCIN; or CHOXD fb (BIODG or CARBN).	NA	INCIN	NA.
K124	Reactor vent scrubber water from the production of ethylenebisdithiocarbamic acid and its salts.	NA	NA	INCIN; or CHOXD fb (BIODG or CARBN).	NA	INCIN	NA.
K125	Filtration, evaporation, and centrifugation solids from the production of ethylenebisdithiocarbamic acid and its salts.	NA	NA	INCIN; or CHOXD fb (BIODG or CARBN).	NA	INCIN	NA.
K126	Baghouse dust and floor sweepings in milling and packaging operations from the production or formulation of ethylene bisdithiocarbamic acid and its salts.	NA	NA	INCIN; or CHOXD fb (BIODG or CARBN).	NA	INCIN	NA.
K131		Methyl bromide	74-83-9	0.11	Grab	15	Total (mg/kg).
K132		Methyl bromide	74-83-9	0.11	Grab	15	Total (mg/kg).
K136		Ethylene dibromide	106-93-4	0.028	Grab	15	Total (mg/kg).
		Methyl bromide	74-83-9	0.11	Grab	15	Total (mg/kg).
		Chloroform	67-66-3	0.046	Grab	5.6	Total (mg/kg).
K141	Process related from the recovery of coal tar, including, but not limited to, tar collecting sump residues from the production of coke by-products produced from coal. This listing does not include K087 (decanter tank tar sludge from coking operations).	Benzene	71-43-2	0.14	Grab	10	Total (mg/kg).
		Benz(a)anthracene	56-55-3	0.059	Grab	3.4	Total (mg/kg).
		Benzo(a)pyrene	50-32-8	0.061	Grab	3.4	Total (mg/kg).
		Benzo(b) fluoranthene	205-99-2	0.11	Grab	6.8	Total (mg/kg).
		Benzo(k) fluoranthene	207-08-9	0.11	Grab	6.8	Total (mg/kg).
		Chrysene	218-01-9	0.059	Grab	3.4	Total (mg/kg).
		Dibenz(a,h)anthracene	53-70-3	0.055	Grab	8.2	Total (mg/kg).
		Indeno(1,2,3-cd)pyrene	193-39-5	0.0055	Grab	3.4	Total (mg/kg).
K142	Tar storage tank residues from the production of coke from coal or from the recovery of coke by-products producted from coal.	Benzene	71-43-2	0.14	Grab	10	Total (mg/kg).
		Benz(a)anthracene	56-55-3	0.059	Grab	3.4	Total (mg/kg).
		Benzo(a)pyrene	50-32-8	0.061	Grab	3.4	Total (mg/kg).

		Benzo(b)fluoranthene	205–99–2	0.11	Grab	6.8	Total (mg/kg).
		Benzo(k)fluoranthene	207–08–9	0.11	Grab	6.8	Total (mg/kg).
		Chrysene	218–01–9	0.059	Grab	3.4	Total (mg/kg).
		Dibenz(a,h)anthracene	53–70–3	0.055	Grab	8.2	Total (mg/kg).
		Indeno(1,2,3-cd)pyrene	193–39–5	0.0055	Grab	3.4	Total (mg/kg).
K143	Process residues from the recovery of light oil, including, but not limited to, those generated in stills, decanters, and wash oil recovery units from the recovery of coke by-products produced from coal.	Benzene	71–43–2	0.14	Grab	10	Total (mg/kg).
		Benz(a)anthracene	56–55–3	0.059	Grab	3.4	Total (mg/kg).
		Benzo(a)pyrene	50–32–8	0.061	Grab	3.4	Total (mg/kg).
		Benzo(b)fluoranthene	205–99–2	0.11	Grab	6.8	Total (mg/kg).
		Benzo(k)flouranthene	207–08–9	0.11	Grab	6.8	Total (mg/kg).
		Chrysene	218–01–9	0.059	Grab	3.4	Total (mg/kg).
K144	Wastewater sump residues from light oil refining, including, but not limited to, intercepting or contamination sump sludges from the recovery of coke by-products produced from coal.	Benzene	71–43–2	0.14	Grab	10	Total (mg/kg).
		Benz(a)anthracene	56–55–3	0.059	Grab	3.4	Total (mg/kg).
		Benzo(a)pyrene	50–32–8	0.061	Grab	3.4	Total (mg/kg).
		Benzo(b)fluoranthene	205–99–2	0.11	Grab	6.8	Total (mg/kg).
		Benzo(k)fluoranthene	207–08–9	0.11	Grab	6.8	Total (mg/kg).
		Chrysene	218–01–9	0.059	Grab	3.4	Total (mg/kg).
		Dibenz(a,h)anthracene	53–70–3	0.055	Grab	8.2	Total (mg/kg).
K145	Residues from naphthalene collection and recovery operations from the recovery of coke by-products produced from coal.	Benzene	71–43–2	0.14	Grab	10	Total (mg/kg).
		Benz(a)anthracene	56–55–3	0.059	Grab	3.4	Total (mg/kg).
		Benzo(a)pyrene	50–32–8	0.061	Grab	3.4	Total (mg/kg).
		Chrysene	218–01–9	0.059	Grab	3.4	Total (mg/kg).
		Dibenz(a,h)anthracene	53–70–3	0.055	Grab	8.2	Total (mg/kg).
		Naphthalene	91–20–3	0.059	Grab	5.6	Total (mg/kg).
K147	Tar storage tank residues from coal tar refining.	Benzene	71–43–2	0.14	Grab	10	Total (mg/kg).
		Benz(a)anthracene	56–55–3	0.059	Grab	3.4	Total (mg/kg).
		Benzo(a)pyrene	50–32–8	0.061	Grab	3.4	Total (mg/kg).
		Benzo(b)fluoranthene	205–99–2	0.11	Grab	6.8	Total (mg/kg).
		Benzo(k)fluoranthene	207–08–9	0.11	Grab	6.8	Total (mg/kg).
		Chrysene	218–01–9	0.059	Grab	3.4	Total (mg/kg).
		Dibenz(a,h)anthracene	53–70–3	0.055	Grab	8.2	Total (mg/kg).
		Indeno(1,2,3-cd)pyrene	193–39–5	0.0055	Grab	3.4	Total (mg/kg).
K148	Residues from coal tar distillation, including, but not limited to, still bottoms.	Benz(a)anthracene	56–55–3	0.059	Grab	3.4	Total (mg/kg).
		Benzo(a)pyrene	50–32–8	0.061	Grab	3.4	Total (mg/kg).
		Benzo(b)fluoranthene	205–99–2	0.11	Grab	6.8	Total (mg/kg).
		Benzo(k)fluoranthene	207–08–9	0.11	Grab	6.8	Total (mg/kg).
		Chrysene	218–01–9	0.059	Grab	3.4	Total (mg/kg).
		Dibenz(a,h)anthracene	53–70–3	0.055	Grab	8.2	Total (mg/kg).
		Indeno(1,2,3-cd)pyrene	193–39–5	0.0055	Grab	3.4	Total (mg/kg).

TREATMENT STANDARDS FOR HAZARDOUS WASTES—Continued

Waste code	Waste description and/or treatment subcategory	Regulated hazardous constituent		Wastewaters		Nonwastewaters	
		Common name	CAS No.	Concentration (mg/l) or technology code	Sampling basis	Concentration or technology code	Sampling basis and units
K149	Distillation of fractionation bottoms from the production of alpha- (or methyl-) chlorinated toluenes, ring-chlorinated toluenes, benzoyl chlorides, and compounds with mixtures of these functional groups. (This waste does not include still bottoms from the distillations of benzyl chloride.).	Chloroform	67-66-3	0.046	Grab	6.0	Total (mg/kg).
		Chloromethane	74-87-3	0.19	Grab	30	Total (mg/kg).
		Chlorobenzene	108-90-7	0.057	Grab	6.0	Total (mg/kg).
		1,4-Dichlorobenzene	106-46-7	0.090	Grab	6.0	Total (mg/kg).
		Hexachlorobenzene	118-74-1	0.055	Grab	10	Total (mg/kg).
		Pentachlorobenzene	608-93-5	0.055	Grab	10	Total (mg/kg).
		1,2,4,5-Tetrachlorobenzene	95-94-3	0.055	Grab	14	Total (mg/kg).
		Toluene	108-88-3	0.080	Grab	10	Total (mg/kg).
K150	Organic residuals, excluding spent carbon adsorbent, from the spent chlorine gas and hydrochloric acid recovery processes associated with the production of alpha- (or methyl-) chlorinated toluenes, ring-chlorinated toluenes, benzoyl chlorides, and compounds with mixtures of these functional groups.	Carbon tetrachloride	56-23-5	0.057	Grab	6.0	Total (mg/kg).
		Chloroform	67-66-3	0.046	Grab	6.0	Total (mg/kg).
		Chloromethane	74-87-3	0.19	Grab	30	Total (mg/kg).
		1,4-Dichlorobenzene	106-46-7	0.090	Grab	6.0	Total (mg/kg).
		Hexachlorobenzene	118-74-1	0.055	Grab	10	Total (mg/kg).
		Pentachloroben-zene	608-93-5	0.055	Grab	10	Total (mg/kg).
		1,2,4,5-Tetrachlorobenzene	95-94-3	0.055	Grab	14	Total (mg/kg).
		1,1,2,2-Tetra-chlortheane	79-34-5	0.057	Grab	6.0	Total (mg/kg).
		Tetrachloroethylene	127-18-4	0.056	Grab	6.0	Total (mg/kg).
		1,2,4-Trichlorobenzene	120-82-1	0.055	Grab	19	Total (mg/kg).
K151	Wastewater treatment sludge, excluding neutralization and biological sludges, generated during the treatment of wastewaters from the production of alpha- (or methyl-) chlorinated toluenes, ring-chlorinated toluenes, benzoyl chlorides, and compounds with mixtures of these functional groups.	Benzene	71-43-2	0.14	Grab	10	Total (mg/kg).
		Carbon tetrachloride	56-23-5	0.057	Grab	6.0	Total (mg/kg).
		Chloroform	67-66-3	0.046	Grab	6.0	Total (mg/kg).
		Hexachlorobenzene	118-74-1	0.055	Grab	10	Total (mg/kg).
		Pentachlorobenzene	608-93-5	0.055	Grab	10	Total (mg/kg).
		1,2,4,5-Tetrachlorobenzene	95-94-3	0.055	Grab	14	Total (mg/kg).
		Tetrachloroethylene	127-18-4	0.056	Grab	6.0	Total (mg/kg).

		Toluene	108-88-3	0.080	Grab	10	Total (mg/kg).
P001	Warfarin (>0.3%)	Warfarin	81-81-2	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	FSUBS; or INCIN	NA.
P002	1-Acetyl-2- thiourea	1-Acetyl-2-thiourea	591-08-2	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
P003	Acrolein	Acrolein	107-02-8	0.29	Composite	FSUBS; or INCIN	NA.
P004	Aldrin	Aldrin	309-00-2	0.021	Composite	0.066	Total (mg/kg).
P005	Allyl alcohol	Allyl alcohol	107-18-6	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	FSUBS; or INCIN	NA.
P006	Aluminum phosphide	Aluminum phosphide	20859-73-8	CHOXD; CHRED; or INCIN.	NA	CHOXD; CHRED; or INCIN.	NA.
P007	5-Aminoethyl 3-isoxazolol	5-Aminoethyl 3-isoxazolol	2763-96-4	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
P008	4-Aminopyridine	4-Aminopyridine	504-24-5	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
P009	Ammonium picrate	Ammonium picrate	131-74-8	CHOXD; CHRED; CARBN; BIODG; or INCIN.	NA	FSUBS; CHOXD; CHRED; or INCIN.	NA.
P010	Arsenic acid	Arsenic	7440-38-2	0.79	Grab	5.6	TCLP (mg/l).
P011	Arsenic pentoxide	Arsenic	7440-38-2	0.79	Grab	5.6	TCLP (mg/l).
P012	Arsenic trioxide	Arsenic	7440-38-2	0.79	Grab	5.6	TCLP (mg/l).
P013	Barium cyanide	Barium	7440-39-3	NA	NA	52	TCLP (mg/l).
		Cyanides (Total)	57-12-5	1.2	Grab	110	Total (mg/kg).
		Cyanides (Amenable)	57-12-5	0.1	Grab	9.1	Total (mg/kg).
P014	Thiophenol (Benzene thiol)	Thiophenol (Benzene thiol)	108-98-5	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
P015	Beryllium dust	Beryllium dust	7440-41-7	NA	NA	RMETL; or RTHRM..	NA.
P016	Bis(chloromethyl)ether	Bis(chloromethyl) ether	542-88-1	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
P017	Bromoacetone	Bromoacetone	598-31-2	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
P018	Brucine	Brucine	357-57-3	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
P020	2-sec-Butyl-4,6-dinitrophenol (Dinoseb).	2-sec-Butyl-4,6-dinitrophenol (Dinoseb).	88-85-7	0.066	Grab	2.5	Total (mg/kg).
P021	Calcium cyanide	Cyanides (Total)	57-12-5	1.9	Grab	110	Total (mg/kg).
		Cyanides (Amenable)	57-12-5	0.1	Grab	9.1	Total (mg/kg).
P022	Carbon disulfide	Carbon disulfide	75-15-0	0.014	GRAB	INCIN	NA.

TREATMENT STANDARDS FOR HAZARDOUS WASTES—Continued

Waste code	Waste description and/or treatment subcategory	Regulated hazardous constituent		Wastewaters		Nonwastewaters	
		Common name	CAS No.	Concentration (mg/l) or technology code	Sampling basis	Concentration or technology code	Sampling basis and units
P023	Chloroacetaldehyde	Chloroacetaldehyde	107–20–0	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
P024	p-Chloroaniline	p-Chloroaniline	106–47–8	0.46	Grab	16	Total (mg/kg).
P026	1-(o-Chlorophenyl) thiourea	1-(o-Chlorophenyl) thiourea	5344–82–1	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
P027	3-Chloropropionitrile	3-Chloropropionitrile	542–76–7	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
P028	Benzyl chloride	Benzylchloride	100–44–7	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
P029	Copper cyanide	Cyanides (Total)	57–12–5	1.9	Grab	110	Total (mg/kg).
		Cyanides (Amenable)	57–12–5	0.1	Grab	9.1	Total (mg/kg).
P030	Cyanides (soluble salts and complexes).	Cyanides (Total)	57–12–5	1.2	Grab	110	Total (mg/kg).
		Cyanides (Amenable)	57–12–5	0.1	Grab	9.1	Total (mg/kg).
P031	Cyanogen	Cyanogen	460–19–5	CHOXD; WETOX; or INCIN.	NA	CHOXD; WETOX; or INCIN.	NA.
P033	Cyanogen chloride	Cyanogen chloride	506–77–4	CHOXD; WETOX; or INCIN.	NA	CHOXD; WETOX; or INCIN.	NA.
P034	2-Cyclohexyl-4,6-dinitrophenol	2-Cyclohexyl-4,6-dinitrophenol	131–89–5	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
P036	Dichlorophenylarsine	Arsenic	7440–38–2	0.79	Grab	5.6	TCLP (mg/l).
P037	Dieldrin	Dieldrin	60–57–1	0.017	Composite	0.13	Total (mg/kg)
P038	Diethylarsine	Arsenic	7440–38–2	0.79	Grab	5.6	TCLP (mg/l).
P039	Disulfoton	Disulfoton	298–04–4	0.017	Grab	0.1	Total (mg/kg).
P040	0,0-Diethyl O-pyrazinyl phosphorothioate.	0,0-Diethyl O-pyrazinyl phosphorothioate.	297–97–2	CARBN; or INCIN	NA	FSUBS; or INCIN	NA.
P041	Diethyl-p-nitrophenyl phosphate	Diethyl-p-nitrophenyl phosphate	311–45–5	CARBN; or INCIN	NA	FSUBS; or INCIN	NA.
P042	Epinephrine	Epinephrine	51–43–4	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
P043	Diisopropylfluorophosphate (DFP)	Diisopropylfluoro' phosphate (DFP)	55–91–4	CARBN; or INCIN	NA	FSUBS; or INCIN	NA.
P044	Dimethoate	Dimethoate	60–51–5	CARBN; or INCIN	NA	FSUBS; or INCIN	NA.
P045	Thiofanox	Thiofanox	39196–18–4	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.

P046	alpha, alpha-Dimethylphenethylamine.	alpha, alpha-Dimethylphenethylamine.	122-09-8	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
P047	4,6-Dinitro-o-cresol	4,6-Dinitro-o-cresol	534-52-1	0.28	Composite	160	Total (mg/kg).
		4,6-Dinitro-o-cresol salts	534-52-1	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
P048	2,4-Dinitrophenol	2,4-Dinitrophenol	151-28-5	0.12	Composite	160	Total (mg/kg).
P049	2,4-Dithiobiuret	2,4-Dithiobiuret	541-53-7	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
P050	Endosulfan	Endosulfan I	939-98-8	0.023	Composite	0.066	Total (mg/kg).
		Endosulfan I	33213-6-5	0.029	Composite	0.13	Total (mg/kg).
		Endosulfan sulfate	1031-07-8	0.029	Composite	0.13	Total (mg/kg).
P051	Endrin	Endrin	72-20-8	0.0028	Composite	0.13	Total (mg/kg).
		Endrin aldehyde	7421-93-4	0.025	Composite	0.13	Total (mg/kg).
P054	Aziridine	Aziridine	151-56-4	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
P056	Fluoride	Fluoride	16964-48-8	35	Grab	NA	NA.
		Fluorine	7782-41-4	NA	NA	ADGAS fb NEUTR.	NA.
P057	Fluoroacetamide	Fluoroacetamide	640-19-7	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
P058	Fluoroacetic acid, sodium salt	Fluoroacetic acid, sodium salt	62-74-8	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
P059	Heptachlor	Heptachlor	76-44-8	0.0012	Composite	0.066	Total (mg/kg).
		Heptachlor epoxide	1024-57-3	0.016	Composite	0.066	Total (mg/kg).
P060	Isodrin	Isodrin	465-73-6	0.021	Composite	0.066	Total (mg/kg).
P062	Hexaethyltetraphosphate	Hexaethyltetra- phosphate	757-58-4	CARBN; or INCIN	NA	FSUBS; or INCIN	NA.
P063	Hydrogen cyanide	Cyanides (Total)	57-12-5	1.2	Grab	110	Total (mg/kg).
		Cyanides (Amenable)	57-12-5	0.10	Grab	9.1	Total (mg/kg).
P064	Isocyanic acid, ethyl ester	Isocyanic acid, ethyl ester	624-83-9	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
P065	Low Mercury Subcategory-less than 260 mg/kg Mercury-residues from RMERC-Mercury fulminate.	Mercury	7439-97-6	0.030	Grab	0.20	TCLP (mg/l).
P065	Low Mercury Subcategory-less than 260 mg/kg Mercury-incinerator residues(and are not residues from RMERC)-Mercury fulminate.	Mercury	7439-97-6	0.030	Grab	0.025	TCLP (mg/l).
P065	Mercury fulminate: (High mercury Subcategory-greater than or equal to 260 mg/kg total Mercury-either incinerator residues or residues from RMERC)..	Mercury Fulminate	628-86-4	NA	NA	RMERC	NA.

TREATMENT STANDARDS FOR HAZARDOUS WASTES—Continued

Waste code	Waste description and/or treatment subcategory	Regulated hazardous constituent		Wastewaters		Nonwastewaters	
		Common name	CAS No.	Concentration (mg/l) or technology code	Sampling basis	Concentration or technology code	Sampling basis and units
	P065Mercury fulminate: (All nonwastewaters that are not incinerator residues from RMERC; regardless of Mercury Content).	Mercury Fulminate	628–86–4	NA	NA	IMERC	NA.
P066	Methomyl	Methomyl	116752–77–5	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
P067	2-Methylaziridine	2-Methylaziridine	75–55–8	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
P068	Methyl hydrazine	Methyl hydrazine	60–34–4	CHOXD; CHRED; CARBN; BIODG; or INCIN.	NA	FSUBS; CHOXD; CHRED; or INCIN.	NA.
P069	Methyllactonitrile	Methyllactonitrile	75–86–5	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
P070	Aldicarb	Aldicarb	116–06–3	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
P071	Methyl parathion	Methyl parathion	298–00–0	0.025	Grab	0.1	Total (mg/kg).
P072	1-Naphthyl-2-thiourea	1–Naphthyl-2-thiourea	86–88–4	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
P073	Nickel carbonyl	Nickel	7440–02–0	0.32	Grab	0.32	TCLP (mg/l).
P074	Nickel cyanide	Cyanides (Total)	57–12–5	1.2	Grab	110	Total (mg/kg).
		Cyanides (Amenable)	57–12–5	0.10	Grab	9.1	Total (mg/kg).
		Nickel	7440–02–0	0.44	Grab	0.32	TCLP (mg/l).
P075	Nicotine and salts	Nicotine and salts	54–11–5	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
P076	Nitric oxide	Nitric oxide	10102–43–9	ADGAS	NA	ADGAS	NA.
P077	p-Nitroaniline	p-Nitroaniline	100–01–6	0.028	Composite	28	Total (mg/kg).
P078	Nitrogen dioxide	Nitrogen dioxide	10102–44–0	ADGAS	NA	ADGAS	NA.
P081	Nitroglycerin	Nitroglycerin	55–63–0	CHOXD; CHRED; CARBN; BIODG; or INCIN.	NA	FSUBS; CHOXD; CHRED; or INCIN.	NA.
P082	N-Nitrosodimethylamine	N-Nitrosodimethylamine	62–75–9	0.40	Composite	INCIN	NA.
P084	N-Nitrosomethylvinylamine	N-Nitrosomethylvinylamine	4549–40–0	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
P085	Octamethylpyrophosphoramide	Octamethylpyrophosphoramide	152–16–9	CARBN; or INCIN	NA	FSUBS; or INCIN	NA.

P087	Osmium tetroxide	Osmium tetroxide	20816–12–0	NA	NA	RMETL; or RTHRM.	NA.
P088	Endothall	Endothall	145–73–3	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	FSUBS; or INCIN	NA.
P089		Parathion	56–38–2	0.025	Grab	0.1	Total (mg/kg).
P092	Low Mercury subcategory-less than 260 mg/kg Mercury residues from RMERC-Phenyl mercury acetate.	Mercury	7439–97–6	0.030	Grab	0.20	TCLP (mg/l).
P092	Low Mercury Subcategory-less than 260 mg/kg Mercury-incinerator residues (and are not residues from RMERC)-Phenyl mercury acetate.	Mercury	7439–97–6	0.030	Grab	0.025	TCLP (mg/l).
P092	Phenyl mercury acetate: (High Mercury Subcategory-greater than or equal to 260 mg/kg total Mercury-either incinerator residues or residues from RMERC).	Phenyl mercury acetate	62–38–4	NA	NA	RMERC	NA.
P092	Phenyl mercury acetate: (All nonwastewaters that are not incinerator residues and are not residues from RMERC: regardless of Mercury Content).	Phenyl mercury acetate	62–38–4	NA	NA	IMERC; or RMERC.	NA.
P093	N-Phenylthiouea	N-Phenylthiouea	103–85–5	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
P094	Phorate	Phorate	298–02–2	0.025	Grab	0.1	Total (mg/kg).
P095	Phosgene	Phosgene	75–44–5	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
P096	Phosphine	Phosphine	7803–51–2	CHOXD; CHRED; or INCIN.	NA	CHOXD; CHRED; or INCIN.	NA.
P097	Famphur	Famphur	52–85–7	0.025	Grab	0.1	Total (mg/kg).
P098	Potassium cyanide	Cyanides (Total)	57–12–5	1.2	Grab	110	Total (mg/kg).
		Cyanides (Amenable)	57–12–5	0.10	Grab	9.1	Total (mg/kg).
P099	Potassium silver cyanide	Cyanides (Total)	57–12–5	1.2	Grab	110	Total (mg/kg).
		Cyanides (Amenable)	57–12–5	0.1	Grab	9.1	Total (mg/kg).
		Silver	7440–22–4	0.29	Grab	0.072	TCLP (mg/l).
P101	Ethyl cyanide (Propanenitrile)	Ethyl cyanide (Propanenitrile)	107–12–0	0.24	Composite	360	Total (mg/kg).
P102	Propargyl alcohol	Propargyl alcohol	107–19–7	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	FSUBS; or INCIN	NA.
P103	Selenourea	Selenium	7782–49–2	1.0	Composite	5.7	TCLP (mg/l).
P104	Silver cyanide	Cyanides (Total)	57–12–5	1.2	Grab	110	Total (mg/kg).
		Cyanides (Amenable)	57–12–5	0.10	Grab	9.1	Total (mg/kg).
		Silver	7440–22–4	0.29	Grab	0.072	TCLP (mg/l).
P105	Sodium azide	Sodium azide	26628–22–8	CHOXD; CHRED; CARBN; BIODG; or INCIN.	NA	FSUBS; CHOXD; CHRED; or INCIN.	NA.
P106	Sodium cyanide	Cyanides (Total)	57–12–5	1.2	Grab	110	Total (mg/kg).
		Cyanides (Amenable)	57–12–5	0.10	Grab	9.1	Total (mg/kg).

TREATMENT STANDARDS FOR HAZARDOUS WASTES—Continued

Waste code	Waste description and/or treatment subcategory	Regulated hazardous constituent		Wastewaters		Nonwastewaters	
		Common name	CAS No.	Concentration (mg/l) or technology code	Sampling basis	Concentration or technology code	Sampling basis and units
P108	Strychnine and salts	Strychnine and salts	57–24–9	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
P109	Tetraethyldithiopyrophosphate	Tetraethyldithiopyrophosphate	3689–24–5	CARBN; or INCIN	NA	FSUBS; or INCIN	NA.
P110	Tetraethyl lead	Lead	7439–92–1	0.040	Grab	0.51	TCLP (mg/l).
P112	Tetranitromethane	Tetranitromethane	509–14–8	CHOXD; CHRED; CARBN; BIODG; or INCIN.	NA	FSUBS; CHOXD; CHRED; or INCIN.	NA.
P113	Thallic oxide	Thallium	7440–28–0	0.14	Composite	NA	NA.
		Thallic oxide	1314–32–5	NA	NA	RTHRM; or STABL.	NA.
P114	Thallium selenite	Selenium	7782–49–2	1.0	Grab	5.7	TCLP (mg/l).
P115	Thallium (I) sulfate	Thallium	7440–28–0	0.14	Composite	NA	NA.
		Thallium (I) sulfate	7446–18–6	NA	NA	RTHRM; or STABL.	NA.
P116	Thiosemicarbazide	Thiosemicarbazide	79–19–6	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
P118	Trichloromethanethiol	Trichloro methanethiol	75–70–7	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
P119	Ammonia vanadate	Vanadium	7440–62–2	28	Composite	NA	NA.
		Ammonium vandate	7803–55–6	NA	NA	STABL	NA.
P120	Vanadium pentoxide	Vanadium	7440–62–2	28	Composite	NA	NA.
		Vanadium pentoxide	1314–62–1	NA	NA	STABL	NA.
P121	Zinc cyanide	Cyanides (Total)	57–12–5	1.2	Grab	110	Total (mg/kg).
		Cyanides (Amenable)	57–12–5	0.10	Grab	9.1	Total (mg/kg).
P122	Zinc Phosphide (<10%)	Zinc Phosphide (<10%)	1314–84–7	CHOXD; CHRED; or INCIN.	NA	CHOXD; CHRED; or INCIN.	NA.
P123	Toxaphene	Toxaphene	8001–35–1	0.0095	Composite	1.3	Total (mg/kg).
U001	Acetaldehyde	Acetaldehyde	75–07–0	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	FSUBS; or INCIN	NA.
U002	Acetone	Acetone	67–64–1	0.28	Grab	160	Total (mg/kg).
U003	Acetonitrile	Acetonitrile	75–05–8	0.17	Grab	INCIN	NA.
U004	Acetophenone	Acetophenone	98–86–2	0.010	Grab	9.7	Total (mg/kg).
U005	2-Acetylaminofluorene	2-Acetylaminofluorene	53–96–3	0.059	Composite	140	Total (mg/kg).
U006	Acetyl chloride	Acetyl chloride	75–36–5	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U007	Acrylamide	Acrylamide	79–06–1	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.

U008	Acrylic acid	Acrylic acid	79–10–7	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	FSUBS; or INCIN	NA.
U009	Acrylonitrile	Acrylonitrile	107–13–1	0.24	Composite	84	Total (mg/kg).
U010	Mitomycin C	Mitomycin C	50–07–7	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U011	Amitrole	Amitrole	61–82–5	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U012	Aniline	Aniline	62–53–3	0.81	Grab	14	Total (mg/kg).
U014	Auramine	Auramine	492–80–8	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U015	Azaserine	Azaserine	115–02–6	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U016	Benz(c)acridine	Benz(c)acridine	225–51–4	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	FSUBS; or INCIN	NA.
U017	Benzal chloride	Benzal chloride	98–87–3	0.055	Composite	INCIN	NA.
U018	Benz(a)anthracene	Benz(a)anthracene	56–55–3	0.059	Composite	8.2	Total (mg/kg).
U019	Benzene	Benzene	71–43–2	0.14	Composite	36	Total (mg/kg).
U020	Benzenesulfonyl chloride	Benzenesulfonyl chloride	98–09–9	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U021	Benzidine	Benzidine	92–87–5	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U022	Benzo(a)pyrene	Benzo(a)pyrene	50–32–8	0.061	Composite	8.2	Total (mg/kg)
U023	Benzotrichloride	Benzotrichloride	98–07–7	CHOXD; CHRED; CARBN; BIODG; or INCIN.	NA	FSUBS; CHOXD; CHRED; or INCIN.	NA.
U024	Bis(2-chloroethoxy)methane	Bis(2-chloroethoxy)methane	111–91–1	0.036	Grab	7.2	Total (mg/kg).
U025	Bis(2-chloroethyl)ether	Bis(2-chloroethyl)ether	111–44–4	0.033	Grab	7.2	Total (mg/kg).
U026	Chlornaphazin	Chlornaphazin	494–03–1	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U027	Bis(2-chloroisopropyl) ether	Bis(2-chloroisopropyl) ether	39638–32–9	0.055	Composite	7.2	Total (mg/kg).
U028	Bis(2-ethylhexyl)phthalate	Bis(2-ethylhexyl) phthalate	117–81–7	0.28	Grab	28	Total (mg/kg).
U029	Bromomethane (Methyl bromide)	Bromomethane (Methyl bromide)	74–83–9	0.11	Grab	15	Total (mg/kg).
U030	4-Bromophenyl phenyl ether	4-Bromophenyl phenyl ether	101–55–3	0.055	Grab	15	Total (mg/kg).
U031	n-Butyl alcohol	n-Butyl alcohol	71–36–3	5.6	Grab	2.6	Total (mg/kg).
U032	Calcium chromate	Chromium (Total)	7440–47–3	0.32	Grab	0.094	TCLP (mg/l).
U033	Carbonyl fluoride	Carbonyl fluoride	353–50–4	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.

TREATMENT STANDARDS FOR HAZARDOUS WASTES—Continued

Waste code	Waste description and/or treatment subcategory	Regulated hazardous constituent		Wastewaters		Nonwastewaters	
		Common name	CAS No.	Concentration (mg/l) or technology code	Sampling basis	Concentration or technology code	Sampling basis and units
U034	Trichloroacetaldehyde (Chloral)	Trichloroacetaldehyde (Chloral)	75–87–6	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U035	Chlorambucil	Chlorambucil	305–03–3	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U036	Chlordane (alpha and gamma)	Chlordane (alpha and gamma)	57–74–9	0.0033	Composite	0.13	Total (mg/kg).
U037	Chlorobenzene	Chlorobenzene	108–90–7	0.057	Composite	5.7	Total (mg/kg).
U038	Chlorobenzilate	Chlorobenzilate	510–15–6	0.10	Composite	INCIN	NA.
U039	p-Chloro-m-cresol	p-Chloro-m-cresol	159–50–7	0.018	Composite	14	Total (mg/kg).
U041	1-Chloro-2,3-epoxypropane (Epichlorohydrin).	1-Chloro-2,3-epoxypropane (Epichlorohydrin).	106–89–8	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U043	Vinyl chloride	Vinyl chloride	75–01–4	0.27	Composite	33	Total (mg/kg).
U044	Chloroform	Chloroform	67–66–3	0.046	Composite	5.6	Total (mg/kg).
U045	Chloromethane (Methyl chloride)	Chloromethane (Methyl chloride)	74–87–3	0.19	Composite	33	Total (mg/kg).
U046	Chloromethyl methyl ether	Chloromethyl methyl ether	107–30–2	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U047	2-Chloronaphthalene	2-Chloronaphthalene	91–58–7	0.055	Composite	5.6	Total (mg/kg).
U048	2-Chlorophenol	2-Chlorophenol	95–57–8	0.044	Composite	5.7	Total (mg/kg).
U049	4-Chloro-o-toluidine hydrochloride	4-Chloro-o-toluidine hydrochloride	3165–93–3	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U050	Chrysene	Chrysene	218–01–9	0.059	Composite	8.2	Total (mg/kg).
U051	Creosote	Naphthalene	91–20–3	0.031	Grab	1.5	Total (mg/kg).
		Pentachlorophenol	87–86–5	0.18	Grab	7.4	Total (mg/kg).
		Phenanthrene	85–01–8	0.031	Grab	1.5	Total (mg/kg).
		Pyrene	129–00–0	0.028	Grab	1.5	Total (mg/kg).
		Toluene	108–88–3	0.028	Grab	28	Total (mg/kg).
		Xylenes (Total)	1330–20–7	0.032	Grab	33	Total (mg/kg).
		Lead	7439–92–1	0.037	Grab	0.51	TCLP (mg/l).
U052	Cresols (Cresylic acid)	o-Cresol	195–48–7	0.11	Composite	5.6	Total (mg/kg).
		Cresols (m- and p-isomers)	NA	0.77	Composite	3.2	Total (mg/kg).
U053	Crotonaldehyde	Crotonaldehyde	4170–30–3	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	FSUBS; or INCIN	NA
U055	Cumene	Cumene	98–82–8	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	FSUBS; or INCIN	NA.
U056	Cyclohexane	Cyclohexane	110–82–7	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	FSUBS; or INCIN	NA.

U057	Cyclohexanone	Cyclohexanone	108–94–1	0.36	Grab	FSUBS; or INCIN	NA.
U058	Cyclophosphamide	Cyclophosphamide	50–18–0	CARBN; or INCIN	NA	FSUBS; or INCIN	NA.
U059	Daunomycin	Daunomycin	20830–81–3	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U060	DDD	o,p'-DDD	53–19–0	0.023	Grab	0.087	Total (mg/kg).
		p,p'-DDD	72–54–8	0.023	Grab	0.087	Total (mg/kg).
U061	DDT	o-p'-DDT	789–02–6	0.0039	Composite	0.087	Total (mg/kg).
		p,p'-DDT	50–29–3	0.0039	Composite	0.087	Total (mg/kg).
		o,p'-DDD	53–19–0	0.023	Composite	0.087	Total (mg/kg).
		p,p'-DDD	72–54–8	0.023	Composite	0.087	Total (mg/kg).
		o,p'-DDE	3424–82–6	0.031	Composite	0.087	Total (mg/kg).
		p,p'-DDE	72–55–9	0.031	Composite	0.087	Total (mg/kg).
U062	Diallate	Diallate	2303–16–4	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U063	Dibenzo(a,h) anthracene	Dibenzo(a,h) anthracene	53–70–3	0.055	Composite	8.2	Total (mg/kg).
U064	1,2,7,8–Dibenzopyrene	1,2,7,8–Dibenzopyrene	189–55–9	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	FSUBS; or INCIN	NA.
U066	1,2–Dibromo-3-chloropropane	1,2–Dibromo-3-chloropropane	96–12–8	0.11	Composite	15	Total (mg/kg).
U067	1,2–Dibromoethane (Ethylenedibromide).	1,2–Dibromoethane (Ethylenedibromide).	106–93–4	0.028	Composite	15	Total (mg/kg).
U068	Dibromomethane	Dibromomethane	74–95–3	0.11	Composite	15	Total (mg/kg).
U069	Di-n-butyl phthalate	Di-n-butyl phthalate	84–74–2	0.057	Grab	28	Total (mg/kg).
U070	o-Dichlorobenzene	o-Dichlorobenzene	95–50–1	0.088	Composite	6.2	Total (mg/kg).
U071	1m-Dichlorobenzene	m-Dichlorobenzene	541–73–1	0.036	Grab	6.2	Total (mg/kg).
U072	p-Dichlorobenzene	p-Dichlorobenzene	104–46–7	0.090	Composite	6.2	Total (mg/kg).
U073	3,3'-Dichlorobenzidine	3,3'- Dichlorobenzidine	91–94–1	0.13	Composite	INCIN	NA.
U074	1,4–Dichloro-2-butenecis-	1,4–Dichloro-2-butene	1476–11–5	0.036	Composite	INCIN	NA
		trans-1,4–Dichloro-2-butene	NA	0.036	Composite	INCIN	NA.
U075	Dichlorodifluoromethane	Dichlorodifluoro- methane	75–71–8	0.23	Composite	7.2	Total (mg/kg).
U076	1,1–Dichloroethane	1,1–Dichloroethane	75–34–3	0.059	Composite	7.2	Total (mg/kg).
U077	1,2–Dichloroethane	1,2–Dichloroethane	107–06–2	0.21	Composite	7.2	Total (mg/kg).
U078	1,1–Dichloroethylene	1,1–Dichloroethylene	75–35–4	0.025	Composite	33	Total (mg/kg).
U079	1,2-Dichloroethylene	trans-1,2-Dichloroethylene	156–060–5	0.054	Composite	33	Total (mg/kg).
U080	Methylene chloride	Methylene chloride	75–09–2	0.089	Composite	33	Total (mg/kg).
U081	12,4–Dichlorophenol	12,4–Dichlorophenol	120–83–2	0.044	Composite	14	Total (mg/kg).
U082	2,6–Dichlorophenol	12,6-Dichlorophenol	187–65–0	0.044	Composite	14	Total (mg/kg).
U083	1,2–Dichloropropane	1,2-Dichloropropane	78–87–5	0.85	Composite	18	Total (mg/kg).
U084	1,3-Dichloropropene	cis-1,3-Dichloropropene	10061–01–5	0.036	Composite	18	Total (mg/kg).
		trans-1,3-Dichloropropylene	10061–02–6	0.036	Composite	18	Total (mg/kg).
U085	1,2:3,4–Diepoxybutane	1,2:3,4–Diepoxybutane	1464–53–5	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	FSUBS; or INCIN	NA.
U086	N,N-Diethylhydrazine	N,N-Diethylhydrazine	1615–80–1	CHOXD; CHRED; CARBN; BIODG; or INCIN.	NA	FSUBS; CHOXD; CHRED; or INCIN.	NA.
U087	O,O-Diethyl S-methyldithiophosphate.	O,O-Diethyl S-methyldithiophosphate.	3288–58–2	CARBN; or INCIN	NA	FSUBS; or INCIN	NA
U088	Diethyl phthalate	Diethyl phthalate	84–66–2	0.2	Grab	28	Total (mg/kg).

TREATMENT STANDARDS FOR HAZARDOUS WASTES—Continued

Waste code	Waste description and/or treatment subcategory	Regulated hazardous constituent		Wastewaters		Nonwastewaters	
		Common name	CAS No.	Concentration (mg/l) or technology code	Sampling basis	Concentration or technology code	Sampling basis and units
U089	Diethyl stilbestrol	Diethyl stilbestro	156–53–1	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	FSUBS; or INCIN	NA.
U090	Dihydrosafrole	Dihydrosafrole	94–58–6	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	FSUBS; or INCIN	NA.
U091	3,3′-Dimethoxybenzidine	3,3′-Dimethoxy-benzidine	119–90–4	0.13	Composite	INCIN	NA.
U092	Dimethylamine	Dimethylamine	124–40–3	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U093	p-Dimethylaminoazobenzene	p-Dimethylamino- azobenzene	60–11–7	0.13	Composite	INCIN	NA.
U094	7,12-Dimethyl benz(a)anthracene	7,12-Dimethyl benz(a) anthracene	57–97–6	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	FSUBS; or INCIN	NA.
U095	3,3′-Dimethylbenzidine	3,3′-Dimethyl-benzidine	119–93–7	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U096	a,a-Dimethyl benzyl hydroperoxide	a,a-Dimethyl benzyl hydroperoxide	80–15–9	CHOXD; CHRED; CARBN; BIODG; or INCIN.	NA	FSUBS; CHOXD; CHRED; or INCIN.	NA.
U097	Dimethylcarbomyl chloride	Dimethylcarbomyl chloride	79–44–7	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U098	1,1-Dimethylhydrazine	1,1-Dimethylhydrazine	57–14–7	CHOXD; CHRED; CARBN; BIODG; or INCIN.	NA	FSUBS; CHOXD; CHRED; or INCIN.	NA.
U099	1,2-Dimethylhydrazine	1,2-Dimethylhydrazine	540–73–8	CHOXD; CHRED; CARBN; BIODG; or INCIN.	NA	FSUBS; CHOXD; CHRED; or INCIN.	NA.
U101	2,4-Dimethylphenol	2,4-Dimethylphenol	105–67–9	0.036	Composite	14	Total (mg/kg).
U102	Dimethyl phthalate	Dimethyl phthalate	131–11–3	0.047	Grab	28	Total (mg/kg).
U103	Dimethyl sulfate	Dimethyl sulfate	77–78–1	CHOXD; CHRED; CARBN; BIODG; or INCIN.	NA	FSUBS; CHOXD; CHRED; or INCIN.	NA.
U105	2,4-Dinitrotoluene	2,4-Dinitrotoluene	121–14–2	0.32	Composite	140	Total (mg/kg).
U106	2,6-Dinitrotoluene	2,6-Dinitrotoluene	606–20–2	0.55	Composite	28	Total (mg/kg).
U107	Di-n-octyl phthalate	Di-n-octyl phthalate	117–84–0	0.017	Grab	28	Total (mg/kg).
U108	1,4-Dioxane	1,4-Dioxane	123–91–1	0.12	Composite	170	Total (mg/kg).

U109	1,2-Diphenylhydrazine	1,2-Diphenylhydrazine	122–66–7	CHOXD; CHRED; CARBN; BIODG; or INCIN.	NA	FSUBS; CHOXD; CHRED; or INCIN.	NA.
U110	Dipropylamine	Dipropylamine	142–84–7	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U111	Di-n-propylnitrosoamine	Di-n-propylnitrosoamine	621–64–7	0.40	Composite	14	Total (mg/kg).
U112	Ethyl acetate	Ethyl acetate	141–78–6	0.34	Composite	33	Total (mg/kg).
U113	Ethyl acrylate	Ethyl acrylate	140–88–5	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	FSUBS; or INCIN	NA.
U114	Ethylene bis-dithiocarbamic acid	Ethylene bis-dithiocarbamic acid	111–54–6	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U115	Ethylene oxide	Ethylene oxide	75–21–8	0.12	NA	NA	NA.
U116	Ethylene thiourea	Ethylene thiourea	96–45–7	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U117	Ethyl ether	Ethyl ether	60–29–7	0.12	Composite	160	Total (mg/kg).
U118	Ethyl methacrylate	Ethyl methacrylate	97–63–2	0.14	Composite	160	Total (mg/kg).
U119	Ethyl methane sulfonate	Ethyl methane sulfonate	62–50–0	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U120	Fluoranthene	Fluoranthene	206–44–0	0.068	Composite	8.2	Total (mg/kg).
U121	Trichloromonofluoro-methane	Trichloromonofluoro-methane	75–69–4	0.020	Composite	33	Total (mg/kg).
U122	Formaldehyde	Formaldehyde	50–00–0	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	FSUBS; or INCIN	NA.
U123	Formic acid	Formic acid	64–18–6	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	FSUBS; or INCIN	NA.
U124	Furan	Furan	110–00–9	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	FSUBS; or INCIN	NA.
U125	Furfural	Furfural	98–01–1	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	FSUBS; or INCIN	NA.
U126	Glycidadehyde	Glycidadehyde	765–34–4	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	FSUBS; or INCIN	NA.
U127	Hexachlorobenzene	Hexachlorobenzene	118–74–1	0.055	Composite	37	Total (mg/kg).
U128	Hexachlorobutadiene	Hexachlorobuta-diene	87–68–3	0.055	Composite	28	Total (mg/kg).
U129	Lindane	alpha-BHC	319–84–6	0.00014	Composite	0.066	Total (mg/kg).
		beta-BHC	319–85–7	0.00014	Composite	0.066	Total (mg/kg).
		delta-BHC	319–86–8	0.023	Composite	0.066	Total (mg/kg).
		Gamma-BHC (Lindane)	58–89–9	0.0017	Composite	0.066	Total (mg/kg).
U130	Hexachlorocyclopentadiene	Hexachlorocyclopentadiene	77–47–7	0.057	Composite	3.6	Total (mg/kg).

TREATMENT STANDARDS FOR HAZARDOUS WASTES—Continued

Waste code	Waste description and/or treatment subcategory	Regulated hazardous constituent		Wastewaters		Nonwastewaters	
		Common name	CAS No.	Concentration (mg/l) or technology code	Sampling basis	Concentration or technology code	Sampling basis and units
U131	Hexachloroethane	Hexachloroethane	67–72–1	0.055	Composite	28	Total (mg/kg).
U132	Hexachlorophenene	Hexachlorophenene	70–30–4	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U133	Hydrazine	Hydrazine	302–01–2	CHOXD; CHRED; CARBN; DIODG; or INCIN.	NA	FSUBS; CHOXD; CHRED; or INCIN.	NA.
U134	Hydrogen fluoride	Fluoride	16964–48–8	35	Grab	NA	NA.
		Hydrogen fluoride	7664–39–3	NA	NA	ADGAS fb NEUTR; or NEUTR.	NA.
U135	Hydrogen sulfide	Hydrogen sulfide	7783–06–4	CHOXD; CHRED; or INCIN.	NA	CHOXD; CHRED; or INCIN.	NA
U136	Cacodylic acid	Arsenic	7440–38–2	0.79	Grab	5.6	TCLP (mg/l).
U137	Indeno(1,2,3-c,d)pyrene	Indeno(1,2,3-c,d)pyrene	193–39–5	0.0055	Composite	8.2	Total (mg/kg).
U138	Iodomethane	Iodomethane	74–88–4	0.19	Composite	65	Total (mg/kg).
U140	Isobutyl alcohol	Isobutyl alcohol	78–83–1	5.6	Grab	170	Total (mg/kg).
U141	Isosafrole	Isosafrole	120–58–1	0.081	Grab	2.6	Total (mg/kg).
U142	Kepone	Kepone	143–50–8	0.0011	Grab	0.13	Total (mg/kg).
U143	Lasiocarpine	Lasiocarpine	303–34–4	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U144	Lead acetate	Lead	7439–92–1	0.040	Grab	0.51	TCLP (mg/l).
U145	Lead phosphate	Lead	7439–92–1	0.040	Grab	0.51	TCLP (mg/l).
U146	Lead subacetate	Lead	7439–92–1	0.040	Grab	0.51	TCLP (mg/l).
U147	Maleic anhydride	Maleic anhydride	108–31–6	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	FSUBS; or INCIN	NA.
U148	Maleic anhydride	Maleic hydrazide	123–33–1	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U149	Malononitrile	Malononitrile	109–77–3	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U150	Melphalan	Melphalan	148–82–3	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U151	Low Mercury Subcategory—less than 260 mg/kg Mercury—residues from RMERC—Mercury.	Mercury	7439–97–6	0.030	Grab	0.20	TCLP (mg/l).
U151	Low Mercury Subcategory—less than 260 mg/kg Mercury—that are not residues from RMERC—Mercury.	Mercury	7439–97–6	0.030	Grab	0.025	TCLP (mg/l).

U151	Mercury: (High Mercury Subcategory—greater than or equal to 260 mg/kg total Mercury).	Mercury	7439–97–6	NA	NA	RMERC	NA.
U151	Mercury: Elemental Mercury contaminated with radioactive materials.	Mercury	7439–97–6	NA	NA	AMLGM	NA.
U152	Methacrylonitrile	Methacrylonitrile	126–98–7	0.24	Composite	84	Total (mg/kg).
U153	Methane thiol	Methane thiol	74–93–1	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U154	Methanol	Methanol	67–56–1	5.6	Grab	FSUBS; or INCIN	NA.
U155	Methapyrilene	Methapyrilene	91–80–5	0.081	Grab	1.5	Total (mg/kg).
U156	Methyl chlorocarbonate	Methyl chlorocarbonate	79–22–1	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U157	3-Methylcholanthrene	3-Methylcholan-threne	56–49–5	0.0055	Composite	15	Total (mg/kg).
U158	4,4'-Methylenebis(2-chloroaniline)	4,4'-Methylenebis-(2-chloroaniline)	101–14–4	0.50	Composite	35	Total (mg/kg).
U159	Methyl ethyl ketone	Methyl ethyl ketone	78–93–3	0.28	Grab	36	Total (mg/kg).
U160	Methyl ethyl ketone peroxide	Methyl ethyl ketone peroxide	1338–23–4	CHOXD; CHRED; CARBN; BIODG; or INCIN.	NA	FSUBS; CHOXD; CHRED; or INCIN.	NA.
U161	Methyl isobutyl ketone	Methyl isobutyl ketone	108–10–1	0.14	Grab	33	Total (mg/kg).
U162	Methyl methacrylate	Methyl methacrylate	80–62–6	0.14	Grab	160	Total (mg/kg).
U163	N-Methyl N'-nitro N-Nitroso- guanidine.	N-Methyl N'-nitro N-Nitroso- guanidine.	70–25–7	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U164	Methylthiouracil	Methylthiouracil	56–04–2	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U165	Naphthalene	Naphthalene	91–20–3	0.059	Composite	3.1	Total (mg/kg).
U166	1,4-Naphthoquinone	1,4-Naphthoquinone	130–15–4	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	FSUBS; or INCIN	NA.
U167	1-Naphthylamine	1-Naphthylamine	134–32–7	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U168	2-Naphthylamine	2-Naphthylamine	91–59–8	0.52	Composite	INCIN	NA.
U169	Nitrobenzene	Nitrobenzene	98–95–3	0.068	Composite	14	Total (mg/kg).
U170	4-Nitrophenol	4-Nitrophenol	100–02–7	0.12	Composite	29	Total (mg/kg).
U171	2-Nitropropane	2-Nitropropane	79–46–9	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U172	n-Nitrosodi-n-butylamine	n-Nitrosodi-n-butylamine	924–16–3	0.40	Composite	17	Total (mg/kg).
U173	N-Nitroso-di-n-ethanolamine	N-Nitroso-di-n-ethanolamine	1116–54–7	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U174	n-Nitrosodiethylamine	n-Nitrosodiethyl-amine	55–18–5	0.40	Composite	28	Total (mg/kg).

TREATMENT STANDARDS FOR HAZARDOUS WASTES—Continued

Waste code	Waste description and/or treatment subcategory	Regulated hazardous constituent		Wastewaters		Nonwastewaters	
		Common name	CAS No.	Concentration (mg/l) or technology code	Sampling basis	Concentration or technology code	Sampling basis and units
U176	N-Nitroso-N-ethylurea	N-Nitroso-N-ethylurea	759–73–9	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U177	N-Nitroso-N-methylurea	N-Nitroso-N-methylurea	684–93–5	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U178	N-Nitroso-N-methylurethane	N-Nitroso-N-methylurethane	615–53–2	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U179	n-Nitrosopiperidine	n-Nitrosopiperidine	100–75–4	0.013	Composite	35	Total (mg/kg).
U180	n-Nitrosopyrrolidine	n-Nitrosopyrrolidine	930–55–2	0.013	Composite	35	Total (mg/kg).
U181	5-Nitro-o-toluidine	5-Nitro-o-toluidine	99–55–8	0.32[4]	Composite	28	Total (mg/kg).
U182	Paraldehyde	Paraldehyde	123–63–7	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	FSUBS; or INCIN	NA.
U183	Pentachlorobenzene	Pentachlorobenzene	608–93–5	0.055	Composite	37	Total (mg/kg).
U184	Pentachloroethane	Pentachloroethane	76–01–7	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U185	Pentachloronitrobenzene	Pentachloronitro-benzene	82–68–8	0.055	Composite	4.8	Total (mg/kg).
U186	1,3-Pentadiene	1,3-Pentadiene	504–60–9	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	FSUBS; or INCIN	NA.
U187	Phenacetin	Phenacetin	62–44–2	0.081	Grab	16	Total (mg/kg).
U188	Phenol	Phenol	108–95–2	0.039	Grab	6.2	Total (mg/kg).
U189	Phosphorus sulfide	Phosphorus sulfide	1314–80–3	CHOXD; CHRED; or INCIN.	NA	CHOXD; CHRED; or INCIN.	NA.
U190	Phthalic anhydride (measured as Phthalic acid).	Phthalic anhydride (measured as Phthalic acid).	85–44–9	0.069	Grab	28	Total (mg/kg).
U191	2-Picoline	2-Picoline	109–06–8	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U192	Pronamide	Pronamide	23950–58–5	0.093	Grab	1.5	Total (mg/kg).
U193	1,3-Propane sultone	1,3-Propane sultone	1120–71–4	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U194	n-Propylamine	n-Propylamine	107–10–8	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U196	Pyridine	Pyridine	110–86–1	0.014	Composite	16	Total (mg/kg).

U197	p-Benzoquinone	p-Benzoquinone	106–51–4	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	FSUBS; or INCIN	NA.
U200	Reserpine	Reserpine	50–55–5	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U201	Resorcinol	Resorcinol	108–46–3	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	FSUBS; or INCIN	NA.
U202	Saccharin and salts	Saccharin and salts	81–07–2	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U203	Safrole	Safrole	94–59–7	0.081	Grab	22	Total (mg/kg).
U204	Selenium dioxide	Selenium	7782–49–2	1.0	Grab	5.7	TCLP (mg/l).
U205	Selenium sulfide	Selenium	7782–49–2	1.0	Grab	5.7	TCLP (mg/l).
U206	Streptozatocin	Streptozatocin	18883–66–4	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U207	1,2,4,5-Tetrachlorobenzene	1,2,4,5-Tetrachlorobenzene	95–94–3	0.055	Composite	19	Total (mg/kg).
U208	1,1,1,2-Tetrachloroethane	1,1,1,2-Tetrachloroethane	630–20–6	0.057	Grab	42	Total (mg/kg).
U209	1,1,2,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	79–34–5	0.057	Composite	42	Total (mg/kg).
U210	Tetrachloroethylene	Tetrachloroethylene	127–18–4	0.056	Composite	5.6	Total (mg/kg).
U211	Carbon tetrachloride	Carbon tetrachloride	56–23–5	0.057	Composite	5.6	Total (mg/kg).
U213	Tetrahydrofuran	Tetrahydrofuran	109–99–9	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	FSUBS; or INCIN	N
U214	Thallium(I)acetate	Thallium (I) acetate	563–68–8	NA	NA	RTHRM; or STABL.	NA
		Thallium	7440–28–0	0.14	Composite	NA	NA.
U215	Thallium(I)carbonate	Thallium (I) carbonate	6533–73–9	NA	NA	RTHRM; or STABL.	NA.
		Thallium	7440–28–0	0.14	Composite	NA	NA.
U216	Thallium (I) chloride	Thallium (I) chloride	7791–12–0	NA	NA	RTHRM; or STABL.	NA.
		Thallium	7440–28–0	0.14	Composite	NA	NA.
U217	Thallium (I) nitrate	Thallium (I) nitrate	10102–45–1	NA	NA	RTHRM; or STABL.	NA.
		Thallium	7440–28–0	0.14	Composite	NA	NA.
U218	Thioacetamide	Thioacetamide	62–55–5	(WETOX or CHOXD) fb CARBN; or INCIN.	NAINCIN	NA..	
U219	Thiourea	Thiourea	62–56–2	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U220	Toluene	Toluene	108–88–3	0.080	Composite	28	NA.
U221	Toluenediamine	Toluenediamine	25376–45–8	CARBN; or INCIN	NA	FSUBS; or INCIN	NA.
U222	o-Toluidine hydrochloride	o-Toluidine hydrochloride	636–21–5	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.

TREATMENT STANDARDS FOR HAZARDOUS WASTES—Continued

Waste code	Waste description and/or treatment subcategory	Regulated hazardous constituent		Wastewaters		Nonwastewaters	
		Common name	CAS No.	Concentration (mg/l) or technology code	Sampling basis	Concentration or technology code	Sampling basis and units
U223	Toluene diisocyanate	Toluene diisocyanate	26471–62–5	CARBN; or INCIN	NA	FSUBS; or INCIN	NA.
U225	Tribromomethane (Bromoform)	Tribromomethane (Bromoform)	75–25–2	0.63	Composite	15	Total (mg/kg).
U226	1,1,1-Trichloroethane	1,1,1–Trichloroethane	71–55–6	0.054	Composite	5.6	Total (mg/kg).
U227	1,1,2-Trichloroethane	1,1,2-Trichloroethane	79–00–5	0.054	Composite	5.6	Total (mg/kg).
U228	Trichloroethylene	Trichloroethylene	79–01–6	0.054	Composite	5.6	Total (mg/kg).
U234	sym-Trinitrobenzene	sym-Trinitrobenzene	99–35–4	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U235	tris-(2,3-Dibromopropyl)phosphate	tris-(2,3-Dibromopropyl)phosphate	126–72–7	0.025	Grab	0.10	Total (mg/kg).
U236	Trypan Blue	Trypan Blue	72–57–1	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U237	Uracil mustard	Uracil mustard	66–75–1	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U238	Ethyl carbamate	Ethyl carbamate	51–79–6	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U239	Xylenes	Xylenes	1330–20–7	0.32	Composite	28	Total (mg/kg).
U240	2,4-Dichlorophenoxyacetic acid	2,4-Dichlorophenoxyacetic acid	94–75–7	0.72	Grab	10	Total (mg/kg).
U240	2,4-Dichlorophenoxyacetic Salts and esters.	2,4-Dichloro- phenoxy- acetic	NA	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U243	Hexachloropropene	Hexachloropropene	1888–71–7	0.035	Composite	28	Total (mg/kg).
U244	Thiram	Thiram	137–26–8	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	INCIN	NA.
U246	Cyanogen bromide	Cyanogen bromide	506–68–3	CHOXD; WETOX; or INCIN.	NA	CHOXD; WETOX; or INCIN.	NA.
U247	Methoxychlor	Methoxychlor	72–43–5	0.25	Composite	0.18	Total (mg/kg).
U248	Warfarin (greater than or equal to 3%).	Warfarin	81–81–2	(WETOX or CHOXD) fb CARBN; or INCIN.	NA	FSUBS; or INCIN	NA.
U249	Zinc Phosphide (<10%)	Zinc Phosphide	1314–84–7	CHOXD; CHRED; or INCIN.	NA	CHOXD; CHRED; or INCIN.	NA.
U328	o-toluidine	o-toluidine	95–53–4	INCIN; or CHOXD fb, (BIODG or CARBN); or BIODG fb CARBN.	NA	INCIN; or Thermal Destruction.	NA.

U353	p-toluidine	p-toluidine	106–49–0	INCIN; or CHOXD fb, (BIODG or CARBN); or BIODG fb CARBN.	NA	INCIN; or Thermal Destruction.	NA.
U359	2-ethoxy- ethanol	2-ethoxy-ethanol	110–80–5	INCIN; or CHOXD fb, (BIODG or CARBN); or BIODG fb CARBN.	NA	INCIN; or FSUBS	NA.

[1] F039 (and D001 and D002 wastes prohibited under §268.37)

§ 268.41 [Reserved]

21. Section 268.41 in subpart D is removed and reserved.

22. Section 268.42 is amended by removing Table 2 and Table 3, and revising paragraphs (a) introductory text, (c)(2) and (d) to read as follows:

§ 268.42 Treatment standards expressed as specified technologies.

(a) The following wastes in paragraphs (a)(1) and (a)(2) of this section and in the Table of Treatment Standards for which standards are expressed as a treatment method rather than a concentration must be treated using the technology or technologies specified in paragraphs (a)(1) and (a)(2) and Table 1 of this section.

* * * * *

(c) * * *

(2) The lab pack does not contain the following wastes: D009, F019, K003, K004, K005, K006, K062, K071, K100, K106, P010, P011, P012, P076, P078, U134, U151.

* * * * *

(d) Hazardous debris containing radioactive waste is subject to the treatment standards specified in § 268.45.

§ 268.43 [Reserved]

23. Section 268.43 in Subpart D is removed and reserved.

24. In subpart D, § 268.47 is added to read as follows:

§ 268.47 Treatment standards for hazardous soil.

(a) Treatment standards for the organic and inorganic constituents listed in § 268.48, Table UTS, Universal Treatment Standards, are applicable to RCRA hazardous soil before the soil is land disposed.

(b) Hazardous soil may be land disposed if the concentration of each constituent found on Table UTS in the soil is equal to or less than:

(1) A 90% reduction of the initial untreated concentration, provided that the resulting treated concentration is less than or equal to ten times the universal treatment standard; or

(2) The concentration is less than or equal to ten times the universal treatment standard; or

(3) A 90% reduction of the initial untreated concentration unless such would result in a treatment level below the universal treatment standard for that constituent, in which case the universal treatment standard would apply.

25. In subpart D, § 268.48 is added to read as follows:

§ 268.48 Universal treatment standards.

(a) Table UTS identifies the hazardous constituents associated with restricted hazardous wastes regulated under this part. It also establishes the concentrations of those constituents that may not be exceeded in the waste or treatment residual, or in an extract of such waste or residual, if so specified in Table UTS.

(1) Compliance with these treatment standards is measured by an analysis of grab samples, unless otherwise noted in the following Table UTS.

(2) The constituent-specific treatment standards in Table UTS supersede the treatment standards found at §§ 268.41 and 268.43, when such constituents are regulated in wastes listed as hazardous under 40 CFR part 261, subpart D, of this chapter.

(3) The requirements of paragraph (a)(2) of this section do not apply to the hazardous waste specified in §§ 268.41 and 268.43 as F024. This waste is subject to the treatment standards in §§ 268.41 and 268.43.

§ 268.48 TABLE UTS—UNIVERSAL TREATMENT STANDARDS

Regulated hazardous constituent	Wastewater concentration total composition (mg/l)	Nonwastewater concentration total composition (mg/kg)
Acenaphthalene	0.059	3.4
Acenaphthene	0.059	3.4
Acetone	0.28	160
Acetonitrile	0.17	NR
Acetophenone	0.010	9.7
2-Acetylaminofluorene	0.059	140
Acrolein	0.29	NR
Acrylonitrile	0.24	84
Aldrin	0.021	0.0664
4-Aminobiphenyl	0.13	NR
Aniline	0.81	14
Anthracene	0.059	3.4
Aramite	0.36	NR
Aroclor 1016	0.013	0.92
Aroclor 1221	0.014	0.92
Aroclor 1232	0.013	0.92
Aroclor 1242	0.017	0.92
Aroclor 1248	0.013	0.92
Aroclor 1254	0.014	1.8
Aroclor 1260	0.014	1.8
alpha-BHC	0.00014	0.066
beta-BHC	0.00014	0.066
delta-BHC	0.023	0.066
gamma-BHC	0.0017	0.066
Benz(a)anthracene	0.059	3.4
Benzal chloride	0.055	6.0
Benzene	0.14	10
Benzo(a)pyrene	0.061	3.4
Benzo-(b)fluoranthene	0.11	6.8
Benzo(g,h,i)perylene	0.0055	1.8
Benzo(k)fluoranthene	0.11	6.8
Bis(2-chloroethoxy)methane	0.036	7.2
Bis(2-chloroethyl)ether	0.033	6.0

§ 268.48 TABLE UTS—UNIVERSAL TREATMENT STANDARDS—Continued

Regulated hazardous constituent	Wastewater concentration total composition (mg/l)	Nonwastewater concentration total composition (mg/kg)
Bis(2-chloroisopropyl)ether	0.055	7.2
Bis(2-ethylhexyl)phthalate	0.28	28
Bromodichloromethane	0.35	15
Bromomethane	0.11	15
4-Bromophenyl phenyl ether	0.055	15
n-Butyl alcohol	5.6	2.6
Butyl benzyl phthalate	0.017	28
2-sec-Butyl-4,6- dinitrophenol	0.066	2.5
Carbon disulfide	0.014	4.81
Carbon tetrachloride	0.057	6.0
Chlordane	0.0033	0.26
p-Chloroaniline	0.46	16
Chlorobenzene	0.057	6.0
Chlorobenzilate	0.10	NR
2-Chloro-1,3-butadiene	0.057	NR
Chlorodibromomethane	0.057	15
Chloroethane	0.27	6.0
Chloroform	0.046	6.0
p-Chloro-m-cresol	0.018	14
2-Chloroethyl vinyl ether	0.062	NR
Chloromethane (Methyl chloride)	0.19	30
2-Chloronaphthalene	0.055	5.6
2-Chlorophenol	0.044	5.7
3-Chloropropylene	0.036	30
Chrysene	0.059	3.4
Cresol (m- and p-isomers)	0.77	3.2
o-Cresol	0.11	5.6
Cyclohexanone	0.36	0.75
o,p'-DDD	0.023	0.087
p,p'-DDD	0.023	0.087
o,p'-DDE	0.031	0.087
p,p'-DDE	0.031	0.087
o,p'-DDT	0.0039	0.087
p,p'-DDT	0.0039	0.087
Dibenzo(a,e)pyrene	0.061	NR
Dibenz(a,h)anthracene	0.055	8.2
tris-(2,3–Dibromopropyl) phosphate	0.11	NR
1,2-Dibromo-3-chloropropane	0.11	15
1,2-Dibromoethane	0.028	15
Dibromomethane	0.11	15
m-Dichlorobenzene	0.036	6.0
o-Dichlorobenzene	0.088	6.0
p-Dichlorobenzene	0.090	6.0
Dichlorodifluoromethane	0.23	7.2
1,1-Dichloroethane	0.059	6.0
1,2-Dichloroethane	0.21	6.0
1,1-Dichloroethylene	0.025	6.0
trans-1,2-Dichloroethylene	0.054	30
2,4-Dichlorophenol	0.044	14
2,6-Dichlorophenol	0.044	14
2,4-Dichlorophenoxyacetic acid (2,4-D)	0.72	10
1,2-Dichloropropane	0.85	18
cis-1,3-Dichloropropylene	0.036	18
trans-1,3-Dichloropropylene	0.036	18
Dieldrin	0.017	0.13
Diethyl phthalate	0.20	28
p-Dimethylaminoazo-benzene	0.13	NR
2,4-Dimethylphenol	0.036	14
Dimethyl phthalate	0.047	28
Di-n-butyl phthalate	0.057	28
1,4-Dinitrobenzene	0.32	2.3
4,6-Dinitrocresol	0.28	160
2,4-Dinitrophenol	0.12	160
2,4-Dinitrotoluene	0.32	140
2,6-Dinitrotoluene	0.55	28
Di-n-octyl phthalate	0.017	28
Di-n-propylnitrosamine	0.40	14
Diphenylamine	0.92	13
1,2-Diphenyl hydrazine	0.087	NR

§ 268.48 TABLE UTS—UNIVERSAL TREATMENT STANDARDS—Continued

Regulated hazardous constituent	Wastewater concentration total composition (mg/l)	Nonwastewater concentration total composition (mg/kg)
Diphenylnitrosoamine	0.92	13
1,4-Dioxane	0.12	170
Disulfoton	0.017	6.2
Endosulfan I	0.023	0.066
Endosulfan II	0.029	0.13
Endosulfan sulfate	0.029	0.13
Endrin	0.0028	0.13
Endrin aldehyde	0.025	0.13
Ethyl acetate	0.34	33
Ethyl benzene	0.057	10
Ethyl ether	0.12	160
Ethyl methacrylate	0.14	160
Ethylene oxide	0.12	NR
Famphur	0.017	15
Fluoranthene	0.068	3.4
Fluorene	0.059	3.4
Heptachlor	0.0012	0.066
Heptachlor epoxide	0.016	0.066
Hexachlorobenzene	0.055	10
Hexachlorobutadiene	0.055	5.6
Hexachlorodibenzofurans	0.000063	0.001
Hexachlorodibenzo-p-dioxins	0.000063	0.001
Hexachlorocyclopentadiene	0.057	2.4
Hexachloroethane	0.055	30
Hexachloropropylene	0.035	30
Indeno(1,2,3-c,d)pyrene	0.0055	3.4
Iodomethane	0.19	65
Isobutyl alcohol	5.6	170
Isodrin	0.021	0.066
Isosafrole	0.081	2.6
Kepone	0.0011	0.13
Methacrylonitrile	0.24	84
Methanol	5.6	0.75
Methapyrilene	0.081	1.5
Methoxychlor	0.25	0.18
3-Methylchloanthrene	0.0055	15
4,4-Methylene-bis-(2-chloraniline)	0.50	30
Methylene chloride	0.089	30
Methyl ethyl ketone	0.28	36
Methyl isobutyl ketone	0.14	33
Methyl methacrylate	0.14	160
Methyl methansulfonate	0.018	NR
Methyl parathion	0.014	4.6
Naphthalene	0.059	5.6
2-Naphthylamine	0.52	NR
p-Nitroaniline	0.0	28
o-Nitroaniline	NR	14
Nitrobenzene	0.068	14
5-Nitro-o-toluidine	0.32	28
o-Nitrophenol	NR	13
p-Nitrophenol	0.12	29
N-Nitrosodiethylamine	0.40	28
N-Nitrosodimethylamine	0.40	2.3
N-Nitrosodi-n-butylamine	0.40	17
N-Nitrosomethylethylamine	0.40	2.3
N-Nitrosomorpholine	0.40	2.3
N-Nitrosopiperidine	0.013	35
N-Nitrosopyrrolidine	0.013	35
Parathion	0.014	4.6
Pentachlorobenzene	0.055	10
Pentachlorodibenzofurans	0.000035	0.001
Pentachlorodibenzo-p-dioxins	0.000063	0.001
Pentachloroethane	NR	6
Pentachloronitrobenzene	0.055	4.8
Pentachlorophenol	0.089	7.4
Phenacetin	0.081	16
Phenanthrene	0.059	5.6
Phenol	0.039	6.2
Phorate	0.021	4.6

§ 268.48 TABLE UTS—UNIVERSAL TREATMENT STANDARDS—Continued

Regulated hazardous constituent	Wastewater concentration total composition (mg/l)	Nonwastewater concentration total composition (mg/kg)
Phthalic acid	0.055	28
Phthalic anhydride	0.055	28
Pronamide	0.093	1.5
Propanenitrile	0.24	360
Pyrene	0.067	8.2
Pyridine	0.014	16
Safrole	0.081	22
Silvex (2,4,5-TP)	0.72	7.9
2,4,5,-T	0.72	7.9
1,2,4,5-Tetrachlorobenzene	0.055	14
Tetrachlorodibenzofurans	0.000063	0.001
Tetrachlorodibenzo-p-dioxins	0.000063	0.001
1,1,1,2-Tetrachloroethane	0.057	6.0
1,1,2,2-Tetrachloroethane	0.057	6.0
Tetrachloroethylene	0.056	6.0
2,3,4,6-Tetrachlorophenol	0.030	7.4
Toluene	0.080	10
Toxaphene	0.0095	2.6
Tribromomethane (Bromoform)	0.63	15
1,2,4-Trichlorobenzene	0.055	19
1,1,1-Trichloroethane	0.054	6.0
1,1,2-Trichloroethane	0.054	6.0
Trichloroethylene	0.054	6.0
Trichloromonofluoromethane	0.020	30
2,4,5-Trichlorophenol	0.18	7.4
2,4,6-Trichlorophenol	0.035	7.4
2,4,5-Trichlorophenoxyacetic acid	0.72	7.9
1,2,3-Trichloropropane	0.85	30
1,1,2-Trichloro-1,2,2-trifluoroethane	0.057	30
Vinyl chloride	0.27	6.0
Xylenes (total)	0.32	30
Total PCBs	0.1	10

Regulated hazardous constituent	Wastewater concentration total composition (mg/l)	Nonwastewater concentration TCLP (mg/l)
Antimony	1.9	2.1
Arsenic	1.4	5.0
Barium	1.2	7.6
Beryllium	0.82	0.014
Cadmium	0.20	0.19
Chromium (total)	0.37	0.33
Cyanide (total)	1.9	[1]590
Cyanide (amenable)	NR	[1]30
Lead	0.28	0.37
Mercury	0.15	0.009
Nickel	0.55	5.0
Selenium	0.82	0.16
Silver	0.29	0.30
Thallium	1.4	0.078
Vanadium	0.042	0.23
Zinc	1.0	5.3

[1] As analyzed using SW–846 Method 9010 or 9012; sample size 10 gram; distillation time one hour and fifteen minutes.

PART 271—REQUIREMENTS FOR AUTHORIZATION OF STATE HAZARDOUS WASTE PROGRAMS

26. The authority citation for part 271 continues to read as follows:

Authority: 42 U.S.C. 6905, 6912(a), and 6926.

Subpart A—Requirements for Final Authorization

27. Section 271.1(j) is amended by adding the following entries to Table 1 in chronological order by date of publication in the **Federal Register**, and by adding the following entries to Table 2 in chronological order by effective date in the **Federal Register**:

§ 271.1 Purpose and scope.

* * * * *

(j) * * *

TABLE 1.—REGULATIONS IMPLEMENTING THE HAZARDOUS AND SOLID WASTE AMENDMENTS OF 1984

Promulgation date	Title of regulation	FEDERAL REGISTER reference	Effective date
•	•	•	•
[Insert date of publication in the Federal Register (FR)].	Land disposal restrictions for newly listed and identified wastes in §268.38 and hazardous soil in §268.47, and universal treatment standards in §268.48.	[Insert FR page numbers].	[Insert date of signature of final rule].
•	•	•	•

TABLE 2.—SELF-IMPLEMENTING PROVISIONS OF THE HAZARDOUS AND SOLID WASTE AMENDMENTS OF 1984

Effective date	Self-implementing provision	RCRA citation	FEDERAL REGISTER reference
•	•	•	•
[Insert date of signature of final rule].	Prohibition on land disposal of newly listed wastes and treatment standards for hazardous soil in §268.47 and universal standards in §268.48.	3004(g)(6)(A) and 3004(m).	[Insert date of publication] 58 FR [insert page numbers].
•	•	•	•

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