

ENVIRONMENTAL PROTECTION AGENCY**40 CFR Parts 148, 266, 268 and 271**

[EPA #530-2-95-002, 6 FRL 5160-7]

RIN 2050-AD38

Land Disposal Restrictions—Phase III: Decharacterized Wastewaters, Carbamate and Organobromine Wastes, and Spent Potliners

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule.

SUMMARY: Today, the Agency is proposing treatment standards for certain hazardous wastes—namely, wastes from the production of carbamate pesticides, organobromine flame-retardants, and aluminum—under its Land Disposal Restrictions (LDR) program. The purpose of the LDR program, authorized by the Resource Conservation and Recovery Act (RCRA), is to minimize short and long-term threats to human health and the environment from exposure to hazardous chemical constituents. The treatment standards for these wastes will minimize threats from exposure to hazardous constituents which may potentially leach from landfills to groundwater.

The Agency is also proposing to revise the treatment standards for other wastes which are hazardous because they display the characteristic of ignitability, corrosivity, reactivity, or toxicity. These wastes, known as “characteristic” hazardous wastes, are sometimes treated in lagoons which are regulated under the Clean Water Act, and sometimes injected into deepwells which are regulated under the Safe Drinking Water Act. Currently, these wastes are no longer regulated under RCRA once the characteristic property is removed. Today’s revised treatment standards require treatment, not only to remove the characteristic, but also to treat any underlying hazardous constituents which may be present in the wastes, even though they are not what causes the characteristic property (i.e., a corrosive waste could have underlying hazardous constituents that, although not corrosive, are nevertheless toxic to human health). Therefore, these revised treatment standards will minimize threats from exposure to hazardous constituents which may potentially migrate from these lagoons or wells.

Finally, EPA is proposing today to forbid the use of hazardous wastes to fill in holes in the ground. EPA proposes

that this practice is illegal disposal of hazardous wastes. EPA is also proposing to add to the regulations an existing policy which states that hazardous wastes which are predominantly metal should not be burned.

DATES: Comments on this proposed rule must be submitted by May 1, 1995.

ADDRESSES: The public must send an original and two copies (and a voluntary copy on computer diskette) of their comments to: RCRA Information Center (5305), U.S. Environmental Protection Agency, 401 M Street, SW., Washington, DC 20460. Place the docket number F-95-PH3P-FFFFF on your comments.

The official record for the proposed rulemaking is located in the EPA RCRA Docket, U.S. Environmental Protection Agency, Room 2616, 401 M Street, SW., Washington, DC 20460. The RCRA Docket is open from 9 a.m. to 4 p.m. Monday through Friday, except for Federal holidays. The public must make an appointment to review docket materials by calling (202) 260-9327. The public may copy a maximum of 100 pages from any regulatory document at no cost. Additional copies cost \$0.15 per page. The mailing address is EPA RCRA Docket (5305), U.S. Environmental Protection Agency, 401 M Street, SW., Washington, DC 20460. For additional information on submitting computer diskettes please see the heading “Paperless Office Effort” in the **SUPPLEMENTARY INFORMATION** section of this document.

FOR FURTHER INFORMATION CONTACT: For general information on the LDR program, contact the RCRA Hotline at 800-424-9346 (toll-free) or 703-412-9810 locally. For information on today’s proposed rule, contact Peggy Vyas in the Office of Solid Waste, phone 703-308-8594. For specific information on the treatment standards for carbamates and/or organobromine wastes, contact Shaun McGarvey at 703-308-8603; for specific information on the treatment standards for K088 wastes, contact Mary Cunningham at 703-308-8453; for specific information on the Universal Treatment Standards, contact Lisa Jones at 703-308-8451. For information on the capacity analyses, contact Les Otte at 703-308-8440. For information on the regulatory impact analyses, contact Linda Martin at 202-260-2791.

SUPPLEMENTARY INFORMATION:**Paperless Office Effort**

EPA is asking prospective commenters to voluntarily submit one additional copy of their comments on labeled personal computer diskettes in ASCII (TEXT) format or a word processing format that can be converted

to ASCII (TEXT). It is essential to specify on the disk label the word processing software and version/edition as well as the commenter’s name. This will allow EPA to convert the comments into one of the word processing formats utilized by the Agency. Please use mailing envelopes designed to physically protect the submitted diskettes. EPA emphasizes that submission of comments on diskettes is not mandatory, nor will it result in any advantage or disadvantage to any commenter. Rather, EPA is experimenting with this procedure as an attempt to expedite our internal review and response to comments. This expedited procedure is in conjunction with the Agency “Paperless Office Effort” campaign. For further information on the submission of diskettes, contact the Waste Treatment Branch at 703-308-8434.

Glossary of Acronyms

BAT—Best Available Technology
 BDAT—Best Demonstrated Available Technology
 BIFs—Boilers and Industrial Furnaces
 CAA—Clean Air Act
 CWA—Clean Water Act
 EP—Extraction Procedure
 HON—Hazardous Organic NESHAPs
 HSWA—Hazardous and Solid Waste Amendments
 HWIR—Hazardous Waste Identification Rule
 ICR—Ignitable, Corrosive, and Reactive wastes, or, Information Collection Request (in section XI.D.)
 ICRT—Ignitable, Corrosive, Reactive, and TC Wastes
 LDR—Land Disposal Restrictions
 NESHAPs—National Emission Standards for Hazardous Air Pollutants
 NPDES—National Pollutant Discharge Elimination System
 POTW—Publicly-Owned Treatment Works
 PSES—Pretreatment Standards for Existing Sources
 PSNS—Pretreatment Standards for New Sources
 RCRA—Resource Conservation and Recovery Act
 RIA—Regulatory Impact Analysis
 SDWA—Safe Drinking Water Act
 TC—Toxicity Characteristic
 TCLP—Toxicity Characteristic Leaching Procedure
 TRI—Toxic Release Inventory
 UIC—Underground Injection Control
 UTS—Universal Treatment Standards

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I. Background

A. Summary of the Statutory Requirements of the 1984 Hazardous and Solid Waste Amendments, and Requirements of the 1993 Proposed Consent Decree With the Environmental Defense Fund

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 for legal land disposal: 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. 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).

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 (RCRA sections 3004(d), (e), and (g)), a task EPA completed within the statutory timeframes. EPA was 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 for all of the wastes identified or listed after the 1984 amendments. As a result, a suit was filed by the Environmental Defense Fund (EDF). EPA and EDF signed a consent decree that establishes a schedule for adopting prohibitions and treatment standards for newly identified and listed wastes. (*EDF v. Reilly*, Cir. No. 89-0598, D.D.C.) This proposed consent decree was modified as a result of the court decision on the Third Third final rule (*Chemical Waste Management v. EPA*, 976 F. 2d 2 (D.C. Cir. 1992), cert. denied 113 S. Ct. 1961 (1993); hereafter referred to as *CWM v. EPA*, or the *Third Third opinion*). Today's proposed rule fulfills several provisions of the proposed consent decree. The rule proposes land disposal restrictions for characteristic hazardous wastes managed in CWA and CWA-equivalent treatment systems, and injected into underground injection control (UIC) Class I nonhazardous injection wells regulated under the SDWA. Today's rule also proposes treatment standards for carbamate and organobromine wastes. The rule also proposes treatment standards for newly listed spent aluminum potliners (K088), which according to the proposed consent decree need not be proposed until June 30, 1995.

B. Summary of the D.C. Circuit's Opinion on the Third Third Standards for Ignitable, Corrosive, Reactive, and Toxic Characteristic Wastes and EPA's Implementation of the Opinion to Date

Characteristic hazardous wastes that are treated or diluted such that they no longer exhibit the hazardous characteristic are no longer subject to RCRA Subtitle C management standards, and thus may be discharged into units that are not subject to the stringent RCRA Subtitle C standards, such as UIC wells. In *CWM v. EPA*, 976 F.2d 2 (D.C. Cir. 1992), the U.S. Court of Appeals for the D.C. Circuit interpreted RCRA section 3004(m) as requiring treatment of underlying hazardous constituents in decharacterized hazardous wastes so as to minimize threats to human health and the environment. As yet, the Agency has not set minimize threat levels under RCRA and therefore must require treatment.

However, the Agency has a process to set levels under the Hazardous Waste Identification Rule (HWIR). If risk-based minimize threat levels are established under HWIR, these levels would implement section 3004(m) and consequently supersede the technology-based treatment standards presently

utilized. See HWTC III, 886 F. 2d at 362-63. Wastes treated to these levels also would not be classified as hazardous wastes and consequently could be disposed in units not subject to subtitle C standards (e.g., landfills not receiving federal permits.) EPA has lodged a proposed consent decree with the U.S. District Court to propose the HWIR levels not later than August 15, 1995, and finalize by December 15, 1996. As was previously mentioned, the Agency entered into a consent decree setting out a schedule for fulfilling the court's mandate for the wastes addressed in today's rule. This consent decree requires the Agency to set treatment standards for these wastes before the HWIR rulemaking.

That being said, the risks addressed by this rule, particularly UIC wells, are very small relative to the risks presented by other environmental conditions or situations. In a time of limited resources, common sense dictates that we deal with higher risk activities first, a principle on which EPA, members of the regulated community, and the public can all agree.

Nevertheless, the Agency is required to set treatment standards for these relatively low risk wastes and disposal practices during the next two years, although there are other actions and projects with which the Agency could provide greater protection of human health and the environment. At the same time, however, EPA has sought to exercise the full extent of its authority under current law to develop innovative options designed to significantly lower the potential cost of these controls while ensuring protectiveness, such as giving credit for up-stream reductions in hazardous constituents, and crafting limited exemptions for wastewaters containing *de minimis* amounts of hazardous constituents. Through the public comment process and further consultation with stakeholders, EPA expects to obtain guidance for any future action we may take.

A detailed discussion of the Agency's interpretation of the opinion in *CWM v. EPA* is provided in the next section. For background information on the relevant portions of the Third Third final rule (i.e., the treatment standards promulgated for hazardous wastes exhibiting the characteristics of ignitability, corrosivity, reactivity, or Extraction Procedure (EP) toxicity), see 55 FR 22653-22659 (June 1, 1990).

The Agency's immediate response following issuance of the opinion can be found in the January 19, 1993 Supplemental Information Report to the Notice of Data Availability (58 FR 4972). This report sets out the Agency's

options for complying with the court's decision. The options discussed in this report applied to reactive, as well as ignitable and corrosive wastes, since EPA knows of no inherent differences among these wastes with respect to propensity to contain hazardous constituents.

1. Summary of the Third Third Standards

On May 8, 1990, EPA promulgated regulations addressing the last of five congressionally-mandated prohibitions on land disposal of hazardous wastes, which was the third one-third of the schedule of restricted hazardous wastes, referred to as the Third Third. Among other things, the Third Third final rule promulgated treatment standards and prohibition effective dates 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 Third Third rule established treatment standards for the characteristic wastes in one of four forms: (1) a concentration level equal to, or greater than, the characteristic level; (2) a concentration level less than the characteristic level; (3) a specified treatment technology (e.g., for ignitable wastes containing high levels of total organic carbon); and (4) a treatment standard of "deactivation" which allowed the use of any technology, including dilution, to remove the characteristic.

The Agency also evaluated the applicability of certain provisions of the land disposal restrictions' framework with respect to characteristic wastes, including wastes regulated under the National Pollutant Discharge Elimination System (NPDES) or pretreatment programs under sections 402 and 307(b) of the CWA and the SDWA UIC programs to try to ensure successful integration of these programs with the regulations being promulgated under RCRA. See generally 55 FR 22653-59 (June 1, 1990). Specifically, the Agency considered the appropriateness of the dilution prohibition for each of the characteristic waste streams, and the applicability of treatment standards expressed as specified methods.

The Agency found, generally, that mixing waste streams to eliminate certain characteristics was appropriate and permissible for corrosive wastewaters, or in some cases, reactive or ignitable wastewaters. Furthermore, EPA stated that the dilution prohibition did not normally apply to characteristic wastewaters that are managed in treatment trains including surface impoundments whose ultimate

discharge is regulated under the pretreatment and NPDES programs under sections 307(b) and 402 of the CWA, or in Class I underground injection well systems regulated under the SDWA. The Agency stated that the treatment requirements and associated dilution rules under the CWA are generally consistent with the dilution rules under RCRA, and that the Agency should rely on the existing CWA provisions. The Agency also singled out certain particularly toxic wastewaters to which the dilution prohibition still applies notwithstanding management in CWA systems. 40 CFR 268.3(b).

Similarly, EPA stated that a regulatory program had been established under the SDWA to prevent underground injection which endangers drinking water sources. Class I deep wells inject below the lowermost geologic formation containing an underground drinking water source and are subject to federal location, construction, and operation requirements. The Agency stated that application of the dilution rules to these wastes would not provide further protection to human health and the environment, and that disposal of these wastes by underground injection at the characteristic levels was as sound a practice as treating them.

2. The Court's Decision

On September 25, 1992, the United States Court of Appeals for the District of Columbia Circuit ruled on the various petitions for review. The principal holdings of the case with respect to characteristic wastes are that: (1) EPA may require treatment under RCRA section 3004(m) to more stringent levels than those at which wastes are identified as hazardous, 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, and consequently must result in destruction and removal of hazardous constituents 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 Class I nonhazardous injection wells) are legal only if it can be demonstrated that hazardous

constituents are reduced or destroyed to the same extent 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 standard for ignitable and corrosive wastes did not fully comply with RCRA section 3004(m). This was because that standard could be achieved by dilution, and dilution fails to destroy or remove the hazardous constituents that can be present in the wastes. *Id.* (A more detailed analysis of the D.C. Circuit's *Third Third opinion* is found in section II of this notice.)

3. Options Prepared for the Notice of Data Availability

On January 19, 1993, EPA published a Notice of Data Availability to solicit as many comments as possible on all issues in the court opinion (58 FR 4972). The Agency prepared a Supplemental Information Report that was distributed to the public that set out the Agency's options for complying with the court's decision. The options discussed in this report applied to reactive, as well as ignitable and corrosive wastes, since EPA knows of no inherent differences among these wastes with respect to propensity to contain hazardous constituents.

The report included options for establishing treatment standards for the underlying hazardous constituents in ignitable, corrosive and reactive (ICR) wastes that would have to be met prior to land disposal (including disposal in UIC wells). (It should be noted that the Agency also believes that underlying hazardous constituents can be present in wastes displaying the toxicity characteristic.) Two approaches were set out, along with the Agency's views on possible advantages and disadvantages of each.

Under approach one, the Agency discussed the possibility of adopting concentration limits for underlying hazardous constituents. Under approach two, the Agency discussed specifying required treatment technologies. The Agency discussed how these possible approaches might apply to ICR wastes that are not managed in CWA centralized wastewater treatment systems. Furthermore, the applicability of LDR treatment standards to CWA facilities, and possible implementation scenarios under the CWA, were also discussed.

The Agency also discussed options for how to determine the equivalency of CWA treatment systems with treatment under RCRA. The "equivalency" discussion included possible options for addressing air emissions, leaks, and

sludges from CWA treatment surface impoundments. Also mentioned were other Agency efforts such as the Hazardous Organic NESHAPs (HON) (59 FR 19402, April 22, 1994) developed by the Office of Air. These options will be developed in a later LDR rulemaking, but are discussed here and elsewhere in this preamble in order to inform and gather comments from all potentially affected persons.

Approximately 60 public comments were received in response to the Notice of Data Availability. Those that pertain to establishing treatment standards for characteristic waste managed in CWA, CWA-equivalent, and Class I nonhazardous UIC wells have been considered as this proposed rule was developed.

4. Contents of the Interim Final Rule

EPA issued an interim final rule on May 24, 1993 (58 FR 29860) to address those treatment standards that were vacated (as opposed to remanded) by the court. Today's rule proposes treatment standards for some of the portions of the rule that were remanded. The distinction between vacated and remanded rules is that vacated rules are no longer in effect after the court's mandate issues, whereas remanded rules remain in force until the Agency acts to replace them.

The Agency's opinion at that time was that 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 not managed in the types of centralized wastewater management systems covered by the remanded rules cited above.

The Agency thus promulgated revised treatment standards for certain ignitable and corrosive wastes that are managed in systems other than those managed: (1) In centralized wastewater treatment systems subject to the CWA or in Class I underground injection wells subject to the SDWA UIC program; or, (2) by a zero discharger with a wastewater treatment system equivalent to that utilized by CWA dischargers prior to land disposal. The treatment standards retained the requirement of deactivation to remove the hazardous characteristic (see DEACT in Table 1, 40 CFR 268.42); however, the rule also set numerical treatment standards for the underlying hazardous

constituents that could reasonably be expected to be present in the wastes. EPA also promulgated alternative treatment standards of incineration, fuel substitution, and recovery of organics for ignitable wastes. In addition, EPA established new precautionary measures to prevent emissions of volatile organic constituents or violent reactions during the process of diluting ignitable and reactive wastes.

5. Regulation of Toxicity Characteristic (TC) Wastes in the LDR Phase II Rule

On March 29, 1990, EPA promulgated a rule that identified organic constituents (in addition to existing EP metals and pesticide 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 were "newly identified wastes" for purposes of the LDR program. Included are wastes identified with the codes D012 through D043 based on the Toxicity Characteristic Leaching Procedure (TCLP), i.e., TC wastes. In the LDR Phase II final rule (59 FR 47982, September 19, 1994), EPA established treatment standards for each of these constituents if they are managed in systems other than those regulated under the CWA, those engaging in CWA-equivalent treatment prior to land disposal, and those injected into Class I deep injection wells regulated under the SDWA. In addition, because wastes exhibiting the TC can contain treatable levels of other hazardous constituents, EPA established treatment standards for the underlying hazardous constituents reasonably expected to be present in the waste. These rules are consistent with the Third Third opinion and adopt the same approach as the May 24, 1993 interim final rule.

Furthermore, as part of a regulatory response to implement the court's ruling, EPA required in the LDR Phase II final rule that hazardous constituents in two types of characteristic wastes—high total organic carbon (TOC) ignitable liquids (D001) and halogenated pesticide wastes that exhibit the toxicity characteristic (D012–D017)—be fully treated before those wastes are disposed into any Class I nonhazardous injection well that does not have a no-migration variance. See 59 FR at 48013. Therefore, these wastes can no longer be legally diluted to remove the characteristic and then be injected into Class I nonhazardous injection wells.

6. Requirements of 1993 Settlement Agreement With CWM, et al.

This proposed rule continues to fulfill the requirements of the settlement agreement with the petitioners in *CWM v. EPA*. Today's rule proposes concentration-based treatment standards for the underlying hazardous constituents reasonably expected to be present in ignitable, corrosive, reactive and TC wastes managed in CWA and CWA-equivalent treatment systems, and injected into UIC Class I nonhazardous injection wells regulated under the SDWA. The settlement agreement calls for developing standards for ignitable and corrosive wastes only; however, the Agency believes that underlying hazardous constituents may also be present in reactive and toxic wastes, and is therefore proposing regulations for these wastestreams as well.

Today's rule also complies with the settlement agreement by describing and discussing the following option for implementing the opinion: the identification of underlying hazardous constituents that are not amenable to treatment in certain CWA centralized treatment systems, and the subsequent prohibition on the introduction of such nonamenable wastes into such systems.

II. EPA's Interpretation of the Third Third Opinion

EPA's action in this rulemaking is taken to implement key portions of the court's mandate in *CWM v. EPA*, the opinion vacating and remanding (among other things) EPA's rules allowing treatment standards for hazardous constituents in characteristic hazardous wastes to be achieved solely by diluting these constituents. EPA's initial view of the opinion is that it interprets the statute to require that hazardous constituents present in hazardous wastes at concentrations exceeding a minimize threat level to be treated so that they are destroyed, removed, or immobilized before the waste is land disposed. Some commenters to the May 24, 1993 interim final rule and the LDR Phase II proposed rule, however, have argued that dilution nevertheless can be utilized as the sole means of treating characteristic hazardous wastes, if dilution reduces hazardous constituent concentration levels to levels reflecting either performance of Best Demonstrated Available Technology (BDAT) or minimize threat levels. This argument is based largely on language in the court's opinion that treatment of hazardous constituents is required if, after dilution, hazardous constituents are present in concentrations sufficient to pose a threat to human health and the

environment. See, e.g., 976 F.2d at 7, 17, 18, 19-20, 23. Some commenters have added the further argument that section 3004(m) requires that treatment "substantially reduce the toxicity of the waste", which is accomplished when dilution lowers hazardous constituents to BDAT levels.

If these arguments were accepted, it would mean that characteristic wastes could be disposed after dilution, without further treatment of hazardous constituents, provided sufficient dilution had occurred. Although this argument has been made chiefly by representatives of facilities engaged in underground injection, the argument is not limited to the injection context, or even to the context of characteristic wastes. Thus, if EPA accepted this argument, it would mean that any hazardous waste could be land disposed into any type of land disposal unit provided the waste was sufficiently diluted before land disposal, notwithstanding that the same volume of hazardous constituents as in the initial waste would be land disposed.

EPA does not accept this interpretation of the court's opinion or of the statute. In the Agency's view, the statute and opinion are best interpreted by requiring hazardous constituents in hazardous wastes to be treated so that hazardous constituents are destroyed, removed, or immobilized before land disposal. The Agency's basis for this conclusion is set out below.

A. Statutory Language

Section 3004(m)(1) requires EPA to establish, as a precondition to land disposal of hazardous waste, treatment standards "which 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." Although the first prong of the test—"substantially diminish the toxicity of the waste"—conceivably is satisfied by dilution,¹ the treatment must not only diminish the waste's toxicity but also do so in a manner that minimizes short-term and long-term harms to human health and the environment.²

¹ If, for example, a wastewater starts out with cadmium concentrations exceeding 100 mg/l and is diluted so that cadmium is present at concentrations below the MCL of 0.1 mg/l, the toxicity of the waste has been diminished.

² "Treatment is required not only for purposes of protecting against the short-term or acute risks associated with the land disposal of hazardous wastes, but more importantly focuses on the long-term hazards associated with migration of the wastes and subsequent contamination of ground or surface water." 130 Cong. Rec. S9178 (July 25,

Furthermore, although EPA has maintained that "minimization" of threats does not necessarily require elimination of all possible hazards (see, e.g., 55 FR 6641 and n.1 (February 26, 1990)), the phrase certainly requires something more substantial than merely diluting hazardous constituents.

Allowing the waste's toxicity to be diminished solely by dilution also is at odds with RCRA's enumerated goals and policies. Congress prohibited land disposal of hazardous waste because of "long-term uncertainties associated with land disposal",³ and persistence, toxicity, mobility, and propensity to bioaccumulate" of hazardous constituents in the waste. Sections 3004 (d)(1), (e)(1), (g)(5); *Hazardous Waste Treatment Council v. EPA*, 886 F. 2d 1355, 1362-63 (D.C. Cir. 1989), cert. denied 111 S. Ct. 139 (1990) (upholding technology-based treatment standards due to the uncertainties inherent in determining when land disposal is protective). Land disposal of untreated hazardous waste is only allowed in "protective" land disposal units, defined as meaning units from which no hazardous constituents will migrate for as long as the waste remains hazardous—to be demonstrated "to a reasonable degree of certainty". Sections 3004 (d)(1), (e)(1), (g)(5). Allowing dilution of hazardous constituents fails to take account of these long-term uncertainties, propensity to bioaccumulate, and the like. As a result, it arguably fails to minimize long-term threats posed by the wastes.

Another provision indicating that Congress did not intend for dilution to be a means of treating toxic hazardous wastes is section 3004(h). Congress, in sections 3004(h) (2) and (3), authorized EPA to postpone LDR prohibition effective dates for up to two years (renewable for up to two additional years for individual facilities) if there is inadequate available treatment capacity for a particular waste. This provision would not have been necessary if dilution could be used as a means of treatment, since it would never take two years (or longer) for a facility to develop the means (i.e. adding dirt or water) of diluting wastes to meet a treatment standard.

1984) (Statement of Sen. Chaffee introducing the amendment that became section 3004(m))

³ See also section 1002(b)(7) which states that "certain classes of land disposal facilities are not capable of assuring long-term containment of certain hazardous wastes, and to avoid substantial risk to human health and the environment, reliance on land disposal should be minimized or eliminated * * *".

B. Legislative History

The legislative history states that dilution is not to be allowed as a means of treating hazardous constituents. See S. Rep. No. 284, 98th Cong. 2d sess. 17, which states that "(t)he dilution of wastes by the addition of other hazardous wastes or any other materials during waste handling, transportation, treatment, or storage is not an acceptable method of treatment to reduce the concentration of hazardous constituents. Only dilution which occurs as a normal part of the process that results in the waste can be taken into account in establishing concentration levels."⁴ The House Report is similarly explicit.⁵ The Conference Report similarly states that "the Conferees intend that through the vigorous implementation of the objectives of this Act, land disposal will be eliminated for many wastes and minimized for all others, and that advanced treatment, recycling, incineration and other hazardous waste control technologies should replace land disposal." H. Rep. No. 1133, 98th Cong. 2d sess. 80.

Other legislative history indicates that Congress intended for EPA to adopt technology-based treatment standards: "The requisite levels o(r) methods of treatment established by the Agency should be the best that has (sic) been demonstrated to be achievable. This does not require a BAT-type process

⁴ The final sentence undoubtedly refers to situations where dilution occurs as part of the manufacturing process that generates the waste (see House Report quoted in the next footnote), not to dilution that occurs once the waste is generated.

This legislative history was to a bill containing the predecessor provision to section 3004(m). The critical provision would have mandated treatment only of hazardous wastes containing significant concentrations of hazardous constituents, and required treatment to levels that would be "protective", defined as satisfying the no-migration test. EPA does not view these differences as being critically different from the enacted section 3004(m), and so views the Senate legislative history as being relevant to ascertaining Congressional intent regarding dilution of hazardous constituents as a means of achieving treatment standards.

⁵ "The Committee intends that dilution to a concentration less than the specified thresholds by the addition of other hazardous waste or any other material during waste handling, transportation, treatment, or storage, other than dilution which occurs as a normal part of a manufacturing process, will not be allowed. Such hazardous waste would still be prohibited from land disposal." H. Rep. No. 198, 98th Cong. 1st sess. 34; see also *id.* at 38 ("(t)he Administrator may also impose limitations on the use of waste dilution to avoid disposal restrictions. The late (sic) is particularly important where regulations are based on concentrations of hazardous constituents.")

The House Bill did not expressly require pretreatment before disposal, the scheme of the enacted law, but nevertheless illuminates Congressional intent not to allow dilution as a means of treating hazardous constituents.

* * *. The intent here is to require utilization of available technology in lieu of continued land disposal without prior treatment." 130 Cong. Rec. S 9178 (daily ed. July 25, 1984) (statement of Sen. Chaffee introducing the amendment that became section 3004(m)); see also 130 Cong. Rec. 20803 (1984 (statement of Sen. Moynihan on section 3004(m)): "The requisite levels o(r) methods of treatment established by the Agency should be the best that has been demonstrated to be achievable." The legislative history also indicates that Congress intended treatment to result in destruction of total cyanide and organic hazardous constituents. 130 Cong. Rec. S 9178 (statement of Sen. Chaffee). Dilution of hazardous constituents, of course, is not BDAT, and does not destroy or remove hazardous constituents.

The legislative history consequently strongly supports reading section 3004(m) as not allowing dilution of hazardous constituents.

C. Judicial Opinions

The D.C. Circuit's position in the Third Third opinion is potentially contradictory on this point. At points in the opinion, as noted above, this court states that dilution could satisfy section 3004(m) requirements, perhaps even for hazardous constituents. Elsewhere, however, the court unequivocally stated that dilution does not satisfy section 3004(m) because hazardous constituents are not destroyed, removed, or immobilized:

We wish to make explicit the impact of our holding * * *. First, where dilution to remove the characteristic meets the definition of treatment under section 3004(m)(1), nothing more is required. Second, where dilution removes the characteristic but does not "treat" the waste by reducing the toxicity of hazardous constituents, then the decharacterized waste may be placed in a surface impoundment if and only if the resulting CWA treatment fully complies with RCRA section 3004(m)(l).

In other words, the material that comes out of CWA treatment facilities that employ surface impoundments must remove the hazardous constituents to the same extent that any other treatment facility that complies with RCRA does. 976 F. 2d at 23. Dilution thus cannot be used as the sole means of treating hazardous constituents because it does not remove hazardous constituents from the waste. The court made this explicit in a footnote quantifying the above-quoted passage:

To illustrate RCRA's focus on treatment of the hazardous constituents in a waste, consider a waste stream hazardous by characteristic for cadmium. Both the

characteristic and treatment levels for the hazardous waste are 1.0 mg/l. Assume that a stream of 3.0 mg/l daily deposits 1000 liters into a treatment facility. A RCRA treatment facility would remove at least 2000 mg of cadmium from the waste stream. A CWA must do the same—although to do so it will have to process at least three times as much water (because dilution of 1000 liters of 3.0 mg/l to just below the characteristic level will yield just over 3000 liters). Allowing dilution alone would decharacterize the waste, but it would not reduce the total amount of cadmium entering the environment. 976 F.2d at 23 n. 8.

Applying this same standard to injection of decharacterized wastewaters into Class I nonhazardous injection wells, the court stated:

(We hold that dilution followed by injection into a deep well is permissible only where dilution itself fully meets section 3004(m)(l) standards or where the waste will subsequently meet section 3004(m)(l) standards. Because deep well injection is permanent land disposal, our holding in effect permits diluted decharacterized wastes to be deep well injected only when dilution meets the section 3004(m)(l) standard or where the deep well secures a no-migration variance. 976 F.2d at 25. This means that “any hazardous waste (must) be treated in such a way that hazardous constituents are removed from the waste before it enters the environment.” 976 F.2d at 24 (emphasis added). Since injection wells are disposal units and do not engage in treatment, they are incapable of satisfying this standard. *Id.* at 25.

EPA believes that the thrust of the opinion is to require treatment of hazardous constituents before land disposal. The court’s explicit and quantified insistence that treatment standards are to reduce mass loadings of hazardous constituents makes this clear. If the court intended to allow dilution as the sole means of treating hazardous constituents, it would at least have discussed how this squared with statutory language, goals and objectives, and legislative history. Thus, the Agency does not accept the commenters’ reading of the opinion. Today’s rule consequently proposes that prohibited, decharacterized wastes be treated so that underlying hazardous constituents are removed, destroyed, or immobilized before final disposal into the environment.

III. Integration of BDAT With Other Agency Actions

As EPA makes decisions in this LDR Phase III rule on so-called end-of-pipe equivalence for direct and indirect dischargers treating prohibited, decharacterized wastes in surface impoundments, there are related Agency rulemaking activities warranting mention: The LDR Phase IV rule, which

will consider leaks, sludges, and air emissions from surface impoundments; the Hazardous Waste Identification Rule (HWIR), which provides a risk based assessment of when wastes are hazardous, and may result in capping the extent of treatment of some hazardous constituents; the Pulp and Paper and Pharmaceutical Industries effluent limitations guidelines which affect industries using impoundment-based treatment systems to manage decharacterized wastes; and rules for control of hazardous air pollutants issued under the Clean Air Act (CAA), which regulate similar air emissions. These interrelationships are explored below, so that the public can be made aware of how future regulations may impact decisions to be made in response to this rule. Comments and data are requested on the LDR Phase IV options discussed in this part.

A. Phase IV LDRs—Cross-Media Transfer and Equivalency Issues

1. Cross-Media Implications

The LDR Phase IV rule will consider equivalent treatment for centralized wastewater treatment systems with impoundments managing wastewaters that are decharacterized. The principle potentially at issue is the transfer of pollutants from one media to another without being destroyed, removed, or immobilized. Treatment of the wastewaters transfers the pollutants, to groundwater from leaks, or to the air. The transfer of pollutants from one media to another is an Agency-wide concern. The environment is not well served by piecemeal regulation which simply transfers pollutants, nor is industry well-served by piecemeal regulation. The Agency’s preference is to look at these situations holistically so that pollutants are not simply transferred, and so that the Agency provides industry with a coordinated understanding of the “environmental requirements” for all media. How the Agency pursues this preference has not been decided, but the following discussion outlines some of the issues being examined.

2. Background of Equivalency Issues EPA is Considering for LDR Phase IV

EPA is considering, in addition to evaluating equivalence at the point of ultimate discharge to surface waters or to a Publicly-Owned Treatment Works (POTWs) (“end-of-pipe equivalence”), conditions for determining equivalence of treatment for decharacterized wastes managed in nonhazardous waste (subtitle D) surface impoundments which would involve consideration of

whether treatment is not equivalent due to cross-media transfers of untreated hazardous constituents. In evaluating the above approaches, EPA is looking both at RCRA and other Agency authorities and programs that would ensure protection and provide control equivalent to RCRA.

The Agency has not made any determination as to the best manner to implement the standard enunciated in the opinion. It is certain that the opinion requires at least a demonstration of end-of-pipe equivalence, which will be accomplished when the treatment standards in today’s proposed rule are finalized. Whether it requires more is unclear. The opinion appears to focus on treatment of wastewaters. For example, the court stated “treatment of solid wastes in a CWA surface impoundment must meet RCRA requirements prior to ultimate discharge into waters of the United States or publicly owned treatment works * * *.” 976 F.2d at 20, emphasis added). See also *id.* at 7, 20 (focus on treatment of waste “streams”, i.e. the liquids in the impoundment); 23 n. 8 (reduction of mass loadings of hazardous constituents of waste stream entering and exiting an impoundment); 24 (court indicates that decharacterized wastes are not held permanently in impoundments, a statement that is uniformly correct for wastewaters but not wastewater treatment sludges); 24 (court focuses on treatment of “liquids” in impoundments). At one point, the court also noted, in distinguishing between subtitle C and subtitle D surface impoundments, that sludges in subtitle C impoundments require further management in accord with subtitle C, *id.* at 24, n. 10, perhaps suggesting by negative implication that sludges in subtitle D impoundments do not.

Equally important, the court held that “RCRA requires some accommodation with (the) CWA”, *id.* at 20, see also *id.* at 23, indicating that to some degree RCRA need not mandate a wholesale disruption of existing wastewater treatment impoundments, provided the CWA treatment system really achieves treatment equivalent to RCRA section 3004(m) treatment: “In other words, what leaves a CWA treatment facility can be no more toxic than if the waste streams were individually treated pursuant to the RCRA treatment standards.” *Id.*

On the other hand, the opinion can be read more broadly to encompass requirements respecting surface impoundment integrity. The court’s fundamental concern with dilution, echoing the requirements of section

3004(m), is that dilution does not reduce or destroy hazardous constituents, and thus does not prevent those constituents from entering the environment. *Id.* at 22, 24, 29–30; see also *id.* at 23 n. 8 stressing the court's holding that total mass loadings of pollutants "entering the environment" must be reduced in order to comply with section 3004(m).

Moreover, the court distinguished a number of times between temporary placement of diluted wastes in impoundments for treatment and permanent disposal in land disposal units, stating that only the temporary placement represents a satisfactory accommodation between RCRA and the CWA. *Id.* at 24, 25. To the extent hazardous constituents leak or volatilize from impoundments, it can be argued that permanent disposal of untreated hazardous constituents is occurring.

The schedule for issuing the LDR Phase III and IV rules are both subject to settlement agreement, and, according to the schedule established by these settlement agreements, will be proposed only six months apart. Therefore, industry will be able to evaluate the LDR Phase III proposed end-of-pipe equivalency requirements while keeping in mind the upcoming LDR Phase IV rule which must consider sludges, leaks, and air emissions from treatment surface impoundments. The Agency has not yet decided how to pursue the potential equivalency issues related to sludges, leaks, or air emissions; however, the Agency is taking this opportunity to discuss the issues and potential options in these three areas. Furthermore, the Agency solicits data characterizing sludges, leaks, and air emissions from surface impoundments,

a. Sludges. Characteristic wastewaters managed in CWA and CWA-equivalent impoundment-based systems invariably are treated to generate a sludge. Under EPA's existing interpretations of the rules, such sludges are usually considered to be prohibited wastes only if they are themselves hazardous. 55 FR at 22661. This is because generation of a new treatability group is considered to be a new point of generation for purposes of determining where LDR prohibitions attach. The Agency has not determined whether the court decision could or should be read to invalidate this interpretation (although the Agency adopted a "waste code carry through" approach for the characteristic wastes addressed in the emergency interim final rule). This will be an issue that must be resolved in the LDR Phase IV rule.

In addressing this issue, it should be noted that the LDR treatment standards

for nonwastewaters and wastewaters are by now well established. There are 521 hazardous waste codes subject to LDR technology-based treatment standards. In instances where analytical methods are available, these hazardous wastes are subject to UTS that were promulgated in the LDR Phase II final rule (UTS are, however, based on treatment standards that have been in effect, in some cases, since 1986 and thus are well established). While no decision has been made on whether to regulate these sludges, if the Agency decides to control sludges from CWA and CWA-equivalent surface impoundments, the treatment standards (UTS levels) are already in place.

EPA believes that the likely impact of such an approach would be mixed—that is, some facilities will continue to use surface impoundments and remove and treat the sludge, if necessary, while others will move away from the use of surface impoundments. For example, aggressive biological treatment, such as that typically used by the petroleum refining industry, may achieve UTS levels as generated. Sludges from primary treatment in surface impoundments are more likely to exceed UTS levels. If the Agency decides to control sludges, such an approach may impose significant costs on the facility. Subjecting sludges to UTS may encourage pollution prevention and recycling alternatives to be used prior to placement of wastes in the impoundment, so that sludge treatment standards are not triggered. Comments are solicited on these issues.

b. Leaking Surface Impoundments. While hazardous wastes entering surface impoundments constitute temporary land disposal (because they are being placed there for treatment), leaks from such impoundments constitute permanent land disposal. Such permanent land disposal was clearly a concern of the court. 976 F. 2d at 25–6.

The Agency is considering the following additional controls if the decision is made to address leaking surface impoundments:

EPA already has UTS limits that could be applied to the influent into the surface impoundment when it is determined that it leaks underlying hazardous constituents at levels above UTS. Applying UTS to the influent would assure that only wastes that have been treated in a manner equivalent to RCRA treatment are land disposed.

EPA is also considering applying some of the subtitle D municipal solid waste landfill criteria to address leaking surface impoundments (Municipal Landfill Rule (56 FR 50978, October 9,

1991). The impacts of such an approach on aggressive biological surface impoundments may not be significant. On the other hand, facilities with leaking impoundments engaged in primary treatment could have to perform some type of action such as retrofitting, remediating groundwater, or switching to tank treatment.

A third option being considered is using triggering controls based on the potential risk of any leak. The Agency could require as a performance standard that owners demonstrate that the expected leaks would pose a low level of risk to nearby receptors. Facilities would have the flexibility to change the influent, install engineering controls, or limit potential exposure in order to comply with this performance standard.

c. Air Emissions. Achieving wastewater or nonwastewater standards by merely transferring hazardous constituents to the air may be inconsistent with the court opinion in that excessive, uncontrolled volatilization could be viewed as unequivalent treatment, or unsafe treatment conditions. For example, treatment of volatile organic compounds in surface impoundments may achieve compliance with a wastewater treatment standard by simply transferring pollutants to the air.

If EPA should determine that the court's opinion should be read to require control of excessive volatilization from impoundments to demonstrate equivalent treatment, one option is deferral to CAA NESHAP standards, such as the Benzene Waste Operations NESHAPs and the HON. The Benzene NESHAPs were promulgated on January 17, 1993, and the HON was promulgated on April 22, 1994 (59 FR 19402). The Agency will explore further whether the CAA standards for hazardous air pollutants provide equivalent protection or control of the hazardous constituents of concern.

Another option is extend the applicability of existing air emission controls in RCRA—the recently promulgated RCRA Air Emission Standards (59 FR 62585 (Dec. 6, 1994)). The RCRA Air Emission Standards are self-implementing and are applicable to 90-day units at hazardous waste generator sites. These standards do not apply to surface impoundments which receive waste that was hazardous at the point of generation but was "decharacterized" (i.e., rendered nonhazardous) before being placed in the surface impoundment.

The approach EPA is considering in the second option is a "target mass removal", which would ensure that hazardous constituents are effectively

removed or destroyed and that standards are not achieved through dilution or air emissions. A key to this approach is that all waste streams commingled with the hazardous waste streams are accounted for, and calculations are made to ensure that dilution is not credited toward achieving the standard. The target mass removal approach is to identify a hazardous waste at its point of generation and determine the mass of hazardous constituents that must be removed to meet UTS. The mass of constituents removed can be calculated by comparing a post-treatment waste determination to the point of generation waste determination. An alternative is to calculate the percent reduction of hazardous constituents that is required to meet the standard, and ensure that associated treatment devices operate at that level of efficiency. Application of this approach could also address the issue of nonamenable waste discussed in Section VI of this preamble. Comments are solicited on the application of this approach.

The likely impacts of establishing air emission requirements are that facilities will pursue pollution prevention, recycling, steam stripping or other treatment to remove volatile organics prior to treatment in surface impoundments. Under this approach, hazardous constituents would either need to be removed prior to entering the surface impoundment, or the impoundment would have to be retrofitted in a way that prevents escape of air emissions.

Comments and data are solicited on options for addressing these three areas of potential cross media transfer from wastewater treatment surface impoundments. Comments and data are also solicited on potential costs and human health benefits.

B. The Hazardous Waste Identification Rule (HWIR)

A recurring concern expressed by many commenters is the relationship between technology-based and risk-based RCRA limits. EPA has established technology-based limits for all LDR rules and will continue to do so in the LDR Phase III rule. The Agency is considering the establishment of risk-based levels, however, under the HWIR that is scheduled to be proposed in the fall of 1995.

The integration of the two approaches could impact how facilities comply with all LDR treatment standards. For example, if the HWIR risk-based limits are determined to minimize threats to human health and the environment, when they are higher than the LDR

standards (less stringent), they will satisfy RCRA section 3004(m) and the waste would not have to be treated to meet the LDR technology-based limits. HWTC III, 886 F. 2d at 362. Integration of the LDR and HWIR will be further addressed in the HWIR rulemaking process.

C. Water Rules—the Pulp and Paper and Pharmaceutical Industries Rules

The LDR Phase III end-of-pipe RCRA wastewater treatment standards (i.e., the standards which will satisfy the end-of-pipe equivalence standard enunciated by the court) being proposed today will be applied at the same location that CWA effluent limitation guidelines and pretreatment standards are currently applied. EPA is currently amending effluent limitation guidelines and standards for two industries that use surface impoundments extensively: the pulp and paper and the pharmaceutical industries. Both of these rules are considering in-process limitations of the highly-volatile constituents.

The combined CWA and CAA Pulp and Paper rule was proposed on December 17, 1993 (58 FR 66077). The Pharmaceutical Industry effluent guidelines are scheduled to be proposed by February 1995. One key issue, with respect to both of these industry categories, is the timing of these amended effluent guidelines and standards in relation to promulgation of LDR Phase III standards. EPA believes that these amended guidelines and standards should establish end-of-pipe equivalence. However, these amended rules may not be promulgated or effective until after this LDR Phase III rule takes effect. For reasons discussed later in today's preamble, however, EPA is proposing to wait until the amended rules for these industrial categories take effect before establishing end-of-pipe equivalence standards for these industries.

IV. End-of-Pipe Treatment Standards

A. EPA's General Approach to Setting Treatment Standards and Its Relation to the End-of-Pipe Standards Proposed Today

In the recently-promulgated LDR Phase II rule, EPA significantly simplified the existing treatment standards by adopting Universal Treatment Standards (UTS). 59 FR 47982 (September 19, 1994). These standards apply the same concentration limit for the same constituent in all prohibited wastes. The Agency believes these standards are typically achievable for all prohibited wastes, and greatly improve the implementation of the LDR

program by reducing the numbers of different treatment standards from thousands to essentially one per constituent.

That being said, however, the Agency is nevertheless proposing today that UTS not apply to hazardous constituents in decharacterized wastewaters discharged by CWA facilities subject to the rule so long as the facility is subject to an appropriate CWA technology-based or water quality-based standard or limitation for that hazardous constituent. As explained more fully in section B below, the Agency believes that such CWA limitations and standards satisfy RCRA section 3004(m) requirements and therefore that the best means of integrating RCRA and CWA requirements is to have the CWA limitation or standard be the RCRA treatment standard as well. This choice by the Agency, should it be finalized, should not be viewed as any retreat from general applicability of UTS. Indeed, as proposed elsewhere in this preamble, EPA is proposing to apply UTS to various newly identified and listed wastes, as well as to prohibited decharacterized wastes injected into Class I nonhazardous injection wells.

B. End-of-Pipe Treatment Standards for Clean Water Act and Equivalent Wastewater Treatment Systems

As discussed before, EPA must impose treatment standards on wastes that heretofore have not been subject to RCRA regulation. Both RCRA and CWA programs require treatment notification, monitoring, and enforcement; however, they do so using different procedures. This rule proposes an approach, discussed in the following subsections, that integrates requirements under both statutes to the maximum extent possible.

The nonhazardous waste surface impoundments in CWA and CWA-equivalent systems currently have no RCRA permit. For CWA systems, the discharge into navigable waters are subject to a NPDES permit, while discharges to POTWs are subject to pretreatment standards. EPA is today proposing to require that the treatment standard be met at the same point that the NPDES and pretreatment limits are required to be met: Generally, at end-of-pipe. CWA-equivalent systems may be subject to state or local permits, and would be subject to the treatment standards before final discharge to the land.

1. CWA Standards and Limitations as RCRA Section 3004(m) Treatment Standards

RCRA section 1006(b) requires EPA (among other things) to integrate provisions of RCRA and the CWA when implementing RCRA and to avoid duplication to the maximum extent possible with CWA requirements. In keeping with this requirement, EPA is proposing to implement the end-of-pipe equivalency standard in the court's opinion so that a technology-based or water quality-based CWA standard for an underlying hazardous constituent in a CWA facility's discharge will also be considered to be the RCRA BDAT treatment standard for that constituent. (If a CWA standard for an underlying hazardous constituent is not included in the CWA permit, the facility must meet UTS at end-of-pipe. See further discussion in the next subsection.) Consequently, satisfying the CWA standard or limitation for that constituent will also satisfy RCRA. Thus, for example, if a facility managing decharacterized wastes containing benzene has an NPDES permit with a limitation for benzene which reflects Best Available Technology (BAT), that limitation would also satisfy RCRA LDR requirements. In addition, the facility would not be subject to a separately enforceable RCRA standard for benzene. In order to limit the amount of potential administrative duplication, EPA is proposing that the standard remain enforceable only under the Clean Water Act.

EPA is proposing that a technology-based CWA limitation or standard for a hazardous constituent satisfies RCRA because such a limitation or standard best reflects the capability of best treatment technologies to treat a specific industry's wastewater (or, when the limitation is determined by a permit writer using Best Professional Judgment, a specific plant's wastewater). The RCRA UTS for wastewaters were developed by transferring performance data from various industries, and thus EPA need not make that same transfer when industry-specific (or plant-specific) wastewater treatment data is available. (EPA notes, however, that the UTS reflect treatment of wastewater matrices that are particularly difficult to treat, and hence that the Agency's conclusion that these standards are typically achievable is sound.)

It is also reasonable for water quality-based limitations to satisfy RCRA requirements. These limitations must be at least as stringent as the limitations required to implement an existing technology-based standard. (See CWA

section 301(b)(1)(c).) Even where there is no existing BAT limitation for a toxic or nonconventional pollutant, a permit writer must determine whether BAT would be more stringent than the applicable water quality-based limitation, and again, must apply the more stringent of the two potential limitations. (40 CFR 125.3(c)(2).) Consequently, a water quality-based limitation not only reasonably satisfies RCRA section 3004(m) requirements, but can be viewed as a type of site-specific minimize threat level.

If a facility has received a Fundamentally Different Factors (FDF) variance, EPA is proposing that the limitations established by that variance also satisfy RCRA requirements. Limitations established by the FDF variance process are technology-based standards reflecting facility-specific circumstances, and hence can appropriately be viewed as BDAT as well, just as with RCRA treatability variance standards. See 51 FR at 40605 (Nov. 7, 1986).

EPA also believes that there are adequate constraints in the CWA implementing rules to prevent these end-of-pipe standards from being achieved by means of dilution. First, many of the effluent limitation guidelines and standards regulate the mass of pollutants discharged, and thus directly regulate not only the concentration of pollutant discharged but the degree of wastewater flow as well. Where rules are concentration-based, NPDES permit writers can set requirements which preclude excessive water use, and EPA has so instructed permit writers. (See 58 FR 66151, December 17, 1993, encouraging permit writers to estimate reasonable rate of flow per facility and factor that flow limit into the permit.) These permit conditions can take the form of best management practices, explicit mass limitations, and conditions on internal waste streams. 40 CFR 122.44(k); 122.45(f), (g) and (h). Indirect dischargers are also subject to specific CWA dilution rules in both the general pretreatment rules and the Combined Wastestream Formula (as well as through many of the categorical standards). 40 CFR 403.6(d) and (e). Many of the guidelines and standards also preclude addition of stormwater runoff to process wastewater to preclude achieving treatment requirements by means of dilution. The Agency is accordingly of the view that end-of-pipe equivalence would be achieved by treatment that removes or destroys hazardous constituents, as required by section 3004(m). (This discussion, of course, still leaves open the questions,

left for the LDR Phase IV rule, of how existence of leaks, air emissions, or depositions of constituents in sludges affects determinations of equivalent treatment and similar issues.)

With respect to indirect dischargers, EPA is further proposing that national categorical standards or, potentially, plant-specific standards contained in control mechanisms (i.e. contracts between industrial users and the POTW or other governmental entity) satisfy RCRA where these standards reflect pass through findings. If it is found that a particular pollutant/hazardous constituent will not pass through to navigable waters because of efficacious treatment by the POTW, there will be full-scale treatment of the pollutant/hazardous constituent before its final release into the environment. EPA is proposing that such full-scale treatment satisfies the court's equivalency test. EPA is also proposing to add such pass-through situations as a valid ground for indirect dischargers to obtain a RCRA treatability variance, for the same reasons.

However, the Agency is not proposing that standards based on interference with POTW operations be deemed to also satisfy RCRA requirements. Interference findings reflect the effect the pollutant may have on overall POTW treatment, not necessarily treatment of the particular constituent. Because the relationship of an interference-based standard with treatment of a particular pollutant is tenuous, the Agency does not believe such a standard can be said to be equivalent to RCRA treatment. The Agency solicits comment on the prevalence of interference-based standards.

2. Implementation When CWA Standards and Limitations Will Be the Exclusive Standard

a. Direct Dischargers

EPA is proposing that if a direct discharger subject to this rule (i.e. generating ICRT wastes containing hazardous constituents at concentrations exceeding UTS at the point the wastes are generated and treating those wastes in surface impoundments) has an NPDES permit containing a limitation for that pollutant based on BAT, New Source Performance Standards, or a more stringent water quality standard, or is regulated through controls on an indicator pollutant, then there are no RCRA requirements other than documentary recordkeeping. An indicator pollutant is a pollutant for which control of that pollutant is considered to indicate control of a

specific constituent. For example, total phenols is an indicator for a specific phenol. The Agency solicits comments on specific circumstances where a pollutant is an indicator of a specific underlying hazardous constituent.

If the existing NPDES permit either does not contain a limitation for the pollutant or does not regulate the pollutant through an indicator, a facility would have several choices. It could do nothing, in which case the hazardous constituent would be subject to the UTS, and compliance would be monitored at end-of-pipe (unless the facility chooses to segregate the wastestreams for treatment, in which case compliance would be measured in the segregated stream after treatment). These standards would be implemented by rule, and thus would not be embodied in a permit. Enforcement would be solely under RCRA.

In the alternative, a facility could seek amendment of its NPDES permit pursuant to § 122.62(a)(2), requesting that the applicable permitting authority modify the permit to add limits for the underlying hazardous constituents reflecting BAT for that pollutant at the facility. Assuming proper design and operation of the wastewater treatment technology, a permit writer in such a case could modify the permit to add a limitation for the pollutant based on Best Professional Judgement reflecting actual treatment (40 CFR 125.3(c)). Modification requests would be processed pursuant to the procedures found at § 124.5. The modified permit limitation would be a CWA requirement and enforceable solely under that statute.

A final alternative is for the facility to seek a RCRA treatability variance. EPA is proposing to amend the grounds for granting such a variance to include situations where a facility is treating decharacterized wastes by treatment identified as BAT, the technology is designed and operated properly, but is not achieving the UTS (see proposed amendments to § 268.44(a)). The amendment would also apply to indirect dischargers properly operating technology identified as the basis for their PSES (Pretreatment Standard for Existing Sources) or their PSNS (Pretreatment Standard for New Sources) standard.

b. Indirect Dischargers

The same alternatives exist for indirect dischargers. First, if an underlying hazardous constituent is not regulated nationally by a PSES, PSNS, or by a local limit, and so therefore becomes subject to the UTS for that constituent, that UTS would be enforced

as a RCRA standard. In addition, if there is no pretreatment standard (i.e., PSES/PSNS) for an underlying hazardous constituent, because the Agency determined that there was no pass through, then the RCRA standard for that underlying hazardous constituents does not apply. However, in cases where an underlying hazardous constituent is not already subject to categorical PSES, categorical PSNS, or to a local limit in a control mechanism reflecting PSES or PSNS-level treatment, water quality, or pass through, the control mechanism between the indirect discharger and the applicable control authority would have to be modified in order to avoid application of the UTS by rule. Although procedures for modifying control mechanisms are less institutionalized than those codified for modifying direct dischargers' permits, the Agency initially does not believe this will pose a significant logistical problem because the number of indirect dischargers significantly affected by this rule (i.e. those treating decharacterized wastewaters in surface impoundments before discharge to a POTW where categorical PSES or local limitation does not address a particular hazardous constituent, and discharging greater than *de minimis* levels of hazardous constituents) appears to be small. The Agency continues to solicit information on the number of indirect dischargers so affected, however.

EPA also solicits comment on the best means of applying the equivalency requirement to industries where the Agency is also undertaking significant revisions to applicable CWA requirements on a somewhat slower schedule than this rule. The Agency has in mind particularly the forthcoming amended standards for the pharmaceutical and pulp and paper industrial categories.⁶ Amended BAT/PSES standards for these industries are likely to encompass most or all of the underlying hazardous constituents typically found in these industries' wastewaters, and will reflect EPA's best judgement of the appropriate optimized technology-based controls for those pollutants, as well as the time needed to implement those controls. The Agency's initial preference, in keeping with the requirements of RCRA section 1006, is to wait until those controls are in place before evaluating end-of-pipe equivalency for those industries. The Agency solicits comment on this matter.

⁶The Pharmaceutical Rule is scheduled to be proposed on February 28, 1995; the Pulp and Paper Rule was proposed on December 17, 1993 (58 FR 66077).

Finally, if the facility treats to UTS and does not modify its CWA permit or control mechanism to include a CWA standard/limitation for an underlying hazardous constituent, EPA is proposing minimal record-keeping requirements, under RCRA authority. EPA is proposing that generators can use generator knowledge to identify the underlying hazardous constituents present at the point of generation of the ICRT wastes which are not covered by a CWA limitation and hence must be treated to meet UTS (assuming no permit modification, etc.). Monitoring at potentially hundreds of points of generation would be unnecessarily burdensome and so is not being proposed as a requirement. EPA is proposing that this information be kept on-site in files at the facility. EPA proposes that the facility will then monitor compliance with the UTS standard for each of these constituents at the point of ultimate discharge on a quarterly basis, and that the results of this monitoring also be kept in the facility's on-site files. Monitoring compliance with UTS at the point of discharge provides appropriate assurance of effective treatment. Failure to comply with the RCRA UTS standard must be reported by the facility to the EPA Regional or authorized state RCRA personnel.

Finally, the Agency is proposing to grant a two-year national capacity variance to allow facilities time to repipe and build on-site treatment, or to modify their CWA permit.

EPA is proposing these same requirements for documenting compliance for zero dischargers without NPDES permits who are affected by this rule. The absence of a permit necessitates some alternative means of documenting compliance, and the scheme outlined above seems to be the least burdensome scheme which would still provide a reasonable means of enforcing this rule.

C. Treatment Standards for Class I Nonhazardous Injection Wells

1. Introduction

Generally, facilities injecting decharacterized ICRT wastes into Class I nonhazardous injection wells do not treat their waste beyond removing the characteristic by mixing and diluting, plus some filtering of solids. There are as many as 149 such facilities. The average flow of a typical Class I nonhazardous well is estimated at 107,000 gallons/day. Typically, the volume of the hazardous wastestreams is relatively small (less than 25%) compared to the volumes of

nonhazardous wastestreams being co-injected.

EPA is proposing that these characteristic wastestreams be considered prohibited at the point they are generated. The Agency is further proposing that underlying hazardous constituents in these prohibited wastes be treated to meet UTS levels before the waste is injected. The treatment must destroy, remove, or immobilize the underlying hazardous constituents in the waste that are present in concentrations exceeding UTS at the point the wastes are generated. It may be that in some situations, one type of treatment may pose more risk than another type, notwithstanding that it removes or destroys hazardous constituents to a greater degree. In such cases, facilities may seek a treatability variance to allow the use of the less aggressive treatment technology (assuming such treatment technology satisfies the 3004(m) standard). In such a situation, the technology posing greater risk could be considered to be "not appropriate to the waste," (see 40 CFR 268.44(a)) and a variance could be granted to allow the use of alternative treatment. EPA believes this result satisfies the court's mandate in the Third Third opinion.

EPA believes that the decision in the Third Third opinion necessitates revising the applicability of the 40 CFR Part 148 requirements, Hazardous Waste Injection Restrictions, as they now apply to Class I nonhazardous injection wells. The Agency is clarifying in proposed revisions to 40 CFR 148.1, that owners and operators of Class I nonhazardous wells must determine, under certain circumstances, whether the LDRs now apply to their facilities. Class I wells which inject nonhazardous wastes at the point of injection must now determine if any of these wastes exhibited a characteristic of hazardous waste at the point they were generated. Accordingly, EPA is proposing to amend § 148.1 and redefine the purpose, scope, and applicability of the Part 148 regulations.

To conform with the Court's ruling the Agency is also proposing to include Class I nonhazardous wells within the scope of the dilution prohibition at 40 CFR 148.3. Class I wells thus may not impermissibly dilute their hazardous waste streams in order to substitute for or avoid treatment levels or methods established in the LDRs.

2. Compliance Options for Class I Nonhazardous UIC Wells

In order to comply with today's requirements, facilities could segregate their characteristic streams for separate

treatment. Treatment could occur either on-site or off-site. After the characteristic wastes have been treated to meet UTS, they can be land disposed (either by injection or by some other means). A facility could also treat the aggregated mass of wastewaters (i.e. the commingled characteristic and non-characteristic wastewaters) to meet UTS before injection.

Another option is for the facility to seek a no-migration variance under § 148.20. Thus, EPA is proposing today to amend the provisions under § 148.20 to allow facilities to seek a no-migration variance for their injection well(s). This amendment, however, would simply formalize EPA's existing interpretation that no-migration variances are already available for such wells. See 59 FR at 48013 (September 19, 1994). If these facilities submit a no-migration petition to EPA and effectively demonstrate to EPA that their formerly characteristic wastes (including any hazardous constituents contained in those wastes) will not migrate from the injection zone for 10,000 years or no longer pose any threat to human health and the environment because the wastes are attenuated, transformed, or immobilized by natural means in the injection zone, then they may continue injection without further treatment.

Each no-migration petition has, to date, taken on average 3 years to process. This time may increase if the Agency receives a large number of petitions. EPA continues to emphasize, however, that interested petitioners need not wait for this rule to be promulgated before pursuing the petition process. Petitions for a no-migration variance for Class I nonhazardous wells receiving decharacterized wastes can be received and evaluated now. *Id.*

EPA is also proposing to extend the availability of case-by-case extensions of the effective date to Class I nonhazardous injection facilities for any applicable Part 148 prohibition. Proposed revisions to § 148.1(c)(1) and § 148.4 will allow Class I well owners and operators on a case-specific basis to follow procedures of § 268.5 to receive a one-year extension, renewable for an additional year, from the effective date of the prohibitions, in order to acquire or construct alternative treatment capacity.

EPA today is proposing two other means for facilities with Class I UIC wells to comply with the LDR requirements. The first involves removing the same mass of hazardous constituents from streams to be injected through pollution prevention rather than pre-injection wastewater treatment.

The second involves creating an exception for situations when the characteristic wastestreams make only a de minimis contribution to the waste mixture being injected. These two proposed options are described below in more detail.

3. Pollution Prevention Compliance Option

The D.C. Circuit stressed that the equivalency test, if enunciated, is required to ensure that mass loadings of hazardous constituents to permanent disposal units are reduced to the same extent they would be if a prohibited waste was treated exclusively under a RCRA regime. 976 F. 2d at 23 n. 8. EPA is proposing that these reductions in mass loadings can be achieved by removing hazardous constituents from any of the wastestreams that are going to be injected, and that these reductions in mass loadings can be accomplished by means of pollution prevention.⁷ Thus, if a facility can, for example, make process changes that reduce the mass of cadmium by the same amount that would be removed if the prohibited wastestream was treated to satisfy UTS, the facility would have satisfied LDR requirements. The facility would thus no longer have to demonstrate that it is meeting UTS concentration levels.

Under this option, a hazardous constituent could be removed from either the hazardous or nonhazardous portion of the injectate, and could be removed before a waste is generated. The result would be that the mass loading into the injection unit would be reduced by the same amount as it would be reduced by treatment of the prohibited, characteristic portion of the injectate.

⁷ In a 1992 memorandum from F. Henry Habicht, then EPA Deputy Administrator, and reiterated in a June 15, 1993 memorandum from Carol Browner, EPA Administrator, the Agency has defined pollution prevention as "source reduction" (as defined in the 1990 Pollution Prevention Act (PPA)), and other practices that reduce or eliminate the creation of pollutants through (1) increased efficiency in the use of raw materials, energy, water, or other resources; or (2) protection of natural resources by conservation. The PPA defines "source reduction" to mean any practice which (1) reduces the amount of any hazardous substance, pollutant, or contaminant entering any waste stream or otherwise released into the environment (including fugitive emissions) prior to recycling, treatment, or disposal; (2) reduces the hazards to public health and the environment associated with the release of such substances, pollutants, or contaminants.

"Source reduction" includes: equipment or technology modifications, process or procedure modifications, reformulation or redesign of products, substitution of raw materials, and improvements in housekeeping, maintenance, training, or inventory control. Recycling, energy recovery, treatment, and disposal are not included in the definition of pollution prevention in the PPA.

The mass/day reduction of a particular underlying hazardous constituent can be calculated by comparing the *injected baseline with the allowance*. The injected baseline is determined by multiplying the volume/day of hazardous waste generated (and subsequently injected) times the concentration of hazardous constituents prior to the pollution prevention measure. The allowance is determined by multiplying the volume/day of a hazardous constituent generated/injected times the UTS for that constituent. The difference between the injected baseline and the allowance is the mass/day reduction.

After successful employment of a pollution prevention measure, the facility must demonstrate that the injected mass achieves the required mass/day reduction. The post-pollution prevention measures would be corrected for production variations by multiplying the mass/day reduction times the ratio of the pre-pollution prevention production baseline divided by the production on the day of sampling after the pollution prevention is successfully implemented. A correction for production variations is needed because the amount of an underlying hazardous constituent in the injectate is dependent upon the level of production. If the initial reading is taken on a day of low production, and the post-pollution prevention reading is taken on a day of high production, then without the correction factor the mass/day reduction calculation would be an underestimate.

The following is an example to illustrate this discussion:

Facility X is daily injecting 1 lb. of benzene (an underlying hazardous constituent in a characteristically hazardous wastestream). The mass allowed for benzene (based on the volume of the hazardous wastestream they inject and the UTS for benzene) is 0.3 lbs. Therefore, the mass of benzene that needs to be removed in order for Facility X to be in compliance with the LDR is 0.7 lb.

Facility X decides to use pollution prevention to remove the 0.7 lb. of benzene from their system. Before employing pollution prevention, Facility X monitors and determines that on a day when they produce 10 tons of product, 3 lbs. of benzene is being injected. After employment of pollution prevention, Facility X monitors and determines that 1 lb. of benzene is being injected. On this day of monitoring they are producing 5 tons of product. Therefore: $3 \text{ lbs.} - 1 * (10/5) = 1 \text{ lb.}$ of benzene removed, which means they are in compliance with LDR, since 0.7 lb.

was all that was necessary to be removed.

EPA is proposing that the results of the monitoring of the underlying hazardous constituent concentration and the volume of the hazardous waste stream being injected, both on the day before employment of pollution prevention, and the day after successful employment of pollution prevention, be reported to the EPA Region or authorized State as a one-time notification. The facility will also include in this report a description of the pollution prevention method used. In addition, the facility will monitor and keep on-site records of the results on a quarterly basis. Quarterly monitoring is already required under SDWA regulations (40 CFR 146.13(b)). The reporting requirements for this option will be a one-time notification; however, if the facility changes its pollution prevention method, they must repeat the initial monitoring and notify the EPA Region or authorized State. The Agency is proposing to consider only those pollution prevention measures taken after the date of publication of this proposed rule.

EPA is proposing that, at this time, the pollution prevention alternative as described in this section of the preamble, be available only for facilities using Class I nonhazardous injection wells. EPA is not proposing the same alternative for facilities using surface impoundments because until the LDR Phase IV rules are completed, there will not be a test as to what comprises equivalent treatment at such facilities. That is, before EPA determines how such issues as potential releases to air and groundwater are to be resolved, there is no final equivalency standard for these facilities. It thus appears to EPA to be premature to determine how a pollution prevention alternative would fit into such a scheme. EPA also notes that because surface impoundments can pose particularly adverse environmental risks, see RCRA section 1002(b)(7) and *CWM v. EPA*, 919 F. 2d 158 (D.C. Cir. 1992), the Agency in any case may wish to develop alternative approaches for decharacterized wastes being managed in such units.

EPA also solicits comment on a number of issues relating to this option. The first is comment on using other production parameters besides or in lieu of volume (e.g., mass, square footage, etc.). The second is comment on use of site-specific non-linear production relationships and multiple production factors to deal with potential differences in underlying hazardous constituents produced in the hazardous and

nonhazardous waste streams. Third, EPA solicits comment on whether more than one day is needed for monitoring pre and post-employment of the pollution prevention option (i.e., some pollution prevention methods may require more than one day to show results).

EPA also solicits comment on the best means of ensuring that the mass reductions achieved through this pollution prevention alternative are objectively verifiable and enforceable. In particular, EPA solicits comments on the best means of documenting baseline levels, and whether flow reductions (as opposed to hazardous constituent removal) should be allowed as an exclusive means of obtaining the requisite reductions in mass loadings of hazardous constituents.

Finally, EPA requests comment as to whether it may eventually be possible to implement this type of alternative by means of a pollutant trading type of approach, whereby the hazardous constituent being removed by means of pollution prevention need not be identical to the hazardous constituent in the characteristic stream. For example, carcinogenic metals could all be grouped rather than evaluated individually. This type of approach may add desirable flexibility if appropriately constructed.

4. De Minimis Volume Exclusion

There is a question of whether EPA should require treatment of relatively small decharacterized hazardous waste streams injected into Class I nonhazardous wells when the result will be essentially the same level of contaminants being injected (and thus risks are not measurably reduced). Therefore the Agency is proposing to establish a de minimis volume exclusion for small volumes of formerly hazardous wastes being injected into these wells along with a greater volume of nonhazardous waste.

There are two existing LDR de minimis provisions (§ 268.1(e) (4) and (5)). Both are for ignitable and/or corrosive wastes (D001 and D002); the first is for de minimis losses of D001 or D002 to wastewater treatment systems of commercial chemical products, while the second is for de minimis losses of D001 or D002 laboratory wastes. Under the approach being proposed today, when underlying hazardous constituents are present in ICRT wastes at concentrations less than 10 times UTS at the point of generation, and the combination of all of the characteristically hazardous streams together are less than 1% of the total flow at point of injection and after

commingling with the nonhazardous streams, and that the total volume of hazardous streams are no more than 10,000 gallons/day, no segregation and/or treatment would be required. The 1% total flow criteria is consistent with the existing de minimis exemption for laboratory wastes (§ 268.1(e)(5)); however, the Agency solicits comment on the 1% criteria, the 10 times UTS criteria as well as the 10,000 gallons/day maximum—should these numbers be higher, lower, or dropped?

The Agency intends to continue analyzing collected data that may provide additional justification for, or alternatively, cause the Agency to modify any or all of the criteria on which it has based the de minimis exemption for injected waste. This analysis will be conducted in conjunction with revising the Regulatory Impact Analysis for underground injected wastes, and may include additional computer modeling used in assessing the health risks posed by Class I injection wells. The Agency may conduct this analysis, for example, by varying specific parameters in the modeling, such as well pump rates, total volume of waste injected, and waste concentrations, and by altering postulated exposure scenarios describing health risks posed by injection of Phase III wastes. Upon conclusion, the analysis may support the proposed de minimis criteria or may cause the Agency to revise them in the final rule. The Agency solicits any comment on this planned approach and any alternative suggestions.

The Agency is proposing that if a generator determines that he meets the requirements of the de minimis exemption, that he place a one-time notice in his files stating the % flow and concentration of the underlying hazardous constituents, and volumetric flow of prohibited wastestreams (i.e. streams exhibiting a characteristic at the point of generation). The concentration of underlying hazardous constituents would have to be determined through monitoring, and the % flow can be determined through several methods. One method for estimating annual average wastewater stream flow is to use the maximum annual production capacity of the process equipment, along with knowledge of the process and mass balance. A second method would involve using measurements that are representative of average process wastewater generation rates. A third method is to select the highest flow rate of process wastewater from the historical records. Other knowledge-based methods, which would be less expensive alternatives to actual

measurement, could also be used. EPA solicits comment on these alternatives.

D. Point of Generation Discussion

1. Introduction

It has long been the rule that land disposal prohibitions apply at the point hazardous wastes are generated. See e.g. 55 FR at 22652 (June 1, 1990); 261.3(a)(2)(iii). Some members of the regulated community, including the Chemical Manufacturer's Association (CMA), have asked EPA to reconsider this issue in light of the Third Third rule and the D.C. Circuit opinion interpreting that rule. See *CWM v. EPA* (976 F. 2d 2 D.C. Cir. 1992). Among other things, the court held that hazardous constituents present above concentrations "sufficient to pose a threat to human health and the environment" in prohibited wastes, including characteristic wastes, must meet LDR treatment standards. See 976 F. 2d at 16.

The regulated community has argued that continued application of the point of generation rule could lead to situations where prohibitions would attach to particular characteristic wastestreams and trigger a host of potentially disproportionate consequences, without necessarily furthering any of the protective objectives of the LDR program. Many industrial processes consist of hundreds or thousands of streams, some of which exhibit characteristics only for a short time or (for batch processes) intermittently. The streams often exist within the physical confines of an industrial process, and may be collected within a common sump or other aggregation point. If one of the streams should exhibit a characteristic of hazardous waste, the entire system of wastewater treatment or other management could be affected if the system contains an impoundment or injection well.

These commenters have also requested that EPA revisit the current interpretation that prohibitions attach at the instant of generation and that this requires in certain cases knowledge or monitoring of many internal streams. They argue that some of these streams may not be readily amenable to monitoring because everything within the process is hard-piped to a common collection point. It should be noted that EPA previously considered the practical difficulties associated with sampling or monitoring wastes within closed-process units. See 55 FR 25760, 25765 (July 8, 1987).

The commenters have expressed concern that there are likely to be

circumstances where mass loadings of hazardous constituents to the environment are not significantly affected by allowing initial aggregation of residual streams from a process. They also have expressed concern with the practical impacts and achievability of determining the precise content of potentially thousands of internal wastestreams within an industrial facility.

In response to these concerns raised by industry groups following the Third Third opinion, the Agency is soliciting comment on a number of approaches to modify the current point of generation approach for making LDR determinations for certain types of wastes. These approaches also could be applied more generally for purposes of subtitle C to determine at what point a waste is generated.

2. Background

EPA has required LDR determinations to be made at the point which hazardous wastes are generated since the Solvents and Dioxins final rule (51 FR 40620, November 7, 1986). EPA asserted the authority to make LDR determinations at either point of generation or point of disposal in the Third Third final rule (55 FR 22652-53). The court invalidated such selectivity (976 F. 2d at 23), but did hold that at least the dilution prohibition did not have to apply to invalidate use of CWA treatment impoundments performing RCRA-equivalent treatment. 2d. at 23-4.

In the course of finalizing the California list rule, EPA solicited comment on a "point of aggregation" approach to assessing when prohibitions attached. (See 52 FR at 22356 (June 11, 1987) where point of aggregation is defined as a point of common aggregation preceding centralized wastewater treatment.) Most commenters at that time criticized such an approach on the grounds that the "point of aggregation" was by no means readily determinable and could result in wastes being treated less or, in some cases, being diluted impermissibly. EPA rejected the approach for these reasons. 52 FR at 25766 (July 8, 1987).

The following options, which are being presented for comment, would narrowly redefine the point at which the land disposal prohibitions attach.

3. Similar Streams Generated by Similar Processes

One possible revision would address situations in which like streams are generated from like processes and combined as a matter of routine practice. An example would be collection of rinses from sequential

rinses in a manufacturing process, or multiple rinses from parallel manufacturing lines all making the same product. In these circumstances, all the rinse water could contain the same hazardous constituents in roughly the same concentrations. Variations in hazardous constituent concentrations would reflect normal process variability, so that mass loadings of hazardous constituents to the environment over time would not alter if the rinses are aggregated and disposed. EPA seeks comment on whether or not such collection of like streams from like units should be considered impermissible dilution, since some in the regulated community might view it as counter-intuitive in many cases to even consider these similar process outputs to be separate.

4. Streams From a Single Process

Industrial facilities frequently collect residual streams from a process in a common unit such as a sump. In many cases, these streams are similar in composition because they all come from a common unit process. Consequently, although some of the residual streams could exhibit a characteristic before common collection, long-term average mass loadings of hazardous constituents per unit of production may not vary significantly, even though the waste concentrations may vary within a normal range over time.

Moreover, where residues are generated within a unit process, it might be possible to view these streams as still within the "normal part of the process that results in the waste", S. Rep. No. 284, 98th Cong. 2d sess. at 17, and consequently that any routine combination of these streams from the common process would not be impermissible dilution. Id. Of course, there is the possibility of abuse in any approach that allows combination of residues. Characteristic wastestreams not normally generated as part of the unit process could be re-piped in order to dilute the characteristic and avoid treatment of underlying hazardous constituents. This would remain impermissible dilution under any of the approaches EPA is considering.

This approach differs from the "point of aggregation" approach EPA rejected as part of the California List rule in that it limits the mixing of waste streams to wastes generated within a single unit process. In the initial "point of accumulation" approach, wastes from various sources could be mixed in a sump, as long as the sump was the first point of accumulation. This option limits the mixing to single manufacturing steps (unit operations).

5. "Battery Limits"

The CMA has suggested an expanded version of the option discussed above. Instead of limiting aggregation to that normally occurring within a single unit process, they would view an entire battery of processes (associated with making a single product or related group of products) as a single manufacturing step. CMA would use the logic of the approach described in the previous section to allow all residues generated from that sequence of processes to be combined before a determination is made as to whether wastes are prohibited. Under CMA's approach, determinations as to whether characteristic wastes are prohibited could be made at this point where all of the aqueous waste streams from a unique industrial process are aggregated (referred to by CMA as "battery limits"), or at a point that a stream exits the manufacturing process unit where it is generated ("point of rejection").

Such aggregation could, in CMA's view, be considered to be "part of the normal process that results in the waste" (S. Rep. No. 284, 98th Cong. 1st sess. 17) so that the aggregation within the industrial process battery limits need not be considered to be impermissible dilution. CMA believes that this approach could ease monitoring burdens, simplify point of generation determinations, facilitate legitimate wastewater treatment and avoid accounting for characteristic properties and underlying hazardous constituents in intermittent streams such as streams from batch processes, or from characteristic streams resulting from one-time spills or other process emergencies.⁸

6. Solicitation of Comment

The Agency solicits comment on the composition of internal residual streams within discrete processes when one or more of the streams exhibits a characteristic in order to determine how frequently such streams are similar with respect to identity and concentration of hazardous constituents. EPA also solicits comments on how difficult it is to identify the physical boundaries of a unit process, and what safeguards could be developed to assure that characteristic streams not normally part of a unit process are not diluted by re-

⁸ However, spills of commercial chemical products exhibiting a characteristic, an example mentioned by CMA, are already not considered to be prohibited provided amounts spilled are de minimis, as defined at 268.1(e)(4) (59 FR 47982, September 19, 1994). See generally, CMA's submission to EPA of October 5, 1994, part of the record for this proposed rule.

piping and combination with unrelated streams.

The Agency seeks comment on potential difficulties with all three options, but mostly the third option. Namely, the various limits do not seem to be graphically self-defining, and, hence, could be difficult to implement. The Agency is also concerned about the possibility of impermissible dilution of non-*de minimis* characteristic wastewater streams whenever large numbers and volumes of wastewaters are brought together and characteristics are eliminated without hazardous constituents being removed or destroyed.

7. Situations Where Existing Point of Generation Determinations May Remain Appropriate

a. Listed Wastes. In considering the above approaches, as well as others, it could be argued that any modification to the point of LDR determination should apply only to characteristic wastes and F001-F005 (spent solvents) listed wastes. In evaluating wastes from other sources for listing (including other "F" series wastes), EPA has carefully evaluated the various waste streams and has defined the point of generation as part of the listing description. Therefore, it may be inappropriate to modify that description with a more generic point of prohibition rule. EPA solicits comment on this issue.

b. Prohibited Wastes Whose Treatment Standard is a Method of Treatment. Section 261.3(b) states that characteristic wastes whose treatment standard is a specified method of treatment may not be diluted to remove the characteristic in lieu of performing the specified method of treatment. Principal examples of such wastes are high TOC ignitable wastes, characteristic pesticide wastes, and certain characteristic mercury wastes. 55 FR at 22657. EPA indicated that these wastes are not typically amenable to adequate treatment by means other than the designated treatment methods,⁹ so that aggregation to remove the characteristic is impermissible dilution unless treatment by the required method follows. Id.

EPA's initial view is that these wastestreams should remain prohibited at the current point of generation. The Agency has made a considered decision that these wastes require a particular type of treatment, and the wastestreams themselves are clearly delineated. 55 FR at 22657. In addition, the treatment

⁹ *De minimis* losses of the discarded commercial chemical product form of these wastes are not considered to be prohibited. 40 CFR 268.1(e)(4).

methods for a number of these wastes (including high TOC ignitable wastes and characteristic mercury wastes) include or require resource recovery, another reason to ensure that this type of treatment continues to occur. *Steel Manufacturers Association v. EPA*, 27 F. 3d 642, 647 (D.C. Cir. 1994). EPA solicits comment as to whether any alteration of the point at which LDRs attach to these wastes should be reconsidered.

8. Implications Beyond LDR Rules

The Agency believes that narrowly redefining the point at which wastes are subject to RCRA regulation should be considered because of industry's concerns with the impact this approach is having on the program currently and what potential impact it may have in the future. Strict interpretation of the current point of generation has already raised questions with respect to the status of a variety of similar wastes that sometimes exhibit the hazardous waste characteristic and are routinely mixed (e.g., spent antifreeze from automobiles, boiler cleanout wastes, emission control residues). This issue may become even more important in the future as EPA adopts exit levels which may be established by the Hazardous Waste Identification Rule.

While absolute clarity of the applicability of RCRA may result from the current point of generation requirement, industry commenters feel that it could be magnified in the future by this and other rulemakings. In considering these concerns, EPA does not wish to undermine the effort to segregate the most concentrated wastes for source reduction or treatment. EPA solicits comment on whether any of the approaches described achieves the proper balance among these goals.

V. Discussion of the Potential Prohibition of Nonamenable Wastes From Land-Based Biological Treatment Systems

This section solicits comment on two regulatory frameworks received from industry and from treaters of hazardous wastes concerning refractory underlying hazardous constituents in land-based biological treatment systems. First, the Environmental Technology Council (ETC) submitted comments to the Agency on EPA's March, 1993 Supplemental Information Report on potential responses to *CWM v. EPA*. The ETC raised concern as to whether the constituents from these decharacterized wastes when placed into biological impoundments are merely being diluted and discharged; volatilized from the surface of the impoundment; or simply

end up concentrating in the sludge at the bottom of the impoundment. The ETC labeled these constituents whose primary fate is air or sludge (or discharge without treatment) via one of these paths as "nonamenable to biotreatment." The comment suggested several criteria for determining whether process streams with "nonamenable" constituents should be kept out of surface impoundments.

Secondly, CMA provided EPA with similar recommendations in August 1993. This section also considers CMA's suggestions for managing refractory chemicals in land-based biological treatment units.

A. Technical Overview

Many "decharacterized" wastes (i.e., wastes that were formerly hazardous wastes due to their ignitable, corrosive or reactive properties as generated but which no longer exhibit a characteristic by the time they are land disposed) are placed in Subtitle D surface impoundments for the purpose of biological treatment. In theory, microorganisms in the impoundment can degrade organic constituents in these wastes (under aerobic and/or anaerobic conditions) to carbon dioxide and water.

The ETC comment suggested that EPA identify and prohibit wastes containing these "nonamenable" constituents from biological treatment impoundments. The issue facing EPA is whether there are wastes for which biological treatment is not BDAT either because biological treatment cannot adequately reduce hazardous constituents or because biological treatment simply transfers hazardous constituents to other media, and, if so, whether an alternative regulatory scheme is appropriate. While the LDR Phase IV rule will specifically address the concerns with respect to sludges, leaks and air emissions, EPA has committed to raising certain technical issues concerning "nonamenability" in the LDR Phase III proposed rule and has also committed to discuss the suggested regulatory resolutions submitted by both the ETC and the CMA, who also submitted comments pertaining to this issue.

What follows is EPA's interpretation of the fundamental concerns which fostered this option, a discussion of the technical issues inherent to this approach and an identification of alternative approaches to address these underlying concerns. The issue of whether RCRA can require segregation of refractory hazardous wastes streams entering land-based surface impoundments is closely connected to the Agency's approach to sludges, leaks

and air emissions in the LDR Phase IV rule. The Agency is therefore delaying any final action on the components of the ETC comments, or on the CMA suggestions, until LDR Phase IV when more comprehensive decisions can be made on each issue.

B. Summary of the ETC's Position

The full text of the ETC's comments can be found in the administrative record for today's rule. This section summarizes that document.

The ETC asserts that "Hazardous constituents in ICR wastes that are not amenable to the biological or sedimentation systems used in CWA lagoons are not receiving RCRA-equivalent treatment." They then propose a definition of "nonamenable waste streams" and suggest a regulatory scheme for keeping these streams out of surface impoundments.

In particular, the ETC recommends that EPA should establish treatment standards for ICR wastes that require destruction and removal of hazardous constituents in the waste as generated, and allow only those ICR wastes that contain hazardous constituents for which biological treatment is the best method to be managed in nonhazardous waste surface impoundments. They provide lists of individual constituents and constituent categories that should be segregated and restricted from biological units. These include the following individual chemicals: mercury, vanadium, chromium, cadmium, lead, and/or nickel, or the following groups of chemicals: aromatic compounds; acrylates, phenolics, and highly oxidized constituents such as phthalates, aldehydes, and ketones; nitrosamines, amines, nitrophenolics, and aniline compounds and most chlorinated and brominated organic constituents. ETC also recommends segregating the following categories of waste: Highly volatile and non-water-soluble constituents, because of the likelihood of air emissions during biological treatment; and the acutely toxic P-listed wastes, because they are poisonous to the biological treatment system. The ETC explicitly recommends the following criterion for designating a waste stream "amenable to biological treatment": the waste must contain less than 1% solids, must be free of oil and grease, and must contain less than 10 ppm total heavy metals.

ETC then defines "ICR waste streams not amenable to biological treatment" as: ICR wastes with constituents (from the groups listed above) at individual concentrations greater than 100 x F039 wastewater treatment standards; and ICR wastes with "water insoluble and

highly volatile" F039 constituents "that are more likely to be released to air and not treated. (ETC did not indicate at what point these concentrations should be measured, although they did suggest that wastes should be segregated at "battery limits".)

The ETC believes that such "nonamenable" wastes should either be required to undergo pretreatment prior to aggregation with other wastewaters (e.g., steam stripping of volatile compounds), or be required to go to other appropriate treatment (e.g., precipitation of metals). The ETC argues that such segregation of nonamenable wastes will promote pollution prevention because companies will have an incentive to modify raw materials or production processes to keep such hazardous constituents out of the waste stream.

C. Summary of the CMA's Position

The full text of CMA's comments can be found in the administrative record for today's rule. This section summarizes that document. CMA describes "three situations in which characteristically corrosive or ignitable hazardous wastes could be sent to biological treatment in surface impoundments without jeopardizing the treatment units effectiveness by introducing non-amenable compounds". CMA implicitly requests that the LDR Phase III rule allow CWA-permitted biological treatment in the following three situations:

(a) When the stream to the impoundment only contains hazardous constituents amenable to biological treatment (listed below);

(b) When the stream contains hazardous constituents amenable to biological treatment plus other (nonamenable) constituents present at concentrations equal to some multiple (e.g., 1000) of the F039/UTS treatment standards in the influent to the surface impoundment; or,

(c) The facility can demonstrate on a case-by-case basis that a nonamenable hazardous constituent is amenable to treatment occurring in the treatment system.

CMA identifies most of the organic UTS constituents as "amenable to biological treatment". This includes all the constituents for which biological treatment is the basis of the F039 wastewater treatment standards plus a number of organic constituents generally recognized in the literature as biodegradable.

The BDAT List constituents not designated by CMA as "amenable to biological treatment" are: all UTS metals, fluoride, sulfide and the volatile and

semivolatile organics in the table that follows.

Nonamenable Volatile Organics

Bromodichloromethane
Carbon tetrachloride
Chloroethane
2-Chloroethyl vinyl ether
Chloroform
Chloromethane
1,2-Dibromoethane
Dichlorodifluoromethane
1,1-Dichloroethane
1,2-Dichloroethane
1,1-Dichloroethylene
trans-1,2-Dichloroethene
1,4-Dioxane
Ethylene oxide
Iodomethane
1,1,1,2-Tetrachloroethane
1,1,2,2-Tetrachloroethane
Tribromomethane (Bromoform)
1,1,1-Trichloroethane
1,1,2-Trichloroethane
Trichloroethene
Trichloromonofluoromethane
Vinyl Chloride

Nonamenable Semivolatile Organics

Benzal chloride
2-sec-Butyl-4,6-dinitrophenol
p-Chloroaniline
Chlorobenzilate
p-Dimethylaminoazobenzene
1,4-Dinitrobenzene
4,6-Dinitro-o-cresol
2,4-Dinitrotoluene
2,6-Dinitrotoluene
Di-n-propylnitrosamine
Isosafrole
Methapyriline
3-Methylcholanthrene
4,4'-Methylenebis (2-chloroaniline)
5-Nitro-o-toluidine
Phenacetin
Pronamide
Safrole
Methoxychlor

D. Summary of EPA's Preliminary Response to CMA's and ETC's Technical Concerns

EPA presents its preliminary evaluation of three major issues that are raised by both CMA's and ETC's suggestions: the question of feed limits for land-based biological treatment units; behavior of nonamenable constituents in land-based biological treatment units and constituent-specific solubility and toxicity questions.

1. Feed Limits

The CMA and ETC approaches both suggest constituent-specific limitations of decharacterized ICR waste streams entering surface impoundments to ensure that certain toxic constituents do not bypass treatment by volatilizing into

the atmosphere, by adsorbing permanently onto sludge sediments at the bottom of the impoundment or by inhibiting biodegradation processes in the impoundment. The Agency agrees that all three of these mechanisms can hinder treatment.

While many aspects of both the ETC and CMA positions have technical and regulatory merit, there appear to be fundamental technical disagreements that need to be resolved. First and primary is the fact that ETC and CMA differ on which constituents (and chemical families of constituents) are "amenable" or "nonamenable" to treatment. Second, proposing regulations requiring segregation of streams entering impoundments would raise the following issues:

(a) Surface impoundments have traditionally provided an engineering advantage—in addition to low energy, maintenance and construction costs—in that, they offer a means of "equilibrating" and "equalizing" the relatively frequent variations in chemical compositions of process wastes (i.e., aggregated waste streams). As such, they receive variable wastes in their capacity as large-volume holding units for process upset streams, stormwaters, spill washdown and other unscheduled wastewater releases. Segregation of these various streams would require construction of holding tanks that may not be able to provide the same equalization capability of an impoundment;

(b) Mandatory analyses and separation may impose considerable added expense; and,

(c) EPA, in some cases, assumed that impoundments would be used for these purposes by not including the costs of impoundment replacement when developing effluent guidelines for affected industries.

2. Technical Concern

In theory, EPA agrees that certain RCRA waste streams should be kept out of certain types of Subtitle D impoundments. (Listed wastes already must go to Subtitle C impoundments, and High TOC D001 ignitables, as well as high mercury wastes, are also restricted from Subtitle D impoundments.) In addition, in 55 FR at 22666 (June 1, 1990), EPA presented general criteria that could affect amenable/nonamenable determinations. All parties seem to agree that certain metal-bearing wastes could also be restricted from impoundments. However, there are additional factors that need to be considered, such as impoundment size, depth, temperature, and retention time. (An individual

organic compound is more treatable in some systems than in others and without information about the extent to which the lagoon supports aerobic and anaerobic processes we cannot assess how treatable these constituents are.)

In addition, the overall composition of each waste—i.e. the entire matrix—must be considered in order to characterize its relative amenability to biological treatment. In particular, waste composition can enhance or inhibit a particular organic compound's amenability to biological destruction. Enhancement occurs, for example, if microorganisms can use one compound as a co-metabolite or co-substrate in metabolizing another. A feature story on biological treatment in the February 1993 issue of *Environmental Science and Technology* reports “* * * highly chlorinated compounds such as trichloroethylene, 1,1,1-trichloroethane and chloroform will transform under aerobic conditions if methane, phenol or toluene is provided as a primary source of carbon and energy for biological growth. However, these reactions are co-metabolic * * *. Therefore it is important to define exact conditions when discussing biodegradation results.” Inhibition occurs when one compound poisons the metabolic pathway by which another compound is otherwise degraded. The degree to which the microbial population in the impoundment has been acclimated to a particular constituent is a significant factor in determining that constituent's amenability. Acclimation determines the balance between inhibition and enhancement and is a factor to be defined in discussing biodegradation results.

The fact that “consortia” of microorganisms, rather than members of a single bacterial strain, accomplish the degradation of complex molecules further complicates the extent to which a compound can accurately be labeled “amenable” (Rittman and Saez in *Levin and Gealt Biological Treatment of Industrial and Hazardous Wastes*, 1993, McGraw-Hill, New York). The presence of different microorganisms in a consortium increases the number of compounds that can be degraded in that impoundment by virtue of the wider array of metabolic degradation pathways present. However, the various microbial species may require a narrower range of pH, dissolved oxygen and other parameters in order to function and may therefore be more liable to collapse and fail than a simpler more robust microbial strain.

Some of the technical issues that are likely to arise include:

(a) Biotreatment systems vary. Constituents that are amenable to treatment in one system may be nonamenable in another, thus an accurate determination of what is a nonamenable waste might have to consider site-by-site factors, which would present considerable problems in the implementation of the program. If EPA set up a more generic approach, other problems are likely to occur, as described below.

(b) The ETC uses the term “battery limits” to describe where nonamenable ICR wastes should be segregated. This term, however, is undefined and could represent the point where the wastestream leaves the production equipment, or a variety of aggregation points.

(c) What levels of constituents justify requiring segregation and recovery?

(d) If EPA required segregation of nonamenable wastes from biological treatment impoundments, there is a very good possibility that facilities would merely replace the surface impoundments with RCRA exempt tanks. Biological treatment in tanks could have the same air emissions unless they are properly controlled.

With respect to specific hazardous organic constituents, EPA is currently investigating whether the BDAT list of compounds could be ordinally ranked into a series of compounds more or less amenable to biological treatment, based on published treatability data. “Amenability” is a continuous variable. Treatability data shows that some compounds are more amenable to biological degradation than are other compounds: there are no organic chemicals, other than polymers, which are absolutely resistant to biological degradation.

Due to the technical problems associated with determining which wastestreams should be kept out of certain impoundment lagoons, and the policy concerns raised by these approaches, we are setting out these issues for comment in this proposed rule.

3. Constituent Properties of Concern

The following three items are criteria ETC suggests in addition to individual constituent concentrations. EPA invites comments on means of managing these waste properties.

a. Water solubility. EPA does not share ETC's concern that less soluble compounds are significantly less amenable to biological treatment than relatively hydrophilic compounds. For example, PCB's are virtually insoluble; nevertheless the literature documents cases where PCB's have been

successfully degraded to hydrochloric acid, carbon dioxide and water.

b. TC Metals. EPA believes the LDR Phase IV limitations on land disposal of wastes that meet the definition of toxicity based on their metals concentration will address ETC's and CMA's concerns about the inadequacy of surface impoundments for metal treatment.

c. Toxicity. EPA solicits comments on the suggestion that P-waste constituents be managed as particularly toxic and thus likely to poison metabolic pathways in the degradation process. EPA further solicits comment on additional constituents or categories of constituents that are likely to be acutely toxic to biological treatment processes, rather than merely resistant to biological treatment.

The target mass removal approach described earlier in this preamble can be applied to biological treatment units to determine whether constituents managed in the units are being effectively degraded. The application of this approach could address the question of wastes nonamenable to biotreatment. The target mass removal approach requires a waste determination prior to the waste entering the treatment unit, and either (1) a waste determination after treatment in the unit, or (2) a determination of the operating efficiency of the treatment unit. This approach has been applied to biotreatment units for at least two promulgated standards that regulate hazardous organic chemicals: the HON and the Subpart CC air rules. Comments are solicited on the approach to address the nonamenable waste concerns.

F. Additional Issues

In addition to the issues raised in the section “Summary of EPA's Preliminary Response” above, there are other technical issues arising in developing a list of UTS constituents that are not amenable to biological treatment. Another issue concerns those UTS constituents for which biological treatment is BDAT: could a wastestream containing such constituents have such a high concentration of other compounds known to be refractory to biological treatment that biotreatment no longer effectively treats the constituents? A third issue considered here is the extent to which “nonamenable” constituents evade treatment by volatilizing into the air or by adsorbing onto sludge, in addition to flowing out untreated in effluent.

1. List of Hazardous Constituents

In order to ensure that all the constituents in a decharacterized waste

are adequately addressed, the starting point should not be the BDAT list but rather the entire list of U and P, appendix VIII, and other toxic chemicals present in the hazardous waste universe. The next LDR rulemaking ("Phase IV") will discuss the universe of hazardous constituents regulated by RCRA (i.e., a composite of the above lists) and may propose which constituents from the composite list are considered "nonamenable" or "amenable". Today's preamble, however, raises general issues associated with "amenability" in order to solicit comments on specific questions. These questions will be addressed in LDR Phase IV. For example, the Phase IV proposed rule may include a discussion of quantification problems and the use of surrogate parameters such as BOD/COD/TOC ratios to assist in measuring performance where analytical methods do not exist.

2. Biotreatment as BDAT

EPA has already promulgated biodegradation (BIODG) as a specified method of treatment for quite a few U and P waste codes that fall under the category that ETC has asked to be classified as "nonamenable". (For example, nitrosamines easily break down in water to nitroamines. Nitrogen-containing organics can typically be biodegraded. Most microorganisms flourish in the presence of nitrogen containing chemicals.) EPA has also established numerical standards for many chemicals based on biotreatment data. EPA is including all of the chemicals in both of these cases in this proposed rule and is asking for comment on them and seeking data that would refute or support that biotreatment is BDAT for these chemicals.

3. Toxics Along for the Ride

EPA intends that the Phase IV proposed rule will expand the discussion on the concept of "toxics along for the ride" in biotreatment (i.e., concern about how best to regulate those toxic compounds that are not degraded to less toxic compounds and consequently pass untreated through the unit and on to land disposal). While the concept is environmentally attractive, in order to create a regulatory construct prohibiting such constituents from biotreatment, the Agency must consider the following constituent-specific factors:

(a) Is the elemental composition of the chemical such that it is truly not "amenable to biotreatment" such as for metals?

(b) Does a low rate of hydrolysis indicate low biodegradability?

(c) Does high volatility necessarily indicate low biodegradability?

(d) What retention time is required for biodegradation?

(e) Is the biological system responsible for degradation of the compound sensitive to upsets in either the chemistry of the impoundment or its biocomposition?

(f) Is the bioactivity considered "aggressive"?

(g) Is the constituent actually chemically treated in the impoundment?

(h) Will the constituent encounter treatment after the impoundment?

(i) Is the waste containing the constituent difficult to segregate from other wastes?

(j) Does the chemical occur naturally in the surrounding soil or water?

(k) Is the chemical already present in the sludge and could then be released by the sludge even though the influent is reduced?

(l) Is the chemical present in other nonhazardous waste that are commingled with the decharacterized wastes?

(m) Is the chemical generated at concentrations below that which is considered neither a chronic nor an acute health risk?

(n) Is there an ecological risk from the inorganic composition of the waste such as the high salinity (dissolved solids) of most D002 wastes?

(o) Is the chemical a surprise presence from the use of some product that contains trace levels that couldn't be measured when the product was used (below product specifications)?

(p) Is the chemical appearing due to corrosion of pipes and equipment?

G. Treatment Standard for Wastes With a High Concentration of Organics

In the Phase II final rule (59 FR 47982, September 19, 1994), EPA finalized regulations prohibiting the disposal in Class I nonhazardous waste injection wells ignitable characteristic wastes with a high total organic carbon (TOC) content and toxic characteristic pesticide wastes, unless either the well is subject to a no-migration determination, or the wastes are treated by the designated the LDR treatment method. The treatment method promulgated was either combustion (i.e. incineration or fuel substitution) or recovery of organics. Today the Agency is raising the option of proposing the same treatment standard for characteristic wastes with high concentrations of organics managed in surface impoundments. This would

result in a prohibition of these wastes going into biological impoundments.

The Agency requests comment on this option, including the question of how to define "high" levels of organics that would justify prohibition from surface impoundments. The Agency believes this option provides many of the benefits of segregation of refractory "nonamenable" streams with significantly lower analytical requirements.

VI. Treatment Standards for Newly Listed Wastes

A. Carbamates

Hazardous Wastes from Specific Sources (K Waste Codes)

K156—Organic waste (including heavy ends, still bottoms, light ends, spent solvents, filtrates, and decantates) from the production of carbamates and carbamoyl oximes.

K157—Wastewaters (including scrubber waters, condenser waters, washwaters, and separation waters) from the production of carbamates and carbamoyl oximes.

K158—Bag house dust, and filter/separation solids from the production of carbamates and carbamoyl oximes.

K159—Organics from the treatment of thiocarbamate wastes.

K160—Solids (including filter wastes, separation solids, and spent catalysts) from the production of thiocarbamates and solids from the treatment of thiocarbonate wastes.

K161—Purification solids (including filtration, evaporation, and centrifugation solids), baghouse dust, and floor sweepings from the production of dithiocarbamate acids and their salts. (This listing does not include K125 or K126.)

Acute Hazardous Wastes (P Waste Codes)

P203 Aldicarb sulfone
 P127 Carbofuran
 P189 Carbosulfan
 P202 m-Cumenyl methylcarbamate
 P191 Dimetilan
 P198 Formetanate hydrochloride
 P197 Formparanate
 P192 Isolan
 P196 Manganese dimethyldithiocarbamate
 P199 Methiocarb
 P190 Metolcarb
 P128 Mexacarbate
 P194 Oxamyl
 P204 Physostigmine
 P188 Physostigmine salicylate
 P201 Promecarb
 P185 Tirpate
 P205 Ziram

Toxic Hazardous Wastes

U394 A2213
 U280 Barban
 U278 Bendiocarb
 U364 Bendiocarb phenol
 U271 Benomyl
 U400 Bis(pentamethylene)thiuram tetrasulfide

U392 Butylate
 U279 Carbaryl
 U372 Carbenzimidazole
 U367 Carbofuran phenol
 U393 Copper dimethyldithiocarbamate
 U386 Cycloate
 U366 Dazomet
 U395 Diethylene glycol, dicarbamate
 U403 Disulfiram
 U390 EPTC
 U407 Ethyl Ziram
 U396 Ferbam
 U375 3-Iodo-2-propynyl n-butylcarbamate
 U384 Metam Sodium
 U365 Molinate
 U391 Pebulate
 U383 Potassium dimethyl dithiocarbamate
 U378 Potassium n-hydroxymethyl-n-methyldithiocarbamate
 U377 Potassium n-methyldithiocarbamate
 U373 Prothion
 U411 Propoxur
 U387 Prosulfocarb
 U376 Selenium, tetrakis (dimethyldithiocarbamate)
 U379 Sodium dibutyldithiocarbamate
 U381 Sodium diethyldithiocarbamate
 U382 Sodium dimethyldithiocarbamate
 U277 Sulfallate
 U402 Tetrabutylthiuram disulfide
 U401 Tetramethylthiuram monosulfide
 U410 Thiocarb
 U409 Thiophanate-methyl
 U389 Triallate
 U404 Triethylamine
 U385 Vernolate

For background information on waste characterization data, data gathering efforts, and applicable technologies, see the Best Demonstrated Available Technology (BDAT) Background Document for Newly Listed or Identified Wastes from the Production of Carbamates and Organobromines.

1. Proposed Treatment Standards

The Agency has promulgated the listing of the wastes from the carbamate industry specified above. The final listing was signed by the administrator on January 31, 1995, and published in the **Federal Register** on February 9, 1995. EPA is today proposing concentration-based treatment standards for these wastes. The concentration limits for the regulated constituents are based on both existing and newly proposed UTS (59 FR 47982, September 19, 1994). UTS standards have already been promulgated for 21 of the constituents of concern for these waste codes (16 organic constituents and 5 metals). These standards were promulgated in the LDR Phase II final rule and are based on the following technologies: (1) Incineration was the primary basis for organic constituents in nonwastewaters; (2) biological treatment or carbon absorption was the basis for organics in wastewaters; (3) high temperature metal recovery and stabilization were the basis for metals in

nonwastewaters; and (4) chemical precipitation was the basis for metals in wastewaters. These treatment standards were developed by examining essentially all the BDAT treatment data the Agency had at the time.

The Agency is proposing new UTS for 42 constituents associated with carbamate wastes. 40 of these constituents are chemicals produced by this industry which may be grouped into the following categories: carbamates and carbamate intermediates, carbamoyl oximes, thiocarbamates, and dithiocarbamates. Please refer to the Background Document for definitions of these chemical groups and the categorization of these 40 chemicals. The other 2 constituents for which new UTS are being proposed (triethylamine, and o-phenylene diamine) are not carbamate products, but are hazardous constituents present at levels of regulatory concern in carbamate wastes. Note that although specific dithiocarbamate chemicals have been added to Appendix VII and VIII, the basis for listing K161, and the waste descriptions of P196, P205, U277, U366, U376-379, U381-384, U393, U396, U400-U403, and U407, the regulated constituent for these chemicals and codes is specified as "Dithiocarbamates (total)", because the analytical method for dithiocarbamates does not distinguish among specific dithiocarbamate constituents.

The Agency is proposing to base the UTS for the carbamate, carbamate intermediate, carbamoyl oxime, dithiocarbamate, and thiocarbamate constituents in wastewaters on data developed by the Office of Water for the development of effluent guidelines, and data from treatability studies performed by RREL. Wastewater standards for carbamate and carbamoyl oxime constituents are based on data from alkaline hydrolysis, with the exception of thiocarb which is based on biological treatment. Wastewater standards for thiocarbamates are based on GAC adsorption, while wastewater standards for dithiocarbamates are based on ozone/UV light oxidation. In cases where data were not available for a specific constituent, the standard has been transferred from the constituent with the most similar chemical structure and properties.

The Agency is proposing to base the UTS for the carbamate, carbamate intermediate, carbamoyl oxime, thiocarbamate, and dithiocarbamate constituents in nonwastewaters on analytical detection limits compiled from sampling and analysis reports prepared to support the proposed listing for these wastes. Although data from the

treatment of these constituents in nonwastewater matrices is not currently available, the thermal destruction technologies currently employed to treat these nonwastewaters can routinely achieve destruction to levels below the detection limit.

In addition, the Agency is proposing UTS standards for triethylamine based on data transferred from the treatment of methapyrilene. The treatment standards for methapyrilene are 0.081 mg/l for wastewaters and 1.5 mg/kg for nonwastewaters. Methapyrilene was selected as the basis for this data transfer because it is the only tertiary amine for which UTS standards have been promulgated.

Finally, the Agency is proposing UTS standards for o-phenylenediamine based on analytical detection limits compiled from sampling and analysis reports prepared to support the proposed listing for these wastes. For the treatment standards being proposed today for waste codes K156-161, P127, P128, P185, P188-192, P194, P196-199, P201-205, U271, U277, U279, U280, U364-367, U372, U373, U375-379, U381-387, U389-396, U400-404, U407, U409-411, see § 268.40 table—Treatment Standards for Hazardous Wastes in the proposed amendments to the regulatory language.

2. Request for Comments

In the LDR Phase II rule establishing UTS, the Agency was able to make modifications to the proposal, where commenters submitted data. The Agency strongly encourages parties affected by these proposed standards to submit any available treatment data for these newly regulated constituents; if such data become available, the Agency will make appropriate adjustments to these proposed standards. The Agency is soliciting comments, technical descriptions, and performance data regarding the characterization and treatability of these wastes and the achievability of these proposed standards. EPA is especially interested in any information regarding the feasibility of product recovery for these wastes, any available treatment data for the new constituents being added to the list of UTS, detection limits for these constituents in treatment residues, and suggestions for specified methods which could be alternatives to the concentration based standards proposed today.

Because standards for organics are based on treatment of organic constituents to non-detect levels, EPA solicits comment on the use of constituent specific detection levels used during the testing of these wastes for purposes of the listing

determination. The Agency recognizes that there may be differences between detection limits prior to and after treatment. Detection levels may be lowered for these wastes after treatment due to the "cleaner" matrix. This data has been placed in the docket for today's proposed rule.

B. Organobromines

K140—Waste solids and filter cartridges from the production of 2,4,6-tribromophenol.
U408—2,4,6-Tribromophenol

For further information on waste characterization data, data gathering efforts, and applicable technologies, see the Best Demonstrated Available Technology (BDAT) Background Document for Newly Listed or Identified Wastes from the Production of Carbamates and Organobromines.

1. Proposed Treatment Standards for Organobromine Wastes

EPA proposed to add 2,4,6-Tribromophenol to Appendix VIII of Part 261 on May 11, 1994, and is today proposing to add this constituent to the list of UTS in 40 CFR 268.48. The decision to add 2,4,6-tribromophenol to appendix VIII was based on the determination that the toxicities of this chemical and its chlorinated analogue, 2,4,6-Trichlorophenol, are essentially the same, due to the Quantitative Structure Activity Relationship (QSAR) between these two compounds.

Since treatment data is not currently available on 2,4,6-tribromophenol, the Agency is proposing to set the UTS for 2,4,6-tribromophenol based on data transferred from the treatment of 2,4,6-trichlorophenol. The structures of 2,4,6-tribromophenol and 2,4,6-trichlorophenol are sufficiently similar to be considered halogenated congeners of phenol. Both halogenated phenols contain three symmetrically placed bromine or chlorine substituents which are difficult to remove by chemical substitution. The chemical behavior and mechanisms of action for 2,4,6-tribromophenol is expected to be similar to its chlorinated analogue, 2,4,6-trichlorophenol. Thus, the Agency is proposing UTS standards of 7.4 mg/kg for nonwastewaters and 0.035 mg/l for wastewaters for 2,4,6-tribromophenol.

The Agency is soliciting comment regarding the achievability of this standard by demonstrated available technologies and regarding the analytical detection limit of 2,4,6-tribromophenol in treatment residual matrices. The Agency is also soliciting any available data on the concentrations 2,4,6-tribromophenol in treatment residuals from the recovery or destruction of wastes containing 2,4,6-

tribromophenol. The analytical method for 2,4,6-Tribromophenol is SW846 method 8270 (GC/MS for semivolatiles, capillary column).

2. Applicable Technology

The lone facility which produces 2,4,6-tribromophenol wastes uses a Bromine Recovery Unit (BRU) to recover bromine values from organic liquid and vapor waste streams. In this unit, the organics are burned and the combustion products are removed by a wet scrubber. The BRU is a halogen acid furnace which meets the regulatory definition of industrial furnace in 40 CFR 260.10. The combustion of hazardous waste in industrial furnaces is regulated under 40 CFR part 266, subpart H, which regulates air emissions from these units and requires monitoring and analyses. The facility which produces 2,4,6-tribromophenol burns listed spent solvents and still bottoms in this BRU; therefore, it is already subject to the performance standards of part 266, subpart H. Treatment of 2,4,6-tribromophenol wastes in the BRU should be effective in destroying the phenolic component of 2,4,6-tribromophenol and providing for recovery of bromine. Based on available information, EPA proposes that treatment by BRU is BDAT for 2,4,6-tribromophenol wastes. EPA solicits comment on this assertion and on the potential applicability of other technologies which destroy 2,4,6-tribromophenol and provide recovery of bromine.

C. Aluminum Potliners (K088)

K088—Spent potliners from primary aluminum reduction.

For background information on waste characterization, see the Best Demonstrated Available Technology Background Document (BDAT) for Newly Listed or Identified Wastes for K088, Spent Aluminum Potliners.

1. Possible Determination of Inherently Waste-Like

Certain current and potential K088 management methods have features of both recycling and conventional treatment. For example, there are a number of management methods involving some type of combustion process that produce a treatment residue from which resources may be recovered and reused. These management methods either destroy or drive off cyanides and toxic organics. Nevertheless, the technologies may useful alternative management methods for K088 if valuable resources are recovered. The Agency has a long-standing preference for recovery over simple treatment. This

position is based on the preference in RCRA for environmentally protective recovery versus waste treatment. Any consideration of relative safety must include not just the recovery step, but transport and storage preceding recovery, and proper management of all residues from recovery. RCRA section 1003(a)(6) as well as S. Rep. No. 284, 98th Cong. 2d sess. at 17.

EPA is considering how best to balance the potential promise of spent potliner recovery technologies with their similarities to conventional treatment technologies, especially with respect to the fate of (and risks generated by) hazardous constituents present in the waste. The Agency would prefer to provide consistent regulatory requirements for these recovery as well as for conventional treatment technologies in order to ensure both safe recovery and treatment. However, the existing regulatory framework may make it difficult to achieve this objective. For example, many of these recovery technologies already could be subject to the existing regulations for industrial furnaces burning hazardous waste (the so-called BIF rules).¹⁰ See 56 FR at 7142 (Feb. 21, 1991); 50 FR at 49171-174 (Nov. 29, 1985).

For K088 recovery technologies subject to BIF regulations, only those facilities in existence on the effective date of the BIF rules (August 21, 1991) could operate without first obtaining a permit. This could create a significant barrier to commercial operation of the technology in the near term. If, however, these units operate in a manner that does not subject them to the BIF regulations, then it is possible that they could operate with little or no oversight under RCRA.

The regulatory classification of residues as hazardous or nonhazardous wastes is another area where there would be dissimilar requirements under current rules. For example, one company has obtained from EPA a delisting determination that residues from their conventional treatment process are at levels low enough to no longer be classified as listed hazardous wastes. Other companies have not obtained such determinations, even though they potentially could treat spent potliners to delisting levels. As a result, these companies face the cost

¹⁰ Because the Agency is not fully aware of all of the details of some of the projected potliner treatment/recovery technologies, we cannot state at this time whether the technologies will meet the regulatory definition of an industrial furnace. It should be noted that processes recovering both energy and material values from a waste are subject to BIF rules, and energy recovery in an industrial furnace need not involve any export of energy).

and time of seeking a delisting petition, or the cost disadvantage of disposal of all residuals as hazardous waste.

Because of the similarities in risks, EPA is soliciting comment on whether there are ways to subject all of these technologies to the same, or nearly the same, regulatory requirements, while assuring that the ultimate goals of protecting human health and the environment are not compromised. The Agency has discussed with aluminum industry representatives the possibility of achieving this objective by designating spent aluminum potliners as inherently waste-like materials pursuant to 261.2(d),¹¹ and using this designation as a triggering event for a determination of "substantial confusion" pursuant to 270.10(e)(2), which could establish a date for eligibility for interim status after August 21, 1991. See generally 56 FR at 7142 making this type of designation and finding of "substantial confusion" for halogen acid furnaces. The Agency solicits comment on this possibility. The benefit of this approach would be to guarantee that these technologies all would be subject to a minimum level of RCRA oversight, especially with respect to design of storage equipment, control of air emissions from the process, minimum treatment standards for residuals, and mandatory corrective action in response to releases of hazardous constituents to the environment.

In order to mitigate some of the potential delay and costs in complying with RCRA, EPA also requests comment on the feasibility of establishing uniform delisting levels for residues from processing spent potliners, much as it did for residues from processing K061 wastes in high temperature metal recovery furnaces. Under this approach,

¹¹ The basis for such a designation would be that spent potliners contain cyanides and polyaromatic hydrocarbons which are destroyed rather than recycled, even by recovery technologies. These hazardous constituents are present in concentrations not ordinarily found in raw materials or products for which the spent potliners would be substituting, and the spent potliners could pose a substantial hazard to human health and the environment when recycled. The combustion process itself, for example, would seem to pose all of the risks the BIF rule is intended to address. Past storage practices for spent potliners also have led to significant environmental damage (although much of this storage utilized open piles).

A designation of inherently waste-like, incidentally, would only apply to the potliners and not to legitimate products obtained by processing the potliner (so long as those products were not burned as fuels or used directly on the land). 56 FR at 7141. Another option, therefore, would be to designate the use of K088 in certain types of recycling (e.g., all processes involving thermal destruction of cyanide, processes that incorporate cyanide/PAHs into product unchanged) as inherently waste-like.

we believe, levels would need to be established for organics, metals, cyanide and fluoride.

Another possibility for assuring safe processing of the potliners would be to develop air emission standards for the processing units pursuant to section 112(d) of the Clean Air Act. This alternative would have to be implemented in such a way as to assure proper management of the potliners before processing, and satisfactory treatment and management of residues from the processing. EPA solicits comment on all of these issues.

EPA wishes to add that its Region 10 office and the Washington State Department of Ecology have already evaluated the spent potliner recovery process used by one vender (Enviroscience). Washington State determined that it is an excluded recycling process, and EPA Region 10 determined that the process is not required to meet emission standards for BIFs, provided the process is conducted pursuant to certain conditions.¹² In light of the existing industry reliance on this determination, any decision made regarding designation of spent potliners in this rulemaking would not change the specific decisions concerning the Enviroscience process that have been completed to date.

2. Overview of Today's Proposal

EPA is proposing treatment standards for K088 expressed as the maximum concentration of specific constituents that would be allowed for land disposal. The tables at the end of this section summarize the constituents proposed for regulation and the maximum allowable concentrations. These maximum concentrations are the UTS for metals, cyanides, and other organics that were developed in the LDR Phase II final rule. These standards are based on a variety of technologies as follows: (1) Alkaline chlorination was the basis for the cyanide wastewater standards; (2) alkaline chlorination of the wastewater to destroy the cyanide prior to the generation of the nonwastewater residual was the basis for the cyanide nonwastewater standard; (3) incineration was the primary basis for other organic constituents in nonwastewaters; (4) biological treatment or carbon absorption was the basis for organics in wastewaters; (5) high temperature metal recovery and stabilization were the basis for metals in nonwastewaters; (6) chemical precipitation was the basis for fluorides and metals in wastewaters; and (7)

immobilization through either vitrification or the addition of calcium as a stabilization reagent was the basis for fluorides in nonwastewaters.

These treatment standards were developed by examining essentially all the BDAT treatment data the Agency had at the time. The Agency is also proposing new nonwastewater treatment standards based on leachate tests for fluoride. The leach tests must be conducted using the TCLP (SW-846 Method 1311 as described in 40 CFR Part 261, Appendix II). These leach standards were developed by the Agency when granting a delisting for certain K088 wastes. The treatment standard for fluoride wastewaters is taken from the UTS promulgated in the LDR Phase II final rule. More information on the development of these treatment standards can be found in the docket to today's rule.

Treatment and recycling technologies such as mineral wool cupolas, metallurgical processes, iron and steel industrial furnaces, and other recovery and recycling technologies should be able to meet the proposed standards. K088 treatment data from Reynolds Metals, Comalco Aluminum Ltd., Ormet Corporation and the EPA Combustion Research Facility (CRF) show that K088 can be treated to meet the UTS. Because EPA is proposing numerical treatment standards, any recycling or treatment technologies can be used as long as the treatment standards are met by actual treatment, rather than impermissible dilution. More discussion on these various technologies is presented later in this preamble.

a. Proposed Regulated Constituents. EPA is proposing to regulate the following constituents: acenaphthene, anthracene, benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, chrysene, dibenz(a,h)-anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, pyrene, antimony, arsenic, barium, beryllium, cadmium, chromium, lead, mercury, nickel, selenium, silver, cyanide and fluoride. Based on the available waste characterization data (see Best Demonstrated Available Technology Background Document (BDAT) for Newly Listed or Identified Wastes for K088, Spent Aluminum Potliners found in the docket to this rule for details), these constituents were found to be present in either the untreated K088 wastes or in the K088 treatment residuals at levels exceeding the UTS. See the proposed delisting of K088 for Reynolds Metals at 56 FR 33004 and 33005, July 19, 1991, and the corresponding docket for that

¹² These evaluations were conducted at the express, voluntary request of Enviroscience.

rulemaking. See also the docket for today's proposal for more data on constituent concentrations in untreated and treated K088. EPA is specifically requesting comment on regulating the phthalates: bis (2-ethylhexyl) phthalate, di-n-butyl phthalate and di-n-octyl phthalate. These constituents can show up in the untreated potliner and the treated residue; however, there is some question that their presence may simply be due to lab contamination.

Treatment technologies for K088 are also designed to recover or stabilize the fluoride. Therefore, EPA is proposing to regulate fluoride in K088 in order to ensure that the fluoride is actually recovered or that it is properly treated. Fluoride is also being regulated because of its toxicity and the high concentrations found in untreated K088 (see Tables 2 and 3 in 56 FR 33004 (July 19, 1991)—the proposed delisting of K088 generated by Reynolds Aluminum Company). If a treatment standard is promulgated for fluoride, the Agency will add fluoride to the UTS for K088. EPA has some data on the toxicity of fluoride (see the docket for today's proposed rule), and is in the process of gathering more information. For more information on regulated constituents see the Best Demonstrated Available Technology Background Document (BDAT) for Newly Listed or Identified Wastes for K088, Spent Aluminum Potliners found in the docket to this rule.

Section 3004(d)(1), (e)(1), and (g)(5) require that land disposal of hazardous wastes is prohibited unless a prohibition is no longer warranted to protect human health and the environment. EPA reads this language to require that land disposal may still be prohibited after treatment of hazardous constituents if the waste might still pose substantial hazards due to presence of other constituents or properties. 56 FR at 41168 (August 19, 1991); *NRDC v. EPA*, 907 F. 2d 1146, 1171-72 (D.C. Cir. 1990) (dissenting opinion). These hazards could be posed due to lack of treatment of other constituents in the waste, in this case, fluoride. It should be noted that this action is consistent with previous Agency actions, since EPA regulated fluoride in the delisting granted to treatment residues from the Reynolds Metals treatment process, and also regulates discharge of fluorides in the CWA effluent limitation guidelines for the primary aluminum subcategory. Consequently, the Agency is proposing a treatment standard for fluoride to assure that ultimate disposal of treated K088 is protective.

EPA is proposing treatment standards for fluoride, as well as the hazardous

constituents contained in the waste. Fluoride is present in these wastes in very high concentrations: upwards of 10%. Untreated concentrations of this magnitude can cause significant adverse effects to human health and the environment if improperly land disposed. The Agency requests comment on whether fluoride should be added to Appendix VIII, as well.

b. Specific Companies Investigating K088 Recovery/Treatment Technologies. It has been mentioned earlier that there are numerous technologies either available or being developed that recycle or recover the value (carbon, fluoride, etc.) in K088. Some of these technologies are described below. This is by no means a comprehensive discussion on those technologies, but rather is intended to give the public some idea of treatment options that are, or may be, available. These technologies or companies are only those of which the Agency has been made aware. EPA has placed in the RCRA Docket of this proposed rule all the recycling/treatment studies, as well as literature and videos submitted to the Agency on the various technologies. The EPA requests comment and data on these technologies and any other recycling or recovery technologies applicable to K088.

- Enviroscience, Inc. (ESI) has completed a pilot plant demonstration sponsored by Kaiser Aluminum, Vanalco and Columbia Falls Aluminum Company. Their process uses K088, K061 (electric arc furnace dust) and F006 (electroplating sludges) to produce zinc oxide, mineral wool fiber and pig iron. The K088 is first formed into briquettes and then heated to approximately 3000 F in a furnace, with lime and silica being added to attain an optimal acid:base ratio for proper fiber formation. The carbon and the cyanide from the potliner are used to reduce the metals in the K061 and F006. The non-reducible metal oxides are spun into a mineral wool from the molten slag.

- Alcan International Limited has developed a Low Caustic Leach and Liming hydrometallurgical process to treat K088. This process converts the fluorides to acid grade fluorspar and recovers the sodium and aluminum as sodium aluminate and caustic feed to be used in aluminum smelter operations. Alcan claims that the remaining brick and carbon fraction constitutes a high ash solid fuel whose reduced sodium content enhances its value as a chemical reducing agent.

- Ormet Corporation has used a pilot-scale melting system vitrification process to treat K088 wastes. The process involves the rapid suspension

heating of the waste and other additives in a preheater prior to physical and chemical melting which occur within a cyclone reactor. Ormet has submitted a petition to the EPA requesting a delisting of their residues from this process. They intend to scale-up this plant upon receiving a delisting of their waste. They claim the process produces a nonhazardous reusable product with the qualities of industrial glass that can be used as glass insulation material, roofing shingle granules or in the manufacture of tiles.

- Comalco Aluminum Ltd. (CAL), an Australian company, has developed the Comtor process, which is a full-scale calcination process which thermally destroys the cyanide in K088. This process also recovers the fluoride and carbon values in K088 by using hydrometallurgical techniques with lime dewatering. The precipitate can be used as a fluxing agent or in cement making. The caustic liquor may be recycled to the alumina plant or can be used as a scrubbing agent. Comalco has plans to upgrade their plant to 10,000 ton/yr and build a second plant in New Zealand. They have a licensing agreement with Aisco Systems of Canada to commercialize the technology.

- Elkem Technology is a Norwegian company which has done bench-scale testing consisting of smelting K088 along with iron ore to produce pig iron and a slag which they hope to get delisted. The process uses the carbon in K088 to act as a reducing agent and destroy the cyanides and other toxic organics, while rendering all other constituents immobile in a glassified, inert slag. For each ton of K088, they produce 0.85 ton of iron. Elkem plans a demonstration plant in the U.S. next year. They also plan to pilot a process to recover fluoride from the molten slag.

- Ausmelt Limited is an Australian company which has performed pilot scale tests using their submerged lance technology, which is a pyrometallurgical process, to destroy the toxic constituents in K088 and produce a stable slag. Fluorides are recovered for re-use in the aluminum smelting process. Ausmelt has plans to build a facility which could process approximately 15,000 tons per year of K088.

For more specific information on these technologies, see the Best Demonstrated Available Technology Background Document (BDAT) for Newly Listed or Identified Wastes for K088, Spent Aluminum Potliners.

For the treatment standards being proposed today for K088, see § 268.40 table— Treatment Standards for

Hazardous Wastes in the proposed amendments to the regulatory language. For performance data supporting these standards, see the aforementioned K088 Background Document.

VII. Improvements to the Existing Land Disposal Restrictions Program

A major part of today's rule is designed to improve the quality and efficiency in the LDR program. Areas that are addressed in this proposed rule include: Completion/adjustments to UTS and expansion/consolidation of certain required methods of treatment.

A. Completion of Universal Treatment Standards

Today's rule proposes further streamlining and simplification of the LDR treatment standards based on the UTS promulgated in the LDR Phase II final rule (59 FR 47982, September 19, 1994). The proposed modifications apply to: (1) all UTS and therefore to all hazardous wastes regulated with numerical treatment standards included in the UTS as summarized in the Consolidated Standards Table at § 268.40, and (2) the numerical treatment standards proposed for carbamate, organobromine and spent aluminum potliner wastes. These proposed changes to UTS therefore extend to all F-, K-, U- and P- waste codes with individually regulated constituents plus ignitable, corrosive, reactive and characteristically toxic wastes with underlying hazardous constituents.

1. Expansion to Cover All Components of Newly Listed Wastes (Carbamates and Organobromines)

A number of constituents regulated with numerical treatment standards in certain waste codes are not represented in UTS. EPA lacked adequate data to cover all the BDAT List with UTS in the LDR Phase II final rule and today the Agency is proposing numerical treatment standards for additional constituents in carbamate and organobromine wastes which are not yet on the current BDAT List. These 43 constituents are:

- A2213
- Aldicarb sulfone
- Barban

- Bendiocarb
- Bendiocarb phenol
- Benomyl
- Butylate
- Carbaryl
- Carbenzadim
- Carbofuran
- Carbofuran phenol
- Carbosulfan
- Cycloate
- Dimetilan
- Dithiocarbamates (total)
- EPTC
- Formetanate hydrochloride
- Formparanate
- m-Cumenyl methylcarbamate
- Isolan
- Methiocarb
- Methomyl
- Metolcarb
- Mexacarbate
- Molinate
- Oxamyl
- Pebulate
- o-Phenylenediamine
- Physostigmine
- Physostigmine salicylate
- Promecarb
- Propham
- Propoxur
- Prosulfocarb
- Diethylene glycol, dicarbamate
- Thiodicarb
- Thiophanate-methyl
- Tirpate
- Triallate
- 2,4,6-Tribromophenol
- Triethylamine
- 3-Iodo-2-propynyl n-butylcarbamate
- Vernolate

The proposed UTS for these constituents can be found in § 268.48 of today's proposed rule.

2. UTS for Constituents in Wastewater and Nonwastewater Forms

For a number of constituents, there exist UTS in wastewater forms of wastes but none in nonwastewaters. EPA believes that these constituents should be controlled in both sets of waste streams associated with a given waste code. This enhances consistent and complete treatment. The organic constituents for which EPA has promulgated wastewater UTS but no nonwastewater UTS include acrolein, 4-aminobiphenyl, aramite, chlorobenzilate, 2-chlorovinylethyl ether, 1,2-diphenylhydrazine, ethylene oxide, methyl methanesulfonate, p-dimethylaminoazobenzene, and 2-naphthylamine.

Today's rule requests comment on potential UTS values for these constituents in nonwastewaters. Although EPA does not have definitive treatability data on hand at the time of proposal, EPA believes that nonwastewater UTS for these constituents would close gaps in the current LDR framework and ensure adequate treatment of all waste streams.

a. Nonwastewaters.

(i) The Environmental Technology Council Data. EPA is soliciting comment on the treatment standards originally proposed, but not promulgated, in the Third Third F039 standards for acrolein, 4-aminobiphenyl, chlorobenzilate, p-dimethylaminoazobenzene, aramite, and 2-naphthylamine. EPA had withdrawn these as constituents of nonwastewater forms of F039 following comments from the ETC that these were analytically problematic. Specifically, in a study reporting detection limits and spike recoveries in incinerator ash from the combustion of hazardous wastes (as analyzed by six different laboratories), ETC reported anomalous levels of detection limits or spike recoveries for these compounds. Detection limits and spike recoveries are of concern because the numerical treatment standard for any constituent in incinerator ash is equal to the product of the detection limit times the accuracy correction factor, the inverse of the percent recovery times a variability factor representing the extent of the data.

ETC reported detection limits and percent recovery values for acrolein, p-dimethylaminoazobenzene (p-DAB), 4-aminobiphenyl (4AB), aramite, chlorobenzilate (CB), methylmethanesulfonate (MMS) and 2-naphthylamine (2NA), and also for dibenzo(a,e)pyrene (DBP). The detection limit results are labeled LIMITS A-F to represent the six different laboratories and the percent recovery results are similarly labeled % REC A-F to represent the six different laboratories. These data, together with the complete ETC investigations for the Third Third proposed rule and the subsequent pesticide study are available for inspection in the RCRA Docket for the LDR Phase II final rule.

TABLE 1.—DETECTION LIMITS

Limit	Constituent							
	Acrolein	p-DAB	4-AB	Aramite	CB	DBP	MMS	2-NA
A	0.029	1.82	6.94	17.18	4.87	9999	2.438	12.561
B	9999	3.2	9999	614.43	8.29	9999	1.85	26.82
C	0.161	9.43	26.89	243.05	7.98	18.72	2.3	6.96
D	9999	1.38	14.06	4.52	2.61	9999	0.75	2.214

TABLE 1.—DETECTION LIMITS—Continued

Limit	Constituent							
	Acrolein	p-DAB	4-AB	Aramite	CB	DBP	MMS	2-NA
E	9999	48.26	0.065	2.37	11.34	9999	9999	2.43
F	9999	1.78	14.18	9999	10.53	9999	1.37	9999

TABLE 2.—PERCENT RECOVERY

% Rec	Constituent							
	Acrolein	p-DAB	4-AB	Aramite	CB	DBP	MMS	2-NA
A	1.6	36	13.661	5.47	138.04	0	50.7	8.77
B	0	118.87	473.41	79.23	175.85	0	63.54	125.48
C	1.954	40.77	34.95	120.34	105.99	27.34	100.38	18.73
D	0	126.74	1.69	0.11	160.43	0	74.11	3.98
E	0	134.65	31.54	80	247.725	0	0	8.89
F	0	558.13	17.55	330.24	436.82	0	33.31	3.08

Although ETC reports relatively few detection limits for acrolein, the consistently problematic low recoveries, all below 2% were the basis of EPA's concern in the Third Third rule. Similarly, dibenzo(a,e)pyrene exhibits extremely and consistently low recoveries while several detection limits are missing from the report. Aramite exhibited several extremely high detection limits plus an erratic set of percent recoveries ranging from very high to very low. The other four constituents, p-dimethylaminoazo-benzene, 4-aminobiphenyl, chlorobenzilate and 2-naphthylamine show a pattern of generally high detection limits and high recoveries, with much variation in recoveries and with several significantly high values in each set. The methylmethanesulfonate data were supplied by ETC despite the fact that EPA did not propose a nonwastewater standard for this constituent in the Third Third rule; this data is presented here for completeness and to stimulate comment on the development of today's proposed methylmethanesulfonate nonwastewater standard discussed below.

(ii) EPA's Treatability Data Detection Limits and Recoveries. High or erratic detection limits and recoveries are of concern to EPA. For both parameters, high values indicate a barrier to quantification and erratic values indicate unreliable quantification. Analysis of the fourteen EPA incinerator burns used to generate nonwastewater treatability data shows both a narrower range of detection limits and lower values of detection limits than the ETC study achieved. The following table presents the ranges of detection limits achieved.

In generating treatability data for listed hazardous wastes EPA undertook

a series of fourteen incinerator burns. Analysis of ash from these burns provided the numerical basis for nonwastewater standards. Detection limit data were obtained from the ash itself for all constituents. However, recovery levels were determined for only a handful of constituents. After these recoveries were determined by spiking ash with the selected constituents and measuring the percentage of the spike which was recovered, these recovery values were transferred to chemically similar constituents and incorporated into the nonwastewater treatment standard calculations. EPA generally rejected recoveries ranging outside the 20% to 200% range following the guidance of the BDAT program's Quality Assurance Project Plan.

ORIGINAL EPA NONWASTEWATER INCINERATOR BURN DETECTION LIMITS

EPA test burn	Detection limits for volatile organics	Detection limits for semivolatiles organics
Test #1	0.1–10.0	0.11–10.0
Test #2	0.2–50.0	0.08–5.0
Test #3	0.05–10.0	0.01–10.1
Test #4	2.0–10.0	2.0–50.0
Test #5	^a 2.0–50.0	0.5–10.0
Test #6	^b 0.2–50.0	0.4–7.0
Test #7	^c 2.0–20	0.2–5
Test #8	0.025–2.0	1.0–10.0
Test #9	0.005–0.4	0.42–4.0
Test #10	^c 1.5–30	1.00–5.0
Test #11	0.005–0.4	0.531–4.0
Test #13	0.01–2.0	0.36–1.8
Test #14	^a 0.010–2	0.36–1.8

^a Excluding one outlier out of 40 analytes.
^b Excluding five outliers out of 40 analytes.
^c Excluding two outliers out of 40 analytes.

(iii) Solicitation of Treatability Data. EPA solicits additional treatability and

analytical data concerning nonwastewater forms of these constituents. By taking comment on whether to promulgate nonwastewater standards for these constituents, EPA is reopening the discussion of the issues of detection limits and recoveries raised by ETC in the comments following the Third Third proposal. EPA opens the question of whether advances in detectability, notably the use of HPLC (high pressure liquid phase chromatography) may allow reliable measurement. EPA also solicits comment whether more reliable recovery values have been achieved for these constituents, and at what detection level are reliable results achieved.

(iv) Additional Potential Nonwastewater UTS Based on Treatability Groups. EPA is also soliciting comment on potential treatment standards for 2-chlorovinyl ether, 1,2-diphenylhydrazine, ethylene oxide and methyl methanesulfonate based on the Treatability Group categories outlined in the LDR Phase II Final Background Document for Universal Standards, Volume A, Universal Standards for Nonwastewater Forms of Listed Hazardous Wastes. Specifically, for each of the constituents listed above, EPA is considering as potential UTS the lowest nonwastewater treatment standard for the treatability group to which that constituent belongs.

Treatability groups collect the UTS constituents into sets of chemically similar compounds with similar behavior in treatment processes and analytical instruments. UTS for nonwastewater UTS are based on the detection limits of that compound in incinerator ash. Since these detection limits reflect the constituent's "fate and transport" in the analytical unit

according to its chemical structure and composition, transferring treatability data among members of treatability groups accounts for similarities in analytical quantification as well as in treatment.

NONWASTEWATER UTS

Compound	NW UTS (mg/l)
Acrolein	2.8
4-Aminobiphenyl	13
Aramite	2.5
Chlorobenzilate	6.6
2-Chlorovinyl ether	5.6
Dibenz(a,e)pyrene	22
1,2-Diphenylhydrazine	1.5
Ethylene oxide	0.75
Methyl methanesulfonate	4.6
p-Dimethylaminoazobenzene	29
2-Naphthylamine	15

(v) UTS for Sulfide in Nonwastewater Form.

EPA is soliciting treatability data for nonwastewater forms of sulfide. In the absence of treatability data for this inorganic ion in nonwastewater matrices, EPA is not proposing treatment standards but is requesting treatability and analytical data on which to develop a standard.

(vi) UTS for Fluoride in Nonwastewater Form.

EPA is today proposing a 48 mg/l as the UTS for the fluoride ion identical to that proposed today for fluoride in K088 nonwastewaters. The basis of the K088 standard is discussed in the section of today's preamble proposing treatment standards for K088 wastes. Today's proposed fluoride nonwastewater UTS, like the K088 fluoride standard, is based on the use of SW-846 leachate method 1311. Fluoride, like zinc, is not an underlying hazardous constituent in characteristic wastes, according to the definition at § 268.2(i).

b. Wastewaters. Additionally, today's rule proposes a wastewater treatment standard for 1,4-dioxane. 1,4-Dioxane is the only UTS constituent for which EPA had promulgated a nonwastewater standard but not a wastewater standard. Commenters reported analytical difficulties in quantifying 1,4-dioxane at the wastewater standard proposed in the LDR Phase II UTS (0.12 mg/l); this standard was based on a transfer from ethyl ether. EPA consequently withdrew that standard in the LDR Phase II final rule. The docket for today's rule includes treatability data submitted by one such commenter.

Today's rule proposes a wastewater UTS of 0.22 mg/l for 1,4-dioxane. This standard is being proposed as the maximum daily limit for 1,4-dioxane in the proposed effluent guidelines for the pharmaceuticals industry, based on the performance of steam stripping followed by biological treatment.

EPA also solicits comment on a wastewater standard for 1,4-dioxane of 8.67 mg/l, followed by biological treatment. The basis of this alternative standard is treatability data for distillation, which was developed for the proposed pharmaceutical effluent guidelines. The data supporting this standard represents a transfer of distillation performance data with methanol to 1,4-dioxane.¹³

WASTEWATER UTS

Compound	WW UTS
1,4-Dioxane	0.22 mg/l

3. Application to Listed Waste

a. Wastewater-nonwastewater pairs. There are several cases where a constituent is regulated in wastewater forms of particular listed wastes with UTS but not in nonwastewater and a nonwastewater UTS exists for these

constituents, having been promulgated in LDR Phase II. For these constituents, EPA proposes to extend the UTS to nonwastewaters, and vice versa. In other words, in cases where the 40 CFR 268.40—Table of Treatment Standards for Hazardous Wastes lists a numerical treatment standard for a constituent in one form of a listed waste but not in the other, today's rule proposes the UTS as the standard for the other form. This section of today's rule does not propose new UTS, rather it extends existing UTS to gaps in the media-specific standards for individual constituents in listed wastes. An example is K019 where p-dichlorobenzene, fluorene and 1,2,4,5-tetrachlorobenzene are regulated with UTS in wastewater forms of K019 but are not regulated—indicated in the Consolidated Table as “NA”—in nonwastewater forms of K019. Today's rule proposes filling in these “NA's” for p-dichlorobenzene, fluorene and 1,2,4,5-tetrachlorobenzene in nonwastewater for K019 with the UTS and similarly applying UTS in other cases where UTS now apply to a constituent in either wastewaters and nonwastewaters but do not apply to both. The gaps between wastewater and nonwastewater coverage for individual constituents in listed wastes occurred because the Agency decided on a waste code-by-waste code basis whether to include constituents in wastewater, nonwastewater or both forms of a waste. EPA now believes that applying UTS to wastewaters and nonwastewaters consistently ensures treatment of regulated constituents regardless of the physical form of the waste or the waste treatment residual regulated under the “derived-from” rule.

The following tables show those regulated constituents, by waste code, where either a wastewater or a nonwastewater UTS is added by today's proposal.

Waste code	Constituent	Wastewater standard (mg/l)
F006	Silver	0.43
F007	Cadmium	0.69
	Silver	0.43
F008	Cadmium	0.69
	Silver	0.43
F009	Cadmium	0.69
	Silver	0.43
F011	Cadmium	0.69
	Silver	0.43
F012	Cadmium	0.69
	Silver	0.43
F038	Nickel	3.98

¹³ At the time of signature of this rule, further data on these effluent guidelines were forthcoming. This additional data, if not available at the time of

publication of this rule, will be made available shortly thereafter.

Waste code	Constituent	Wastewater standard (mg/l)
K018	Pentachloroethane	0.055
K030	Hexachloropropylene	0.035
	Pentachlorobenzene	0.055
	Pentachloroethane	0.055
K035	Acenaphthene	0.059
	Anthracene	0.059
	Dibenz(a,h)anthracene	0.055
	Fluorene	0.068
	Indeno(1,2,3-cd)pyrene	0.0055
K048	Nickel	3.98
K049	Nickel	3.98
K050	Nickel	3.98
K051	Nickel	3.98
K052	Nickel	3.98
K061	Antimony	1.9
	Arsenic	1.4
	Barium	1.2
	Beryllium	0.82
	Mercury	0.15
	Selenium	0.82
	Silver	0.43
	Thallium	1.4
	Zinc	2.61
P013	Barium	1.2

Waste code	Constituent	Nonwastewater standard (mg/kg unless otherwise noted)
F001-5 ...	Carbon disulfide	4.8 (mg/l TCLP)
	Cyclohexanone	0.75 (mg/l TCLP)
	Methanol	0.75 (mg/l TCLP)
F037	Acenaphthene	3.4
	Fluorene	3.4
	Lead	0.37 (mg/l TCLP)
F038	Fluorene	3.4
	Lead	0.37 (mg/l TCLP)
F039	Acetonitrile	38
	Acrolein	2.8
	4-Aminobiphenyl	13
	Aramite	2.5
	Carbon disulfide	4.8 (mg/l TCLP)
	Chlorobenzilate	6.6
	2-Chloro-1,3-butadiene	0.28
	Cyclohexanone	0.75 (mg/l TCLP)
	Dibenz(a,e)pyrene	22
	Diphenylamine/diphenylnitrosamine	13
	1,2-Diphenylhydrazine	1.5
	Ethylene oxide	0.75
	Methanol	0.75 (mg/l TCLP)
	Methyl methanesulfonate	4.6
	2-Naphthylamine	15
	N-Nitrosodimethylamine	2.3
	Phthalic anhydride	28
	tris-(2,3-Dibromopropyl)phosphate	0.10
	Beryllium	0.014 (mg/l TCLP)
	Fluoride	48
	Thallium	0.078 (mg/l TCLP)
	Vanadium	0.23 (mg/l TCLP)
K006	Lead	0.37 (mg/l TCLP)
K018	Chloromethane	30
K019	p-Dichlorobenzene	6.0
	Fluorene	3.4
	1,2,4,5-Tetrachlorobenzene	14
K028	Cadmium	0.19 (mg/l TCLP)
K030	o-Dichlorobenzene	6.0
	p-Dichlorobenzene	6.0
K048	Fluorene	3.4
	Lead	0.37 (mg/l TCLP)
K049	Carbon disulfide	4.8 (mg/l TCLP)
	2,4-Dimethylphenol	14

Waste code	Constituent	Nonwastewater standard (mg/kg unless otherwise noted)
K050	Lead	0.37 (mg/l TCLP)
	Lead	0.37 (mg/l TCLP)
K051	Acenaphthene	3.4
	Fluorene	3.4
K052	Lead	0.37 (mg/l TCLP)
	2,4-Dimethylphenol	14
K083	Lead	0.37 (mg/l TCLP)
K086	Cyclohexanone	0.75 (mg/l TCLP)
	Cyclohexanone	0.75 (mg/l TCLP)
K101	Methanol	0.75 (mg/l TCLP)
	Cadmium	0.19 (mg/l TCLP)
K102	Lead	0.37 (mg/l TCLP)
	Mercury	0.025 (mg/l TCLP)
	Cadmium	0.19 (mg/l TCLP)
	Lead	0.37 (mg/l TCLP)
P003	Mercury	0.025 (mg/l TCLP)
P056	Acrolein	2.8
U038	Fluoride	48
U042	Chlorobenzilate	6.6
U093	2-Chloroethyl vinyl ether	5.6
U134	p-Dimethylaminoazobenzene	29
U168	Fluoride	48
	2-Naphthylamine	15

b. Elimination of Redundant Methods of Treatment. Several constituents had been regulated with UTS in one medium (wastewaters or nonwastewaters) but were regulated with a method of treatment in the other as alternatives, namely P022 carbon disulfide (nonwastewaters), U003 acetonitrile (nonwastewaters), U057 cyclohexanone (nonwastewaters), U108 1,4-dioxane (wastewaters and nonwastewaters), U110 1,2-diphenylhydrazine (wastewaters), U115 ethylene oxide (wastewaters), U154 methanol (wastewaters and nonwastewaters). The LDR Phase II proposal did not suggest that the specified methods be replaced with the UTS. However, in comments received on the proposal, commenters requested that EPA apply the UTS to these wastes. Because EPA had not specifically proposed such a change, the LDR Phase II final rule allowed both the specified method or the UTS.

EPA believes that the UTS are appropriate so that the alternative specified method is now unnecessary. Numerical treatment standards, such as UTS, ensure treatment more reliably than do standards expressed as methods of treatment because the target concentrations allow for verification that the waste has been treated. Consequently, EPA intends to replace required methods of treatment with numerical standards whenever possible. EPA believes UTS for these constituents provides such an opportunity. Therefore today's rule proposes to eliminate the alternative methods of treatment and

establishes UTS for both wastewater and nonwastewater constituents.

4. Revision to the Acetonitrile Standard

a. The acetonitrile nonwastewater standard. EPA reviewed the constituent-specific standard for acetonitrile nonwastewaters, and believes that this standard should be raised from 1.8 mg/kg to 38 mg/kg. The 1.8 mg/kg standard, which was based on incineration, is not consistent with treatment data and standards for other structurally related organo-nitrogen UTS compounds. For example, the nonwastewater treatment standard for both acrylonitrile and methacrylonitrile is 84 mg/kg. The nonwastewater standards for ethyl methacrylate and methyl methacrylate are 160 mg/kg.

Acetonitrile is one of the compounds singled out by the ETC as being problematic to analyze for in combustion residues (i.e., nonwastewaters). In response to the Third Third Rulemaking, the ETC had submitted data from which they calculated a method detection limit of 6.678 mg/kg for other combustion residues.

The Agency is soliciting data and comment specifically on the analytical achievability of the 1.8 mg/kg acetonitrile nonwastewater standard in combustion residues and the ability of non-combustion technologies to achieve the 1.8 mg/kg and the proposed standard of 38 mg/kg for acetonitrile in nonwastewaters.

b. Revoking the special wastewater/nonwastewater definition for

acrylonitrile wastes. The Agency also recognizes that K011/13/14 nonwastewaters could consist of over 90% water, and that wastewater treatment is an appropriate means of treating these wastes. For the above reasons, the Agency is proposing to revise the treatment standard for acetonitrile in nonwastewaters to 38 mg/kg based on the existing treatment data, which comes from treating K011/13/14 wastes containing greater than 1% TOC by steam stripping. (See the background documents for K011/13/14 nonwastewaters in the Second Third Final Rule Docket and the background documents for K011/13/14 "wastewaters" in the Third Third Final Rule Docket).

5. Aggressive Biological Treatment as BDAT for Petroleum Refinery Wastes

EPA solicits comment whether to specify aggressive biological treatment as the treatment standard for decharacterized petroleum refining wastewaters. Aggressive biological treatment is defined in § 261.31(b)(2) as one of the following four processes: activated sludge, trickling filters, rotating biological contactors or high-rate mechanical aeration. The American Petroleum Institute (API) has submitted data to the Agency on ten of its facilities using aggressive biological treatment. Along with the data API requested that EPA specify aggressive biological treatment as the treatment standard for their wastes. Such a standard, which would operate in lieu of UTS, may reduce the monitoring burden. EPA

solicits comment on proposing aggressive biological treatment as BDAT for these wastes. However, because monitoring is required under CWA permits, EPA is also soliciting comment on whether a reduction in the number of constituents monitored is significant. The data which API submitted demonstrate that aggressive biological treatment in the industry may consistently meet UTS. There was one observation, however, for which a constituent exceeded UTS, and other observations which involved detection limits which exceeded UTS. This data is available in the docket for today's rule.

B. Dilution Prohibition

Under the existing LDR dilution prohibition (40 CFR 268.3), burning inorganic metal-bearing hazardous wastes can be a form of impermissible dilution. On May 27, 1994, the Assistant Administrator for the Office of Solid Waste and Emergency Response issued a Statement of Policy which clarified this point (59 FR 27546-7). Today the Agency is proposing to codify and quantify these principles.

1. Dilution Prohibited as a Method of Treatment

Under RCRA, the LDR prohibition on dilution states generally that no person "shall in any way dilute a restricted waste * * * as a substitute for adequate treatment to achieve compliance with (a treatment standard for that waste)". 40 CFR 268.3(a). This prohibition implements the requirement of section 3004(m) of RCRA, which requires that hazardous constituents in hazardous wastes be destroyed, removed or immobilized before these wastes can be land disposed. Hazardous constituents are not destroyed, removed or immobilized if they are diluted. *CWM v. EPA*, 976 F.2d at 16, 17, 19-20; see also S. Rep. No. 298, 98th Cong. 1st Sess. 17 (1983) ("the dilution of wastes by the addition of other hazardous waste or any other materials during waste handling, transportation, treatment or storage is not an acceptable method of treatment to reduce the concentration of hazardous constituents").

Consistent with these authorities, the Agency has stated that the dilution prohibition serves one chief purpose—"to ensure that prohibited wastes¹⁴ are treated by methods that are appropriate for that type of waste." (55 FR 22532, June 1, 1990). Impermissible dilution can occur under a number of circumstances. The most obvious is

when solid wastes are added to a prohibited waste to reduce concentrations but not volumes of hazardous constituents, or to mask their presence. Impermissible dilution also may occur when wastes not amenable to treatment by a certain method (i.e., treated very ineffectively by that treatment method) are nevertheless "treated" by that method (55 FR 22666, June 1, 1990) (biological treatment does not effectively remove toxic metals from wastes; therefore, prohibited wastes with treatment standards for metals ordinarily would be impermissibly diluted if managed in biological treatment systems providing no separate treatment for the metals). See also 52 FR at 25778-79 (July 8, 1987) (impoundments which primarily evaporate hazardous constituents do not qualify as section 3005(j)(11) impoundments which may receive otherwise-prohibited hazardous wastes that have not met the treatment standard).

This proposed rule gives a general distinction between "adequate treatment" and potential violations of the dilution prohibition. The Agency has evaluated the listed wastes and has determined that 43 of the RCRA listed wastes (as set forth in 40 CFR 261) typically appear to be such inorganic hazardous wastes; i.e., they typically do not contain organics, or contain only insignificant amounts of organics, and are not regulated for organics¹⁵. BDAT for these inorganic, metal-bearing listed wastes is metal recovery or stabilization. Thus, impermissible dilution may result when these wastes are combusted.

This proposed rule reflects the Agency's concerns about the hazard presented by toxic metals in the environment. When an inorganic metal-bearing hazardous waste with insignificant organics is placed in a combustion unit, legitimate treatment for purposes of LDR ordinarily is not occurring. No treatment of the inorganic component occurs during combustion, and therefore, metals are not destroyed, removed, or immobilized. Since there are no significant concentrations of organic compounds in inorganic metal-bearing hazardous wastes, it cannot be maintained that the waste is being properly or effectively treated via combustion (i.e., thermally treated or destroyed, removed, or immobilized).

In terms of the dilution prohibition, if combustion is allowed as a method to achieve a treatment standard for these

wastes, metals in these wastes will be dispersed to the ambient air and will be diluted by being mixed in with combustion ash from other waste streams. Adequate treatment (stabilization or metal recovery to meet LDR treatment standards) has not been performed and dilution has occurred. It is also inappropriate to regard eventual stabilizing of such combustion ash as providing adequate treatment for purposes of the LDRs. Simply meeting the numerical BDAT standards for the ash fails to account for metals in the original waste stream that were emitted to the air and for reductions achieved by dilution with other materials in the ash. (In most cases, of course, the metal-bearing wastes will have been mixed with other wastes before combustion, which mixing itself could be viewed as impermissible dilution).

These inorganic, metal-bearing hazardous wastes should be and are usually treated by metal recovery or stabilization technologies. These technologies remove hazardous constituents through recovery in products, or immobilize them, and are therefore permissible BDAT treatment methods.

There are eight characteristic metal wastes; however, only wastes that exhibit the TC as measured by both the TCLP and the EP for D004-D011 are presently prohibited (see 55 FR 22660-02, June 1, 1990). Characteristic wastes, of course, cannot be generically characterized as easily as listed wastes because they can be generated from many different types of processes. For example, although some characteristic metal wastes do not contain organics or cyanide or contain only insignificant amounts, others may have organics or cyanide present which justify combustion, such as a used oil exhibiting the TC characteristic for a metal. Thus, it is difficult to say which D004-D011 wastes would be impermissibly diluted when combusted, beyond stating that as a general matter, impermissible dilution would occur if the D004-D011 waste does not have significant organic or cyanide content but is nevertheless combusted.

2. Permissible Dilution

EPA ordinarily would not consider the following hazardous wastes to contain "significant organic or cyanide content", for which combustion would otherwise be impermissible dilution (the Agency is adding criteria beyond that included in the May 27, 1994 policy memorandum to clarify situations raised in comments received). Combustion of the following inorganic metal-bearing wastes is therefore not

¹⁴ A "prohibited" hazardous waste is one which is actually subject to a prohibition on land disposal without first being treated, or disposed in a no-migration unit. See 54 FR 36968 (Sept. 6, 1989).

¹⁵ To the extent that these wastes or residues of these wastes (i.e., biological treatment sludges) contain significant organic content, combustion may be an appropriate treatment technology. See later discussion regarding this point.

prohibited under the LDR dilution prohibition: (1) Wastes that, at the point of generation, or after any bona fide treatment such as cyanide destruction prior to combustion, contain hazardous organic constituents or cyanide at levels exceeding the constituent-specific treatment standard for UTS; (2) organic, debris-like materials (e.g., wood, paper, plastic, or cloth) contaminated with an inorganic metal-bearing hazardous waste; (3) wastes that, at point of generation, have reasonable heating value such as greater than or equal to 5000 Btu/lb (see 48 FR 11157, March 16, 1983); (4) wastes co-generated with wastes that specify combustion as a required method of treatment; (5) wastes, including soil, subject to Federal and/or State requirements necessitating reduction of organics (including biological agents); and (6) wastes with greater than 1% Total Organic Carbon (TOC). An "inorganic metal-bearing waste" is one for which EPA has established treatment standards for metal hazardous constituents, and which does not otherwise contain significant organic or cyanide content. (See 40 CFR Appendix XI proposed in today's rule for a list of waste codes which EPA tentatively believes satisfies this definition.) The foregoing six categories of waste typically would contain sufficient organic content to indicate that combustion can be a reasonable means of treating the wastes prior to land disposal. EPA solicits comments on whether there are other inorganic wastes that would technically justify combustion as a means of complying with BDAT. For example, are there metal bearing organic wastes or complexing agents not covered by the above criteria that prevent effective stabilization of metals due to the presence of unregulated organics? However, as noted above, mixing practices such as fuel blending to add organics to inorganic metal-bearing hazardous wastes ordinarily would be considered to be impermissible dilution. This is because, under current rules, the dilution prohibition applies at the point a hazardous waste is generated. *CWM v. EPA* 976 F.2d at 22-3; see also 48 FR 11158, 11159 and nn. 2 and 4 (March 16, 1983); 53 FR at 522 (Jan. 8, 1988) determinations of legitimacy of recycling are made on a waste-by-waste basis before any blending occurs.

The Agency is aware of a practice within the foundry industry that recycles foundry sand by thermally oxidizing impurities. It is EPA's view that this process would violate the policy against combustion of inorganics, unless the foundry sand being oxidized

contains toxic organic constituents or has a significant organic component (as described above).

3. Cyanide-Bearing Wastes and Combustion

A commenter questioned why EPA allows the presence of cyanide to justify combustion when there are adequate alternative treatment methods. This approach was adopted because cyanide is destroyed by combustion. Existing LDR rules, in many cases, identify combustion as an appropriate BDAT for destruction of cyanide-bearing wastes. The May 27, 1994 policy statement did not change BDAT determinations and thus reflected that combustion could be appropriate for destroying certain cyanide-bearing wastes. EPA, however, solicits comments on whether the cyanide criterion should be dropped.

While cyanide is effectively treated in combustion devices, EPA has received comments that non-combustion technologies such as alkaline chlorination are available to effectively treat metal bearing wastes that contain cyanide and that BDAT for these wastes should not include combustion. EPA solicits comments on the relative effectiveness and risks of combustion versus alkaline chlorination in treating cyanides in inorganic metal bearing wastes.

4. Table of Inorganic Metal Bearing Wastes

The table being proposed in 40 CFR part 268, Appendix XI today indicates the list of waste codes for which EPA regulates only metals and/or cyanides that would be affected by this proposed rule. Except for P122, this list is identical to the list originally published in the aforementioned Policy Statement on this subject. The Agency is removing P122 (Zinc Phosphide greater than 10%) from the list of restricted inorganic metal-bearing wastes, because the Agency has previously promulgated a treatment standard of INCIN for the nonwastewater forms of this waste. See 40 CFR 268.40. The policy memo was in error on this point. The Agency solicits comment on this issue, particularly with respect to costs associated with the segregation of these wastes.

5. The Addition of Iron Dust To Stabilize Characteristic Hazardous Wastes: Potential Classification as Impermissible Dilution

The Agency has become aware that certain industries may be adding iron dust or iron filings to some characteristic hazardous wastes as a form of treatment. For example, foundries are known to mix iron dust or

filing with the D008 waste sand generated from their spent casting molds, viewing this practice as a form of stabilization. The Agency believes, however, that such stabilization is inadequate to minimize the threats posed by land disposal of metal-containing hazardous wastes, and is today proposing to clarify that this waste management practice is "impermissible dilution" under 40 CFR 268.3, for reasons discussed below.

In particular, when iron dust or filings are added to a characteristic waste foundry sand, it is considered "treatment" under the definition in 40 CFR 260.10. Nevertheless, the Agency does not believe it to be adequate treatment; rather, it is merely the addition of material as a substitute for adequate treatment, and thus constitutes impermissible dilution. See § 268.3(b), 54 FR at 48494 (Nov. 1989), and 55 FR at 22532 (June 1, 1990). The Agency believes it is unlikely that any chemical reactions are taking place when iron dust or iron filings are added, because the waste foundry sand would likely contain only lead, silica, microscopic pieces of castings, and binders (clays, phenols, and tars) from the molds. The Agency does not believe that simply adding iron would provide treatment for either the lead or the organics (i.e., phenol and tar).

While it is arguable that iron could form temporary, weak, ionic complexes with silica and/or phenate, so that when analyzed by the TCLP test the lead appears to have been stabilized, the Agency believes that this "stabilization" is temporary, based upon the nature of the complexing. In fact, a report prepared by EPA on Iron Chemistry in Lead Contaminated Materials (Feb. 22, 1994), which specifically addressed this issue, found that iron lead bonds are weak, adsorptive surface bonds, and therefore not likely to be permanent. Furthermore, as this iron-rich mixture is exposed to moisture and oxidative conditions over time, interstitial water would likely acidify, which could potentially reverse any temporary stabilization, as well as increase the leachability of the lead from the foundry sand. Therefore, the addition of iron dust or filings to characteristic waste foundry sand does not appear to provide long-term treatment.

Another related concern is that the addition of iron has been demonstrated to result in false negatives for lead when wastes are analyzed by means of the

TCLP¹⁶. This significant interference with the analytical method for detecting lead, in conjunction with the concerns about the temporary nature of any stabilization that would occur, fully supports identifying this practice as impermissible dilution or otherwise failing to satisfy the requirements of RCRA section 3004(m) to minimize short- and long-term threats to human health and the environment. Comments and data are solicited on whether this type of stabilization is effective in achieving long-term treatment. Comments and data are also solicited on whether a test method other than the TCLP is more appropriate for measuring compliance for this waste.

D. Expansion of Methods Requiring Incineration

EPA is proposing to modify the treatment standard expressed as INCIN, which specifies hazardous waste incineration, to, CMBST, which allows combustion in incinerators and boilers and industrial furnaces. The INCIN requirement was set before EPA had issued air emission requirements for boilers and industrial furnaces (BIFs). Now that BIF regulations are in place, the need to constrain treatment to one type of combustion device is no longer appropriate. With the development of innovative technologies, EPA also solicits comment on whether the Catalytic Extraction Process, for which Molten Metal Technology received a determination of equivalent treatment under § 268.42(b)¹⁷, should also be allowed for all wastes which have a treatment standard of CMBST, and whether there are other technologies which are equivalent to CMBST.

E. Clean Up of 40 CFR Part 268

EPA is proposing further changes to the LDR program to achieve the goal of simplified regulations. The Agency is committed to improving the LDR program by implementing participant suggestions from the LDR Roundtable held on January 12–14, 1993.

The LDR requirements are found, primarily, in 40 CFR Part 268. EPA intends to remove language that is out-of-date, and to clarify language which

may be confusing, in an effort to make the LDR program easier to understand, implement, and enforce. This effort will continue in the LDR Phase IV rule, scheduled for proposal in June 1995.

1. Section 268.8

Section 268.8 stated that First and Second Third wastes for which EPA did not promulgate treatment standards by their respective effective dates could continue to be disposed of in landfill and surface impoundment units until May 8, 1990 (see 55 FR 22526). Because treatment standards for all scheduled wastes were promulgated in the Third Third rule in 1990, these “soft hammer” requirements are no longer necessary. Therefore, § 268.8 is proposed to be removed from part 268.

2. Sections 268.10–268.12

The purpose of Subpart B of § 268 was to set out a schedule for hazardous wastes by the date when treatment standards were to be established. Sections 268.10, 268.11, and 268.12 of Subpart B included the First Third, Second Third, and Third Third scheduled wastes respectively. Deadlines in all three of these sections were met on time, and the wastes are subject to treatment standards. Therefore, these three sections are no longer necessary, and are proposed to be removed.

3. Section 268.2(f)

The existing wastewater definition found in § 268.2(f) includes wastes that have less than 1% TOC and less than 1% TSS. There are three exceptions given to this definition: (1) F001–F005 wastewaters have no criteria for TSS, and must contain less than 1% solvent constituents, (2) K011, K013, K014 wastewaters must contain less than 5% TOC and less than 1% TSS, and (3) K103 and K104 wastewaters must contain less than 4% TOC and less than 1% TSS. With the promulgation of UTS in the LDR Phase II final rule (59 FR 47982, September 19, 1994), such distinctions are inconsistent and an unnecessary complication of the regulations. While such initial classifications may have had some meaning, after effective BDAT treatment the residuals are appropriately regulated by the wastewater or nonwastewater limit as specified by the 1% TOC and TSS criteria. The Agency is therefore proposing to remove paragraphs (1)–(3) from § 268.2(f).

VIII. Proposed Prohibition of Hazardous Waste as Fill Material

EPA is also proposing today to amend the LDR rules so as to prohibit the

placement of hazardous waste as a fill material unless the prohibited waste is treated so that short- and long-term threats have been minimized. By “fill material”, the Agency means uses¹⁸ of waste as a substitute for low grade material (such as sand or dirt) to raise the level of land, occupy space, or otherwise fill in depressions. Hazardous waste includes, of course, any waste that is identified or listed as hazardous under § 261.3, and so includes wastes (such as residues from treating listed wastes) that are hazardous by virtue of the mixture and derived-from rules. The result of this rule, if finalized, would thus be to confirm that such uses are prohibited and therefore illegal unless the fill area is a regulated unit (i.e., a subtitle C landfill).

EPA in fact already interprets current rules as ordinarily providing a similar result. In the preamble to the May 19, 1980 rules establishing the subtitle C hazardous waste management program, EPA stated that an exemption from regulation for legitimate recycling activities does not apply to “sham uses and recovery or reclamation—e.g. ‘landfilling’ or ‘land reclamation’”. 45 FR at 33093. In the April 4, 1983 Federal Register Notice proposing a separate regulatory regime for hazardous wastes legitimately recycled in a manner constituting disposal (ultimately promulgated as 40 CFR 260.20–23), the Agency stated that this provision would not apply to hazardous wastes used as fill material, the specific example provided being “waste stabilization processes where the stabilized material is then used as fill.” 48 FR at 14985. The Agency further stated that it was “convinced that these waste treatment operations are not production processes and can therefore be regulated as waste management.” *Id.*

The reasons for the Agency’s interpretation are evident. The wastes are being put into the environment without any safeguards to prevent exposure. Hazardous constituents can migrate into the environment and reach human and environmental receptors by any number of direct pathways, including inhalation, dermal contact, surface runoff, and leaching to groundwater. Indirect exposure pathways exist as well.

The amended rule, if adopted, would prohibit the use of hazardous waste as fill material, and add a conforming amendment to § 266.20(b) stating that

¹⁸ Incidentally, the term “use” here has no specific meaning other than the normal dictionary definition. It is not meant to connote the phrase “used or reused” found in § 261.1(c)(5), which is a term of art for determining the scope of the exclusion in § 261.2(e)(1) (i) and (ii).

¹⁶ See memo from John V. Cignatta, Datanet to John Gauthier, EPA Region 1, dated September 8, 1992.

¹⁷ The Catalytic Extraction Process, used by Molten Metal Technology, involves a molten metal bath, with temperatures around 3000°F, into which liquid wastes are injected, and solid wastes are fed with a carrier gas (Ar). The process treats the wastes in a high temperature reduction environment, which reduces the compounds to their elemental state. The metallic, inorganic ceramic, and gaseous phases which result are then reused, or purified and released.

disposal of hazardous waste as fill material is not a type of use constituting disposal subject to the special standards of Part 266 subpart C, but rather disposal plain and simple, and hence illegal unless occurring in a regulated unit; or, as explained below, if the prohibited waste can be shown to be treated to satisfy section 3004(m). Section 3004(m) of the statute states that EPA is to establish "levels or methods of treatment, if any, which substantially reduce the likelihood of migration of hazardous constituents from the wastes so that short-term and long-term threats to human health and the environment are minimized." (Emphasis added). In this case, the Agency is unable to determine any level of treatment of hazardous wastes which can guarantee the requisite minimization of short-term and long-term threats when prohibited hazardous wastes are used as fill material.

Because there are no specifications or constraints on placement of fill material, reliable assessments pose particular uncertainties and difficulties. These uncertainties relate to release, transport, and ultimate exposure, and include uncertainties regarding release mechanisms, types and amounts of hazardous constituents released due to potential waste variability, location of human and environmental receptors, and transport mechanisms. cf. *HWTC III*, 886 F. 2d at 1362-63. The existing LDR treatment standards do not fully address these potential problems for at least two reasons. First, the LDR standards are technology-based, not risk-based standards. Second, for metal hazardous constituents, the LDR standards do not regulate the total metal content of hazardous wastes. Total metal content is relevant to many possible exposure pathways when hazardous waste is used as fill material, including inhalation and direct ingestion pathways. See also 59 FR at 43499 (August 24, 1994), where EPA made similar findings with respect to use of hazardous waste K061 as anti-skid or deicing material (uses which are better defined, and hence more assessable, than use as fill material). Similarly, this type of disposal does not appear to satisfy the ultimate protectiveness standard in sections 3004(d), (e), and (g) (which requires that disposal of hazardous waste that meets a treatment standard must nevertheless still be protective, taking into account enumerated uncertainties—including long-term uncertainties associated with the persistence, toxicity, mobility, and propensity to bioaccumulate—of land disposed hazardous waste and

hazardous constituents). See 56 FR at 41168 (August 19, 1991), adopting this standard, which was first articulated in *NRDC v. EPA*, 907 F. 2d 1146, 1171-2 (D.C. Cir. 1990) (dissenting opinion).

EPA is not, in this notice, proposing to prohibit other uses of hazardous waste that involve placement on the land. Thus, hazardous waste presently placed on the land as fill material can be diverted to a less risky, more acceptable activity. See 59 FR 8583 (Feb. 23, 1994) noting availability of safer alternatives as justification for the then-proposed prohibition on non-encapsulated uses of hazardous waste K061. Nor would the agency preclude the possibility that particular types of prohibited waste could be used as fill material, provided that it can be established that threats to human health and the environment have been minimized, taking into account all of the statutorily-enumerated uncertainties cited above.

In a recent proposed rule on the product use of High Temperature Metal Recovery slags derived from K061, F006, and K062 hazardous waste, the Agency initially evaluated the risks that result from a variety of uses of these slags, including use as road subbase, an ingredient in cement and asphalt, top grade material for roads, etc. (59 FR 67256, December 29, 1994). While this evaluation considered the possible release and transport of waste constituents, the uses examined did not include the unrestricted use of the waste-derived product as fill material. Use as fill could result in placement of the waste residual in almost any location, including a residential setting. Therefore, an evaluation of the risks posed by use of waste-derived products as fill would need to consider the potential for direct exposure to receptors located on-site (e.g., direct ingestion or inhalation of the material), in addition to the potential for movement of the material off-site to other receptors. Such an evaluation would need to consider at a minimum the volume of material used as fill, the levels of toxic constituents in the material (both total and leachable), the placement site and proximity to receptors, and activity at the site that would promote release, transport, and exposure. Indirect exposure pathways also could be relevant, particularly for hazardous wastes containing bioaccumulative hazardous constituents (including dioxins and dibenzofurans).

IX. Capacity Determinations

A. Introduction

This section summarizes the results of the capacity analysis for the wastes covered by this proposal. For background information on data sources, methodology, and a summary of each analysis, see the Background Document for Capacity Analysis for Land Disposal Restrictions, Phase III—Decharacterized Wastewaters, Carbamate and Organobromine Wastes, and Spent Potliners, found in the docket for today's rule.

In general, EPA's capacity analysis methodologies focus on the amount of waste to be restricted from land disposal that is currently managed in land-based units and that will require alternative treatment as a result of the LDRs. The quantity of wastes that are not managed in land-based units (e.g., wastewaters managed only in RCRA exempt tanks, with direct discharge to a POTW) is not included in the quantities requiring alternative treatment as a result of the LDRs. Also, wastes that do not require alternative treatment (e.g., those that are currently treated using an appropriate treatment technology) are not included in these quantity estimates.

EPA's decisions on whether to grant a national capacity variance are based on the availability of alternative treatment or recovery technologies. Consequently, the methodology focuses on deriving estimates of the quantities of waste that will require either commercial treatment or the construction of new on-site treatment systems as a result of the LDRs—quantities of waste that will be treated adequately either on site in existing systems or off site by facilities owned by the same company as the generator (i.e., captive facilities) are omitted from the required capacity estimates.¹⁹

B. Capacity Analysis Results Summary

For the decharacterized ICR and TC wastes managed in CWA, CWA-equivalent, and Class I injection well systems, EPA estimates that between 3.5 and 15 billion tons will be affected as a result of today's proposal. EPA believes that some affected facilities need time to build treatment capacity for these wastes, as wastewater volumes

¹⁹Traditionally, capacity analyses have focused on the demand for alternative capacity once existing on-site capacity and captive off-site capacity have been accounted for. However, for some of the wastes at issue in this rule it may not be feasible to ship wastes off site to a commercial facility. In particular, facilities with large volumes of wastewaters may not readily be able to transport their waste to treatment facilities. Alternative treatment for these wastes may need to be constructed on site.

generally make off-site treatment impractical. EPA has determined that sufficient alternative treatment capacity is not available, and today is proposing to grant a two-year national capacity variance for decharacterized wastewaters.

EPA estimates that approximately 90,000 tons of newly listed wastes included in today's proposal will require alternative treatment. In particular, approximately 4,500 tons of carbamate wastes (K156-K161, P127, P128, P185, P188-P192, P194, P196-P199, P201-P205, U271, U277-U280, U364-U367, U372, U373, U375-U379, U381-U387, U389-U396, U400-U404, U407, U409-U411) will require alternative treatment. Less than 100 tons of organobromine wastes (K140, U408) are expected to require alternative treatment capacity. In addition, 85,000 tons of spent aluminum potliners (K088) will require alternative treatment

capacity. Sufficient commercial capacity exists to manage all of these wastes, so EPA is not proposing to grant a national capacity variance for these wastes.

The quantities of radioactive wastes mixed with wastes included in today's proposal are generated primarily by the U.S. Department of Energy. EPA estimates that 820 tons of high-level waste and 360 tons of mixed low-level waste that may be affected by this proposal will be generated annually by DOE. In addition, there are currently 7,000 tons of high-level waste, 10 tons of mixed transuranic waste, and 2,700 tons of mixed low-level waste in storage that may be affected by this proposal. DOE currently faces treatment capacity shortfalls for high-level wastes and mixed transuranic wastes. Although DOE does have some available treatment capacity for mixed low-level wastes, most of this capacity is limited to treatment of wastewaters with less than

one percent total suspended solids and is not readily adaptable for other waste forms. DOE has indicated that it will generally give treatment priority to mixed wastes that are already restricted under previous LDR rules. Therefore, EPA is proposing to grant a two-year national capacity variance to radioactive wastes mixed with the hazardous wastes affected by today's proposal.

Table 1 lists each RCRA hazardous waste code for which EPA is today proposing LDR standards. For each code, this table indicates whether EPA is proposing to grant a national capacity variance for land-disposed wastes.²⁰ Also, EPA is proposing to grant a three month national capacity variance for all wastes in this proposed rule to handle logistical problems associated with complying with the new standards. EPA is soliciting comment on these variance determinations.

TABLE 1.—VARIANCES FOR NEWLY LISTED AND IDENTIFIED WASTES
[“Yes” Indicates EPA is Proposing to Grant a Variance]

Waste description	Surface-disposed wastes	Deep well-injected wastes
Ignitable Wastes ¹ (D001)	YES	YES.
Corrosive Wastes ¹ (D002)	YES	YES.
Reactive Wastes ¹ (D003)	YES	YES.
Newly Identified Pesticide Wastes ² (D012-D017)	YES	YES.
Newly Identified TC Organic Wastewaters (D018-D043)	YES	YES.
Spent Aluminum Potliners (K088)	NO	NO.
Carbamate Production Wastes (K156-K161, P127, P128, P185, P188-P192, P194, P196-P199, P201-P205, U271, U277-U280, U364-U367, U372, U373, U375-U379, U381-U387, U389-U396, U400-U404, U407, U409-U411)	NO	NO.
Organobromine Wastes (K140, U408)	NO	NO.
Mixed Radioactive Wastes ³	YES	YES.

¹ The variance determinations listed here apply only to decharacterized wastewaters managed in CWA, CWA-equivalent, and SDWA systems.
² The variance determinations listed here apply only to newly identified decharacterized D012-D017 wastewaters managed in CWA, CWA-equivalent, and SDWA systems.

³ The variance determinations given listed apply only to radioactive wastes mixed with decharacterized D001-D003 or newly identified D012-D017 wastes managed in CWA, CWA-equivalent, and SDWA systems; to radioactive wastes mixed with newly identified TC organic wastewaters; and to radioactive wastes mixed with spent aluminum potliners, carbamate production wastes, or organobromine production wastes.

EPA is also proposing in this notice to prohibit placement of hazardous waste as fill material. To the extent this can be viewed as a new prohibition (which, given EPA's consistent interpretation that this activity should be occurring in regulated units, is unclear), EPA would not propose any type of capacity variance. Hazardous waste treatment residues satisfying LDR standards can be land disposed in subtitle C units, and there is no shortage of such disposal capacity. In addition, there may be opportunities for recycling hazardous waste treatment residues presently placed as fill (such as use in

asphalt, cement, or as light weight aggregate) which would provide adequate capacity.

C. Requests for Comment

EPA is soliciting general comment and data on sources, quantities, and management practices of characteristic wastes, as well as presence and quantities of underlying hazardous constituents, from facilities managing their wastes using Subtitle D surface impoundments (CWA), or subsequent land disposal of treated wastewaters (CWA-equivalent), or Class I nonhazardous injection wells, or tanks. EPA requests specific information from facilities managing *de minimis* ICRT wastes, including information on waste sources, quantities, and management

practices, as well as underlying hazardous constituents.

EPA requests specific information on volumes of carbamate and organobromine wastes that are recycled, mixed with, or co-managed with other wastes, and the volumes and types of residuals that are generated by the various management practices applicable to these wastes. EPA is also soliciting information, including quantities, management practices, and waste characteristics, for soil and debris contaminated with carbamate and/or organobromine wastes. EPA also seeks comments from the aluminum industry on volumes of K088 generated and future management of this waste.

EPA is soliciting specific data on reactive wastes which are deactivated

²⁰ The term "land-disposed wastes" denotes wastes that are managed in land-based units at any time during the waste's storage, treatment, or disposal.

using processes that may cause explosions, including quantities, management practices, and waste characteristics, and is requesting data for mixed TC/radioactive wastes which are deepwell injected.

X. 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 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 applies in authorized States in the interim.

Today's rule is 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 to 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 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 modified to indicate that this rule is a self-implementing provision of HSWA.

EPA's proposal to prohibit hazardous waste as fill material is also a HSWA regulation. It implements RCRA sections 3004 (d), (e), (g)(5), and (m), which provisions require EPA to prohibit all land disposal of hazardous waste that is not capable of being done in a manner that is protective and that minimizes short-term and long-term threats to human health and the environment from hazardous waste disposal. See also 59 FR 43499 (August 24, 1994), which is a HSWA rule prohibiting K061 as anti-skid/de-icing material and implements these same LDR provisions. Consequently, this provision, if enacted, would be effective immediately in authorized states.

B. Effect on State Authorization

As noted above, EPA is today proposing a rule that, 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 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 final authorization are described in 40 CFR 271.21.

Section 271.21(e)(2) requires that States with final authorization must modify their programs to reflect Federal program changes and to 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). This deadline can be extended in certain cases (see section 271.21(e)(3)). 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 UIC primacy status. A State currently authorized to administer the UIC program under the 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 LDRs 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 discussed in a July 15, 1985 final rule (50 FR 28728).

XI. Regulatory Requirements

A. Regulatory Impact Analysis Pursuant to Executive Order 12866

Executive Order No. 12866 requires agencies to determine whether a regulatory action is "significant." The Order defines a "significant" regulatory action as one that "is likely to result in a rule that may: (1) Have an annual effect on the economy of \$100 million or more or adversely affect, in a material way, the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities; (2) create serious inconsistency or otherwise interfere with an action taken or planned by another agency; (3) materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients; or (4) raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order."

The Agency estimated the costs of today's proposed rule to determine if it is a significant regulation as defined by

the Executive Order. The analysis considers compliance cost and economic impacts for both characteristic wastes and newly listed wastes affected by this rule. For characteristic wastes, the potential cost impacts of this rule depend on whether facilities' current wastewater treatment systems will meet the UTS levels or if additional treatment will be required. If current treatments are adequate, facilities will only incur administrative costs to have their permits revised. A rough estimate would be that there would be one-time incremental costs of \$0.9 to \$2.9 million for all incrementally impacted facilities. However, at the high end, if current wastewater treatment systems need to be augmented with additional treatment steps, the incremental compliance costs for today's rule could be as high as \$1 million per affected facility. If 20% of the firms comply by installing additional treatment, treatment costs are estimated to be \$6.5–\$18.1 million/year. The Agency does not have adequate data to estimate how many, if any, facilities may require modification to their treatment facilities. The Agency requests comment and data on how often additional treatment may be required and what type of treatment may be needed.

For newly listed wastes, the costs are substantially higher and will be incurred each year. These costs range from approximately \$11.9 million to \$47.3 million and are attributable primarily to thermal treatment of spent aluminum potliner wastes (K088). Therefore, today's proposed rule may be considered an economically significant rule. Because today's proposed rule is significant, the Agency analyzed the costs, economic impacts, and benefits.

This section of the preamble for today's proposed rule provides a discussion of the methodology used for estimating the costs, economic impacts and the benefits attributable to today's proposed rule, followed by a presentation of the cost, economic impact and benefit results. More detailed discussions of the methodology and results may be found in the background document, "Regulatory Impact Analysis of the Proposed Rule for the LDR Phase III Newly Listed and Identified Wastes," which has been placed in the docket for today's proposed rule.

1. Methodology Section

In today's proposed rule, the Agency is establishing treatment standards for the following wastes: end-of-pipe standards for ICR wastewaters managed in CWA and CWA-equivalent systems, and Class I nonhazardous UIC wells, TC

pesticide (D012-17) and organic (D018-43) wastewaters managed in CWA and CWA-equivalent systems, and Class I nonhazardous UIC wells (all UIC managed volumes are covered under a different section of the preamble for today's rule), and newly listed wastes from three industries - organobromines, spent aluminum potliners, and carbamates.

a. Methodology for Estimating the Affected Universe. In determining the costs, economic impacts, and benefits associated with today's rule, the Agency estimated the volumes of waste affected by today's rule. The procedure for estimating the volumes of ICR waste and TC organic and pesticide waste, and newly listed wastes affected by today's rule is summarized below.

First, the Agency examined all industries which might be likely to produce wastes covered under today's standards. Through reviewing comments to the Supplemental Notice of Data Availability published by the Agency in 1993, reviewing runs from the Biennial Reporting System (BRS) of volumes generated from particular industry sectors, as well as discussions with industry, and discussions with the Office of Water at EPA HQ, the Agency narrowed it down to 16 industries which would potentially have significant volumes of wastewater affected by today's rule.

Using a host of databases and/or sources, the Agency collected data on the quantities, constituents, and concentrations of the volumes affected from each of the 16 industries. In addition, the Agency gathered any data on current management practices, plant design, etc. The following sources were used: Section 308 data from the Office of Water, Industrial Studies Database (ISDB), 1991 Biennial Reporting System (BRS), primary summary and development documents from effluent guidelines, Toxicity Characteristic Regulatory Impact Analysis documents, data gathered in the capacity analysis performed for today's rule, as well as comments from potentially affected industries.

The Agency obtained volume information for the newly listed wastes—organobromines (K140), spent aluminum potliners (K088), and carbamate wastes (K156–161)—from the listing documents prepared for these wastes during the listing procedure.

b. Cost Methodology. The cost analysis estimates the national level incremental costs which will be incurred as a result of today's rule. The cost estimates for both the baseline and post-regulatory scenarios are calculated employing: (i) The facility wastestream

volume, (ii) the management practice (baseline or post-regulatory) assigned to that wastestream, and (iii) the unit cost associated with that practice. Summing the costs for all facilities produces the total costs for the given waste and scenario. Subtracting the baseline cost from the post-regulatory cost produces the national incremental cost associated with today's rule for the given waste.

The cost methodology section includes three subsections: (i) ICR and TC Pesticide and Organic Wastes Managed in CWA and CWA-Equivalent Systems, (ii) Newly Listed Wastes, (iii) Testing and Recordkeeping Costs. (The costs for wastes managed in Class I nonhazardous waste deep wells are discussed in section B.)

(i) ICR and TC Pesticide and Organic Wastes Managed in CWA and CWA-Equivalent Systems. The Agency employed the following approach to estimate the incremental costs for the ICR and TC wastes. First, using information available on the affected industries, the Agency created average-sized model facilities for each industry. Second, for a given model facility in an affected industry, the Agency used available unit cost data to develop costs for the baseline management practices (usually treatment in surface impoundments followed by discharge into receiving waters through a NPDES permit). Third, the Agency used data on the constituents and waste quantities for each industry, where applicable, to determine the necessary treatment required to reduce to UTS levels the constituents present. Fourth, the Agency used unit costs to develop costs for the post-regulatory management practices for the treatment requirements determined in the third step. Fifth, subtracting the baseline from the post-regulatory costs for an average facility in an industry sector and using the data available on the number of facilities affected within each industry, the Agency was able to calculate the incremental cost for a given industry. Sixth, summing costs across affected industries, the Agency determined the incremental cost for the rule for the end-of-pipe treatment standards.

(ii) Newly Listed Wastes. The costs for treatment of organobromines (K140), spent aluminum potliners (K088), and carbamate wastes (K156–161) will be determined using data from the listings on baseline management practices, judgment on the technology(s) required to meet the UTS standards for these wastes, and available unit cost data.

(iii) Testing and Recordkeeping Costs. Testing and recordkeeping costs, including costs that facilities will incur for ensuring that hazardous constituents

in characteristic waste are meeting new treatment standards and costs associated with permit modifications will be based upon an average, one-time testing cost and an Information Collection Request, respectively.

c. **Economic Impact Methodology.** The economic effects of today's proposed rule are defined as the difference between the industrial activity under post-regulatory conditions and the industrial activity in the absence of regulation (i.e., baseline conditions).

The Agency used (1) historic average capital expenditures for each industry, (2) historic average operating expenditures for each industry, (3) historic revenues, and (4) historic average pollution abatement and control expenditures (PACE) to determine the economic impacts. However, the Agency was unable to examine the impacts on a facility-specific basis due to lack of data. Therefore, the impacts are assessed on an industry-specific basis.

d. **Benefits Methodology.** The approach for estimating benefits associated with today's rule involves three components: (i) estimation of pollutant loadings reductions, (ii) estimation of reductions in exceedances of health-based levels, and, (iii) qualitative description of the potential benefits. The benefits assessment is based upon the waste quantity and concentration data collected for the cost analysis. This incremental assessment focuses upon reductions in toxic concentrations at the point of discharge and does not consider any potential benefits resulting from reductions in air emissions or impacts on impoundment leaks and sludges which may occur as part of treating wastes to comply with the LDRs.

EPA has not conducted an assessment of the benefits related to the effects of the proposed rule on newly listed wastes. These benefits depend on the incremental risk reductions that may result from treatment of the wastes prior to disposal at a subtitle C facility. EPA data indicate that between 100,000 and 118,000 tons of spent aluminum potliners are generated annually. Improper management of these wastes has caused many serious past damage incidents. (See listing Background Document for K088). However, data are limited with regard to current management practices and risk levels for these wastes. Therefore, EPA is not yet able to evaluate the benefits resulting under the proposed rule for these wastes. Because the quantity of waste is very small, benefits for newly

listed organobromine and carbamate wastes are expected to be minimal.

(i) **Estimation of Pollutant Loadings Reductions.** An incremental approach was used to estimate reductions in pollutant loadings. For the baseline scenario, contaminant concentrations were based upon data or estimates of current effluent discharge concentration levels. For the post-regulatory scenario, concentration levels were assumed to equal UTS levels.

(ii) **Estimation of Reductions in Exceedances of Health-Based Levels.** The methods used for evaluating the benefits associated with cancer and noncancer risk reductions resulting from the proposed rule entail comparing constituent concentration levels to health-based standards to evaluate whether implementation of the proposed rule reduces concentration levels below levels that pose risk to human health.

To estimate benefits from cancer risk reductions resulting from the proposed rule, a simple screening analysis was performed. This analysis compared contaminant concentrations for the baseline and post-regulatory scenario to health-based levels for carcinogens. Further analysis may be undertaken to quantify benefits associated with facility/ wastestream combinations identified in the contaminant concentration comparisons.

Benefits associated with reductions in non-cancer exceedances are estimated based upon comparisons of contaminant concentration levels in effluent discharges of the affected wastestreams to the reference health levels. These benefits are expressed in terms of the number of exceedances of health-based levels under the baseline scenario compared to the number of exceedances under the proposed rule.

(iii) **Qualitative Description of the Potential Benefits.** A qualitative assessment of potential benefits likely to result from the proposed rule is used where data are limited. The Agency acknowledges limited data availability in developing waste volumes affected, constituents, concentrations, cost estimates, economic impacts, and benefits estimates for the proposed LDR Phase III rulemaking. The Agency respectfully requests comment from industry regarding constituents, concentrations, waste volumes, and current management practices.

2. Results

a. **Volume Results.** The Agency has estimated the volumes of formerly characteristic wastes potentially affected by today's rule to total in the range of 33.5 to 500 million tons. The Agency

requests comment on waste volumes affected by the proposed LDR Phase III rule. For newly listed wastes, the analyses supporting the listing determination showed about 4,500 tons of carbamate wastes, less than 100 tons of organobromine wastes, and 100,000 to 118,000 tons of spent aluminum potliners are potentially affected by this rule.

b. **Cost Results.** For characteristic wastes, the potential cost impacts of this rule depend on whether facilities' current wastewater treatment systems will meet the UTS levels or if additional treatment will be required. If current treatments are adequate, facilities will only incur administrative costs to have their permits revised. A rough estimate would be that there would be one-time incremental costs of \$0.9 to \$2.9 million for all incrementally impacted facilities. However, at the high end, if current wastewater treatment systems need to be augmented with additional treatment steps, the incremental compliance costs could be as high as \$1 million per affected facility. The Agency does not have adequate data to estimate how many, if any, facilities may require modification to their treatment facilities. The Agency requests comment and data on how often additional treatment may be required.

For newly listed wastes, the costs are substantially higher and will be incurred each year. These costs range from approximately \$11.9 million to \$47.3 million and are attributable primarily to thermal treatment of spent aluminum potliner wastes (K088). The Agency requests comment on these estimates.

c. **Economic Impact Results.** The Agency has estimated the economic impacts of today's rule to represent less than one percent of historic pollution control and operating costs for the organic chemical and petroleum refining industries. However, for those facilities that may need to treat to UTS to comply with today's rule, costs could be more significant. The estimated compliance costs for treating newly listed spent aluminum potliners represents 40 percent of pollution control operating costs for aluminum reducers; however, treatment costs represent only one percent of total historic operating costs. The Agency requests comment on anticipated economic impacts resulting from the proposed LDR Phase III rule.

d. **Benefit Estimate Results.** The Agency has estimated the benefits associated with today's rule to be small. Assuming facilities comply with the proposed rule by treating their affected wastestreams, loadings reductions

estimates range between 36 and 407 tons per year for direct dischargers, and between 1,490 and 24,391 tons per year for indirect dischargers. For direct dischargers, loadings reductions represent between .03 to .30 percent of total Toxic Release Inventory (TRI) chemical loadings to surface waters. For indirect dischargers, loadings reductions represent between .8 and 12.8 percent of all TRI loadings transferred to POTWs. Based upon the results of this screening, and more detailed risk assessments, the estimated baseline risks associated with only four wastestreams exceed commonly assumed threshold cancer and noncancer risk levels. EPA estimated that three wastestreams containing aniline pose baseline cancer risks ranging from 1×10^{-5} to 1×10^{-4} which potentially would be reduced to between 8×10^{-8} and 3×10^{-6} under the Phase III rule. A fourth wastestream containing acrylamide poses baseline cancer risk at a level of 2×10^{-3} . The proposed rule is estimated to reduce this risk to between 2×10^{-4} and 4×10^{-3} . All four of these wastestreams are currently discharged to POTWs; if POTW treatment removes these constituents from the wastewater prior to discharge to surface water and/or if no drinking water intake is located downstream from the POTW's outfall, baseline risks will be lower than those estimated above. The Agency requests comment and any available information related to these wastestreams.

B. Regulatory Impact Analysis for Underground Injected Wastes

The Agency has completed a separate regulatory impact analysis for underground injected wastes affected by the LDR Phase III proposed rule. This analysis describes and evaluates the regulatory impacts only to the Class I injection well universe. The new proposed Phase III LDRs cover decharacterized ICR and TC organic wastes, and other newly-identified hazardous wastes that are distinctly industrial wastes injected by owners and operators of only Class I hazardous and non-hazardous injection wells.

According to the available data outlined in the RIA, indications are that of the 223 Class I injection facilities in the nation, up to 154 could be affected by the new Phase III LDRs. Of these facilities, 101 inject nonhazardous waste and 53 inject hazardous waste. Combined, these facilities may inject up to 14 billion gallons of waste annually into Class I wells. These Class I injection facilities will now be required to either treat wastes, or file no migration petitions as outlined in 40

CFR 148 (See 53 FR 28118 (July 26, 1988)) preamble for a more thorough discussion of the no migration petition review process). Additional options for compliance with the proposed Phase III LDRs, including a *de minimis* exemption and a pollution prevention option are discussed in more detail in the RIA.

Of these newly affected Class I facilities, 38 already have no migration exemptions approved by EPA, but may face additional requirements requiring some modifications of their petitions due to the proposed LDR Phase III rule. For the facilities which do not have approved no migration exemptions, today's proposed rule will add compliance costs to those currently incurred as a result of previous rulemakings. 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 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 LDR Phase III rule will have several options. As previously mentioned, 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 altogether. EPA assessed compliance costs for Class I facilities submitting no-migration petitions, employing alternative treatment, and/or implementing pollution prevention measures. Although facilities using pollution prevention/waste minimization to comply with the Phase III LDRs will likely lower overall regulatory compliance costs, these situations are site-specific and, therefore, EPA cannot estimate these cost savings.

For Class I facilities opting to use alternative treatment, the Agency derived costs for both treating wastes on-site, and/or shipping wastes and treating them off-site at a commercial facility. However, the Agency believes that transportation of large volumes of liquid wastes off-site is not practical. This makes the off-site treatment scenario, at best, a highly conservative analysis. EPA expects most facilities that treat their wastes will do so on-site. Preliminary EPA estimates show that

the total annual compliance cost for petitions and alternative on-site treatment to industry affected by the new LDR Phase III prohibitions will range between \$9.2 million to \$13.2 million. The noncommercial facilities choosing to segregate their wastes may incur additional costs totaling \$2.98 million. The average annual compliance costs per affected facility employing on-site alternative treatment ranges from \$59,740 to \$85,714. The overall annual regulatory compliance cost to industry for petitions and alternatively treating wastes off-site will range between \$486.5 million to \$805.3 million. 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. All of these costs will be incurred by Class I injection well owners and operators. The estimated economic impacts of the proposed rule were based on the random assignment of injection facilities to petition and treatment outcomes using a decision tree analysis method described in the RIA. The Agency requests comment as to how frequently facilities with Class I nonhazardous injection wells will be able to receive a no-migration variance. The Agency also requests comment on how frequently owners will choose to treat their waste and whether that treatment will occur on-site.

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. EPA conducted a preliminary quantitative assessment of the potential human health risks associated with two worst-case scenarios involving well malfunction. EPA applied the approach taken in an earlier study to measure health risks of two LDR Phase III contaminants: benzene and carbon tetrachloride. The results of this preliminary analysis show that all of the cancer and noncancer risks calculated are below regulatory concern, with the exception of the cancer risk and hazard index calculated for carbon tetrachloride, assuming an abandoned borehole is near the injection well, drinking water pumping is occurring, and the local geology is typical of the East Gulf Coast Region. The assumptions used in deriving these results were based on conservative, upper-bound estimates. The Agency intends to expand this analysis in the final rule to include other constituents

and facilities. The Agency is interested in comments on this methodology and any data on actual injection volumes and constituents.

The economic analysis of LDR Phase III compliance costs suggests that publicly traded companies affected by the rule will probably not be significantly economically impacted. The limited data available for the privately held companies suggests, however, that they may face significant impacts due to the proportionally larger expenses they may face as a result of the proposed rule.

C. 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 (May 4, 1992), the Agency committed to considering regulatory alternatives in rulemakings when there were any economic impacts estimated on any small entities. See RCRA sections 3004(d), (e), and (g)(5), which apply uniformly to all hazardous wastes. 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 proposed 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. 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 generator provisions and conditionally exempt small quantity generator exemptions found in 40 CFR 262.11-12, and 261.5, respectively. These exemptions basically prescribe 100 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. See also § 268.1(c)(1), which states that LDR rules do not apply to small quantity generators.

D. Paperwork Reduction Act

The new information collection requirements in this proposed rule have been submitted for approval to the Office of Management and Budget under the Paperwork Reduction Act, 44 U.S.C. 3501 *et seq.* Four Information Collection Request (ICR) documents has been prepared by EPA, covering the three programs impacted (i.e., the LDR program, the UIC program, and the CWA NPDES program: LDR ICR# 1442.08; UIC ICR# 1738.01; NPDES Application ICR# 0226.11; and NPDES Discharge Monitoring Report ICR# 0229.10). The overall reporting and recordkeeping burden is estimated to be approximately 632,500 hours (sum from the four ICRs). The average burden per respondent is slightly more than 4,000 hours (sum from the four ICRs.). Only incremental burdens are discussed in the ICRs. These incremental burdens will eventually be merged with: the UIC program ICR, the LDR program ICR, the NPDES permit program ICR, and the Discharge Monitoring Report program ICR.

The public reporting burden for these collections is estimated to average: for the LDR program, 75 hours per respondent; for the UIC program, 3800 hours per respondent; for the NPDES application program, 37.5 hours per respondent; and for the NPDES discharge monitoring report, 211.5 hours per respondent. This includes time for reviewing instructions, gathering and compiling data, maintaining the data, and preparing and submitting all data.

A copy of the ICRs for this rule may be obtained from the Sandy Farmer, Environmental Protection Agency, Information Policy Branch, 401 M Street, S.W. (Mail Code 2136), Washington D.C. 20460 or by calling (202) 260-2740. The public should send comments regarding the burden estimate, or any other aspect of this collection of information, including suggestions for reducing burden to EPA; and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, D.C. 20460, marked "Attention: Desk Officer for EPA."

List of Subjects

40 CFR Part 148

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

40 CFR Part 266

Hazardous waste, 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: February 16, 1995.

Carol M. Browner,
Administrator.

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

2. Section 148.1 is amended by revising paragraphs (a), (b) and (d) to read as follows:

§ 148.1 Purpose, scope and applicability.

* * * * *

(a) This part identifies wastes that are restricted from disposal into Class I wells and defines those circumstances under which a waste, otherwise prohibited from injection, may be injected.

(b) The requirements of this part apply to owners or operators of Class I hazardous waste injection wells used to inject hazardous waste; and, owners or operators of Class I injection wells used to inject wastes which once exhibited a prohibited characteristic of hazardous waste identified in subpart C of part 261 of this chapter, at the point of generation, and no longer exhibit the characteristic at the point of injection.

* * * * *

(d) Wastes that are only characteristically hazardous and otherwise prohibited are not prohibited if the wastes are disposed into a nonhazardous injection well defined under 40 CFR 144.6(a) and do not

exhibit any prohibited characteristic of hazardous waste identified in subpart C of part 261 of this chapter, and do not contain any hazardous constituents identified in 40 CFR 268.48 diluted below the Universal Treatment Standard levels prior to injection.

3. Section 148.3 is revised to read as follows:

§ 148.3 Dilution prohibited as a substitute for treatment.

(a) The provisions of § 268.3 of this chapter shall apply to owners or operators of Class I wells used to inject a waste which is hazardous at the point of generation whether or not the waste is hazardous at the point of injection.

(b) Owners or operators of Class I nonhazardous waste injection wells which inject waste formerly exhibiting a hazardous characteristic which has been removed by dilution, may address underlying hazardous constituents by treating the hazardous waste, obtaining an exemption pursuant to a petition filed under § 148.20, or complying with the provisions set forth in § 268.9 of this chapter.

4. Section 148.4 is revised to read as follows:

§ 148.4 Procedures for case-by-case extensions to an effective date.

The owner or operator of a Class I hazardous or nonhazardous waste injection well may submit an application to the Administrator for an extension of the effective date of any applicable prohibition established under subpart B of this part according to the procedures of § 268.5 of this chapter.

5. Section 148.18 is added to subpart B to read as follows:

§ 148.18 Waste specific prohibitions—Newly Identified Wastes.

(a) On [Insert date 90 days from date of publication of final rule], the wastes specified in 40 CFR part 261.32 as EPA Hazardous waste numbers K088, K140, K156–K161, P127, P128, P185, P188–P192, P194, P196–P199, P201–P205, U271, U277–U280, U364–U367, U372, U373, U375–U379, U381–387, U389–U396, U400–U404, and U407–U411 are prohibited from underground injection.

(b) On [Insert date 2 years from effective date of the final rule], the wastes specified in 40 CFR part 261 as EPA Hazardous waste numbers D018–043, and Mixed TC/Radioactive wastes, are prohibited from underground injection.

(c) On [Insert date 2 years from effective date of the final rule], the wastes specified in 40 CFR part 261 as EPA Hazardous waste numbers D001–

D003 are prohibited from underground injection.

6. Section 148.20 is amended by revising paragraph (a) introductory text to read as follows:

§ 148.20 Petitions to allow injection of a waste prohibited under Subpart B.

(a) Any person seeking an exemption from a prohibition under subpart B of this part for the injection of a restricted hazardous waste, including a hazardous waste exhibiting a characteristic and containing underlying hazardous constituents at the point of generation, but no longer exhibiting a characteristic when injected into a Class I injection well or wells, shall submit a petition to the Director demonstrating that, to a reasonable degree of certainty, there will be no migration of hazardous constituents from the injection zone for as long as the waste remains hazardous. This demonstration requires a showing that:

* * * * *

PART 266—STANDARDS FOR THE MANAGEMENT OF SPECIFIC HAZARDOUS WASTES AND SPECIFIC TYPES OF HAZARDOUS WASTE MANAGEMENT FACILITIES

7. The authority citation for part 266 continues to read as follows:

Authority: 42 U.S.C. 6905, 6912(a), 6924, and 6934.

8. In Subpart C, § 266.20, paragraph (b) is amended by adding one sentence to the end of the paragraph to read as follows:

§ 266.20 Applicability.

* * * * *

(b) * * * This provision does not apply to hazardous waste used as a fill material (i.e., a substitute for sand, dirt or comparable material) to fill in holes, occupy space, raise land levels, or be used for other similar purposes.

* * * * *

PART 268—LAND DISPOSAL RESTRICTIONS

9. 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

10. Section 268.1 is amended by revising paragraph (e)(4) and by removing paragraph (e)(5) to read as follows:

§ 268.1 Purpose, scope and applicability.

* * * * *

(e) * * *

(4) *De minimis* losses of characteristic wastes to wastewaters are defined as:

(i) 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; discharges from safety showers and rinsing and cleaning of personal safety equipment; rinsate from empty containers or from containers that are rendered empty by that rinsing; and laboratory wastes not exceeding one per cent of the flow of wastewater into the facility's headworks on an annual basis; or

(ii) Characteristic wastes which are injected into Class I nonhazardous wells whose combined volume is less than one per cent of the total flow at the wellhead on an annualized basis, and which any underlying hazardous constituents in the characteristic wastes are present at the point of generation at levels less than ten times the treatment standards found at § 268.48.

11. Section 268.2 is amended by revising the introductory text to paragraph (f), by removing paragraphs (f)(1), (f)(2), and (f)(3), and by adding paragraph (j) to read as follows:

§ 268.2 Definitions applicable in this part.

* * * * *

(f) *Wastewaters* are wastes that contain less than 1% by weight total organic carbon (TOC) and less than 1% by weight total suspended solids (TSS).

* * * * *

(j) *Inorganic metal-bearing waste* is one for which EPA has established treatment standards for metal hazardous constituents, and which does not otherwise contain significant organic or cyanide content as described in § 268.3(b)(1), and is specifically listed in appendix XI of this part.

12. Section 268.3 is revised to read as follows:

§ 268.3 Dilution prohibited as a substitute for treatment.

(a) No generator, transporter, handler, or owner or operator of a treatment, storage, or disposal facility shall in any way dilute a restricted waste or the residual from treatment of a restricted waste as a substitute for adequate treatment to achieve compliance with subpart D of this part, to circumvent the effective date of a prohibition in subpart C of this part, to otherwise avoid a prohibition in subpart C of this part, or to circumvent a land disposal

prohibition imposed by RCRA section 3004.

(b) Combustion of hazardous waste is prohibited, unless the waste, at the point of generation, or after any bona fide treatment such as cyanide destruction prior to combustion, can be demonstrated to comply with one or more of the following criteria (unless otherwise specifically prohibited from combustion):

(1) The waste contains hazardous organic constituents or cyanide at levels exceeding the constituent-specific treatment standard found in § 268.48;

(2) The waste consists of organic, debris-like materials (e.g., wood, paper, plastic, or cloth) contaminated with an inorganic metal-bearing hazardous waste;

(3) The waste, at point of generation, has reasonable heating value such as greater than or equal to 5000 BTU per pound;

(4) The waste is co-generated with wastes for which combustion is a required method of treatment;

(5) The waste is subject to Federal and/or State requirements necessitating reduction of organics (including biological agents); or

(6) The waste contains greater than 1% Total Organic Carbon (TOC).

13. Section 268.7 is amended by adding paragraph (b)(5)(v) to read as follows:

§ 268.7 Waste analysis and recordkeeping.

* * * * *

(b) * * *

(5) * * *

(v) For characteristic wastes D001, D002, D003 and D012–D043 that contain underlying hazardous constituents as defined in § 268.2(i) that are treated on-site to remove the hazardous characteristic and to treat underlying hazardous constituents to levels in § 268.48 Universal Treatment Standards, the certification must state the following:

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove the hazardous characteristic. This decharacterized waste contained underlying hazardous constituents that have been treated on-site to meet § 268.48 Universal Treatment Standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

* * * * *

§ 268.8 [Removed and Reserved]

14. Section 268.8 is removed and reserved.

15. Section 268.9 is amended by revising paragraphs (a), (b), (d)(1)(i), (d)(1)(ii), (d)(2) introductory text; and by

adding paragraphs (d)(3), (e) and (f) 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 a hazardous characteristic (and the waste is not a D004–D011 waste, a High TOC D001, or is not treated by CMBST, or RORGS of § 268.42, Table 1), the generator must determine what underlying hazardous constituents (as defined in § 268.2 of this Part), are reasonably expected to be present above the universal treatment standards found in § 268.48 of this part.

(b) Where a prohibited waste is both listed under 40 CFR part 261, subpart D and exhibits a characteristic under 40 CFR part 261, subpart C, the treatment standard for the waste code listed in 40 CFR part 261, subpart D will operate in lieu of the standard for the waste code under 40 CFR part 261, subpart C, provided that the treatment standard for the listed waste includes a treatment standard for the constituent that causes the waste to exhibit the characteristic and for any underlying hazardous constituents reasonably expected to be present in the waste. Otherwise, the waste must meet the treatment standards for all applicable listed and characteristic waste codes.

* * * * *

(d) * * *

(1) * * *

(i) For characteristic wastes other than those managed on-site in a wastewater treatment system subject to the Clean Water Act (CWA), zero-dischargers engaged in CWA-equivalent treatment, or Class I nonhazardous injection wells, the name and address of the Subtitle D facility receiving the waste shipment;

(ii) For all characteristic wastes, a description of the waste as initially generated, including the applicable EPA Hazardous Waste Number(s), treatability

group(s), and underlying hazardous constituents;

(2) The certification must be signed by an authorized representative and must state the language found in § 268.7(b)(5).

* * * * *

(3) For characteristic wastes whose ultimate disposal will be into a Class I nonhazardous injection well, and compliance with the treatment standards found in § 268.48 for underlying hazardous constituents is achieved through pollution prevention, the following information must also be included:

(i) A description of the pollution prevention mechanism;

(ii) The mass of each underlying hazardous constituent before pollution prevention;

(iii) The mass of each underlying hazardous constituent that must be removed, normalized for production; and,

(iv) The mass reduction of each underlying hazardous constituent that is achieved.

(e) For decharacterized wastes managed on-site in a wastewater treatment system subject to the Clean Water Act (CWA), zero-dischargers engaged in CWA-equivalent treatment, or Class I nonhazardous injection wells, compliance with the treatment standards found at § 268.48 must be monitored quarterly. Monitoring results must be kept in on-site files for 5 years.

(f) For characteristic wastes whose ultimate disposal will be into a Class I nonhazardous injection well which qualifies for the de minimis exclusion described in § 268.1, information supporting that qualification must be kept in on-site files.

§ 268.10–§ 268.12 [Removed and Reserved]

16. Sections 268.10 through 268.12 are removed and reserved.

17. In subpart C, § 268.39 is added to read as follows:

* * * * *

§ 268.39 Waste specific prohibitions—spent aluminum potliners, carbamates and organobromine wastes.

(a) On [Insert date 90 days from date of publication of the final rule], the wastes specified in 40 CFR 261.32 as EPA Hazardous Waste numbers K088, K140, K156–K161; and in 40 CFR 261.33 as EPA Hazardous Waste numbers P127, P128, P185, P188–P192, P194, P196–P199, P201–P205, U271, U277–U280, U364–U367, U372, U373, U375–U379, U381–U387, U389–U396, U400–U404, and U407–U411 are prohibited from land disposal. In addition, soil and debris contaminated

with these wastes are prohibited from land disposal.

(b) On [Insert date two years from date of publication of the final rule], characteristic wastes that are managed in systems whose discharge is regulated under the Clean Water Act (CWA), or that are zero dischargers that engage in CWA-equivalent treatment before ultimate land disposal, are prohibited from land disposal. Radioactive wastes mixed with K088, K140, K156–K161, P127, P128, P185, P188–P192, P194, P196–P199, P201–P205, U271, U277–U280, U364–U367, U372, U373, U375–U379, U381–U387, U389–U396, U400–U404, and U407–U411 are also prohibited from land disposal. In addition, soil and debris contaminated with these radioactive mixed wastes are prohibited from land disposal.

(c) Between [Insert date 90 days from date of publication of the final rule] and [Insert date two years from date of publication of the final rule], the wastes included in paragraph (b) of this section may be disposed 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 treatment 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 treatment 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 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 levels, the waste is prohibited from land disposal, and all requirements of part 268 are applicable, except as otherwise specified.

18. The table in § 268.40 is amended as follows:

a. By revising the entries for D001 through F012, F037 through F039, K006, K018, K019, K028, K030, K035, K048 through K052, K061, K083, K086, K101, K102, P003, P013, P056, U038, U042, U093, U134, and U168.

b. By adding in alpha-numerical order entries for K088, K140, K156 through K161, P127, P128, P185, P188 through P192, P194, P196 through P199, P201 through P205, U271, U277 through U280, U364 through U367, U372, U373, U375 through U379, U381 through U387, U389 through U396, U400 through U404, and U407 through U411.

§ 268.40 Applicability of treatment standards.

* * * * *

TREATMENT STANDARDS FOR HAZARDOUS WASTES

Waste code	Waste description and treatment/regulatory subcategory ¹	Regulated hazardous constituent		Wastewaters	Nonwastewaters
		Common name	CAS ² No.	Concentration in mg/l ³ ; or technology code ⁴	Concentration in mg/kg ⁵ unless noted as "mg/l TCLP"; or technology code
D001	Ignitable Characteristic Wastes, except for the § 261.21(a)(1) High TOC Subcategory.	NA	NA	DEACT and meet § 268.48 standards; or RORGS; or CMBST.	DEACT and meet § 268.48 standards; or RORGS; or CMBST.
	High TOC Ignitable Characteristic Liquids Subcategory based on 40 CFR 261.21(a)(1)—Greater than or equal to 10% total organic carbon. (Note: This subcategory consists of nonwastewaters only.)	NA	NA	NA	RORGS; or CMBST.
D002	Corrosive Characteristic Wastes	NA	NA	DEACT and meet § 268.48 standards.	DEACT and meet § 268.48 standards.
D002, D004, D005, D006, D007, D008, D009, D010, D011.	Radioactive high level wastes generated during the reprocessing of fuel rods. (Note: This subcategory consists of nonwastewaters only.)	Corrosivity (pH)	NA	NA	HLVIT.
		Arsenic	7440–38–2	NA	HLVIT.
		Barium	7440–39–3	NA	HLVIT.
		Cadmium	7440–43–9	NA	HLVIT.
		Chromium (Total)	7440–47–3	NA	HLVIT.
		Lead	7439–92–1	NA	HLVIT.
		Mercury	7439–97–6	NA	HLVIT.
D003	Reactive Sulfides Subcategory based on § 261.23(a)(5).	Selenium	7782–49–2	NA	HLVIT.
		Silver	7440–22–4	NA	HLVIT.
		NA	NA	DEACT and meet § 268.48 standards.	DEACT and meet § 268.48 standards.
D003	Explosives Subcategory based on § 261.23(a)(6), (7), and (8).	NA	NA	DEACT and meet § 268.48 standards.	DEACT and meet § 268.48 standards.

TREATMENT STANDARDS FOR HAZARDOUS WASTES—Continued

Waste code	Waste description and treatment/regulatory subcategory ¹	Regulated hazardous constituent		Wastewaters	Nonwastewaters
		Common name	CAS ² No.	Concentration in mg/l ³ ; or technology code ⁴	Concentration in mg/kg ⁵ unless noted as "mg/l TCLP"; or technology code
	Other Reactives Subcategory based on § 261.23(a)(1).	NA	NA	DEACT and meet § 268.48 standards.	DEACT and meet § 268.48 standards.
	Water Reactive Subcategory based on § 261.23(a)(2), (3), and (4). (Note: This subcategory consists of nonwastewaters only.)	NA	NA	NA	DEACT and meet § 268.48 standards.
	Reactive Cyanides Subcategory based on § 261.23(a)(5).	Cyanides (Total) ⁷	57-12-5	Reserved	590.
		Cyanides (Amenable) ⁷	57-12-5	0.86	30.
D004	Wastes that exhibit, or are expected to exhibit, the characteristic of toxicity for arsenic based on the extraction procedure (EP) in SW846 Method 1310.	Arsenic	7440-38-2	5.0	5.0 mg/l EP.
		Arsenic; alternate ⁶ standard for nonwastewaters only.	7440-38-2	NA	5.0 mg/l TCLP.
D005	Wastes that exhibit, or are expected to exhibit, the characteristic of toxicity for barium based on the extraction procedure (EP) in SW846 Method 1310.	Barium	7440-39-3	100	100 mg/l TCLP.
D006	Wastes that exhibit, or are expected to exhibit, the characteristic of toxicity for cadmium based on the extraction procedure (EP) in SW846 Method 1310.	Cadmium	7440-43-9	NA	1.0 mg/l TCLP.
	Cadmium Containing Batteries Subcategory. (Note: This subcategory consists of nonwastewaters only.)	Cadmium	7440-43-9	NA	RTHRM.
D007	Wastes that exhibit, or are expected to exhibit, the characteristic of toxicity for chromium based on the extraction procedure (EP) in SW846 Method 1310.	Chromium (Total)	7440-47-3	5.0	5.0 mg/l TCLP.
D008	Wastes that exhibit, or are expected to exhibit, the characteristic of toxicity for lead based on the extraction procedure (EP) in SW846 Method 1310.	Lead	7439-92-1	5.0	5.0 mg/l EP.
		Lead; alternate ⁶ standard for nonwastewaters only.	7439-92-1	NA	5.0 mg/l TCLP.
	Lead Acid Batteries Subcategory (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). This subcategory consists of nonwastewaters only.)	Lead	7439-92-1	NA	RLEAD.

TREATMENT STANDARDS FOR HAZARDOUS WASTES—Continued

Waste code	Waste description and treatment/regulatory subcategory ¹	Regulated hazardous constituent		Wastewaters	Nonwastewaters
		Common name	CAS ² No.	Concentration in mg/l ³ ; or technology code ⁴	Concentration in mg/kg ⁵ unless noted as "mg/l TCLP"; or technology code
	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 stabilization, nor do they include organolead materials that can be incinerated and stabilized as ash. This subcategory consists of nonwastewaters only.)	Lead	7439-92-1	NA	MACRO.
D009	Nonwastewaters that exhibit, or are expected to exhibit, the characteristic of toxicity for mercury based on the extraction procedure (EP) in SW846 Method 1310; and contain greater than or equal to 260 mg/kg total mercury that also contain organics and are not incinerator residues. (High Mercury-Organic Subcategory).	Mercury	7439-97-6	NA	IMERC; or RMERC.
	Nonwastewaters that exhibit, or are expected to exhibit, the characteristic of toxicity for mercury based on the extraction procedure (EP) in SW846 Method 1310; and contain greater than or equal to 260 mg/kg total mercury that are inorganic, including incinerator residues and residues from RMERC. (High Mercury-Inorganic Subcategory).	Mercury	7439-97-6	NA	RMERC.
	Nonwastewaters that exhibit, or are expected to exhibit, the characteristic of toxicity for mercury based on the extraction procedure (EP) in SW846 Method 1310; and contain less than 260 mg/kg total mercury. (Low Mercury Subcategory).	Mercury	7439-97-6	NA	0.20 mg/l TCLP.
	All D009 wastewaters.	Mercury	7439-97-6	0.20	NA.
	Elemental mercury contaminated with radioactive materials. (Note: This subcategory consists of nonwastewaters only.)	Mercury	7439-97-6	NA	AMLGM.
	Hydraulic oil contaminated with Mercury Radioactive Materials Subcategory. (Note: This subcategory consists of nonwastewaters only.)	Mercury	7439-97-6	NA	IMERC.
D010	Wastes that exhibit, or are expected to exhibit, the characteristic of toxicity for selenium based on the extraction procedure (EP) in SW846 Method 1310.	Selenium	7782-49-2	1.0	5.7 mg/l TCLP.
D011	Wastes that exhibit, or are expected to exhibit, the characteristic of toxicity for silver based on the extraction procedure (EP) in SW846 Method 1310.	Silver	7440-22-4	5.0	5.0 mg/l TCLP.

TREATMENT STANDARDS FOR HAZARDOUS WASTES—Continued

Waste code	Waste description and treatment/regulatory subcategory ¹	Regulated hazardous constituent		Wastewaters	Nonwastewaters
		Common name	CAS ² No.	Concentration in mg/l ³ ; or technology code ⁴	Concentration in mg/kg ⁵ unless noted as "mg/l TCLP"; or technology code
D012	Wastes that are TC for Endrin based on the TCLP in SW846 Method 1311.	Endrin Endrin aldehyde	72-20-8 7421-93-4	BIODG; or INCIN BIODG; or INCIN	0.13 and meet § 268.48 standards. 0.13 and meet § 268.48 standards.
D013	Wastes that are TC for Lindane based on the TCLP in SW846 Method 1311.	alpha-BHC beta-BHC delta-BHC gamma-BHC (Lindane)	319-84-6 319-85-7 319-86-8 58-89-9	CARBN; or INCIN CARBN; or INCIN CARBN; or INCIN CARBN; or INCIN	0.066 and meet § 268.48 standards. 0.066 and meet § 268.48 standards. 0.066 and meet § 268.48 standards. 0.066 and meet § 268.48 standards.
D014	Wastes that are TC for Methoxychlor based on the TCLP in SW846 Method 1311.	Methoxychlor	72-43-5	WETOX or INCIN	0.18 and meet § 268.48 standards.
D015	Wastes that are TC for Toxaphene based on the TCLP in SW846 Method 1311.	Toxaphene	8001-35-2	BIODG or INCIN	2.6 and meet § 268.48 standards.
D016	Wastes that are TC for 2,4-D (2,4-Dichlorophenoxyacetic acid) based on the TCLP in SW846 Method 1311.	2,4-D (2,4-Dichlorophenoxyacetic acid).	94-75-7	CHOXD, BIODG, or INCIN.	10 and meet § 268.48 standards.
D017	Wastes that are TC for 2,4,5-TP (Silvex) based on the TCLP in SW846 Method 1311.	2,4,5-TP (Silvex)	93-72-1	CHOXD or INCIN	7.9 and meet § 268.48 standards.
D018	Wastes that are TC for Benzene based on the TCLP in SW846 Method 1311.	Benzene	71-43-2	0.14 and meet § 268.48 standards.	10 and meet § 268.48 standards.
D019	Wastes that are TC for Carbon tetrachloride based on the TCLP in SW846 Method 1311.	Carbon tetrachloride	56-23-5	0.057 and meet § 268.48 standards.	6.0 and meet § 268.48 standards.
D020	Wastes that are TC for Chlordane based on the TCLP in SW846 Method 1311.	Chlordane (alpha and gamma isomers).	57-74-9	0.0033 and meet § 268.48 standards.	0.26 and meet § 268.48 standards.
D021	Wastes that are TC for Chlorobenzene based on the TCLP in SW846 Method 1311.	Chlorobenzene	108-90-7	0.057 and meet § 268.48 standards.	6.0 and meet § 268.48 standards.
D022	Wastes that are TC for Chloroform based on the TCLP in SW846 Method 1311.	Chloroform	67-66-3	0.046 and meet § 268.48 standards.	6.0 and meet § 268.48 standards.
D023	Wastes that are TC for o-Cresol based on the TCLP in SW846 Method 1311.	o-Cresol	95-48-7	0.11 and meet § 268.48 standards.	5.6 and meet § 268.48 standards.
D024	Wastes that are TC for m-Cresol based on the TCLP in SW846 Method 1311.	m-Cresol (difficult to distinguish from p-cresol).	108-39-4	0.77 and meet § 268.48 standards.	5.6 and meet § 268.48 standards.
D025	Wastes that are TC for p-Cresol based on the TCLP in SW846 Method 1311.	p-Cresol (difficult to distinguish from m-cresol).	106-44-5	0.77 and meet § 268.48 standards.	5.6 and meet § 268.48 standards.
D026	Wastes that are TC for Cresols (Total) based on the TCLP in SW846 Method 1311.	Cresol-mixed isomers (Cresylic acid) (sum of o-, m-, and p-cresol concentrations).	1319-77-3	0.88 and meet § 268.48 standards.	11.2 and meet § 268.48 standards.
D027	Wastes that are TC for p-Dichlorobenzene based on the TCLP in SW846 Method 1311.	p-Dichlorobenzene (1,4-Dichlorobenzene).	106-46-7	0.090 and meet § 268.48 standards.	6.0 and meet § 268.48 standards.
D028	Wastes that are TC for 1,2-Dichloroethane based on the TCLP in SW846 Method 1311.	1,2-Dichloroethane	107-06-2	0.21 and meet § 268.48 standards.	6.0 and meet § 268.48 standards.

TREATMENT STANDARDS FOR HAZARDOUS WASTES—Continued

Waste code	Waste description and treatment/regulatory subcategory ¹	Regulated hazardous constituent		Wastewaters	Nonwastewaters
		Common name	CAS ² No.	Concentration in mg/l ³ ; or technology code ⁴	Concentration in mg/kg ⁵ unless noted as "mg/l TCLP"; or technology code
D029	Wastes that are TC for 1,1-Dichloroethylene based on the TCLP in SW846 Method 1311.	1,1-Dichloroethylene	75-35-4	0.025 and meet § 268.48 standards.	6.0 and meet § 268.48 standards.
D030	Wastes that are TC for 2,4-Dinitrotoluene based on the TCLP in SW846 Method 1311.	2,4-Dinitrotoluene	121-14-2	0.32 and meet § 268.48 standards.	140 and meet § 268.48 standards.
D031	Wastes that are TC for Heptachlor based on the TCLP in SW846 Method 1311.	Heptachlor	76-44-8	0.0012 and meet § 268.48 standards.	0.066 and meet § 268.48 standards.
		Heptachlor epoxide	1024-57-3	0.016 and meet § 268.48 standards.	0.066 and meet § 268.48 standards.
D032	Wastes that are TC for Hexachlorobenzene based on the TCLP in SW846 Method 1311.	Hexachlorobenzene	118-74-1	0.055 and meet § 268.48 standards.	10 and meet § 268.48 standards.
D033	Wastes that are TC for Hexachlorobutadiene based on the TCLP in SW846 Method 1311.	Hexachlorobutadiene	87-68-3	0.055 and meet § 268.48 standards.	5.6 and meet § 268.48 standards.
D034	Wastes that are TC for Hexachloroethane based on the TCLP in SW846 Method 1311.	Hexachloroethane	67-72-1	0.055 and meet § 268.48 standards.	30 and meet § 268.48 standards.
D035	Wastes that are TC for Methyl ethyl ketone based on the TCLP in SW846 Method 1311.	Methyl ethyl ketone	78-93-3	0.28 and meet § 268.48 standards.	36 and meet § 268.48 standards.
D036	Wastes that are TC for Nitrobenzene based on the TCLP in SW846 Method 1311.	Nitrobenzene	98-95-3	0.068 and meet § 268.48 standards.	14 and meet § 268.48 standards.
D037	Wastes that are TC for Pentachlorophenol based on the TCLP in SW846 Method 1311.	Pentachlorophenol	87-86-5	0.089 and meet § 268.48 standards.	7.4 and meet § 268.48 standards.
D038	Wastes that are TC for Pyridine based on the TCLP in SW846 Method 1311.	Pyridine	110-86-1	0.014 and meet § 268.48 standards.	16 and meet § 268.48 standards.
D039	Wastes that are TC for Tetrachloroethylene based on the TCLP in SW846 Method 1311.	Tetrachloroethylene	127-18-4	0.056 and meet § 268.48 standards.	6.0 and meet § 268.48 standards.
D040	Wastes that are TC for Trichloroethylene based on the TCLP in SW846 Method 1311.	Trichloroethylene	79-01-6	0.054 and meet § 268.48 standards.	6.0 and meet § 268.48 standards.
D041	Wastes that are TC for 2,4,5-Trichlorophenol based on the TCLP in SW846 Method 1311.	2,4,5-Trichlorophenol	95-95-4	0.18 and meet § 268.48 standards.	7.4 and meet § 268.48 standards.
D042	Wastes that are TC for 2,4,6-Trichlorophenol based on the TCLP in SW846 Method 1311.	2,4,6-Trichlorophenol	88-06-2	0.035 and meet § 268.48 standards.	7.4 and meet § 268.48 standards.
D043	Wastes that are TC for Vinyl chloride based on the TCLP in SW846 Method 1311.	Vinyl chloride	75-01-4	0.27 and meet § 268.48 standards.	6.0 and meet § 268.48 standards.

TREATMENT STANDARDS FOR HAZARDOUS WASTES—Continued

Waste code	Waste description and treatment/regulatory subcategory ¹	Regulated hazardous constituent		Wastewaters	Nonwastewaters
		Common name	CAS ² No.	Concentration in mg/l ³ ; or technology code ⁴	Concentration in mg/kg ⁵ unless noted as "mg/l TCLP"; or technology code
F001, F002, F003, F004 & F005.	F001, F002, F003, F004 and/or F005 solvent wastes that contain any combination of one or more of the following spent solvents: acetone, benzene, n-butyl alcohol, carbon disulfide, carbon tetrachloride, chlorinated fluorocarbons, chlorobenzene, o-cresol, m-cresol, p-cresol, cyclohexanone, o-dichlorobenzene, 2-ethoxyethanol, ethyl acetate, ethyl benzene, ethyl ether, isobutyl alcohol, methanol, methylene chloride, methyl ethyl ketone, methyl isobutyl ketone, nitrobenzene, 2-nitropropane, pyridine, tetrachloroethylene, toluene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, 1,1,2-trichloro-1,2,2-trifluoroethane, trichloroethylene, trichloromonofluoromethane, and/or xylenes [except as specifically noted in other subcategories]. See further details of these listings in § 261.31.	Acetone	67-64-1	0.28	160.
		Benzene	71-43-2	0.14	10.
		n-Butyl alcohol	71-36-3	5.6	2.6.
		Carbon disulfide	75-15-0	3.8	4.8 mg/l TCLP.
		Carbon tetrachloride	56-23-5	0.057	6.0.
		Chlorobenzene	108-90-7	0.057	6.0.
		o-Cresol	95-48-7	0.11	5.6.
		m-Cresol (difficult to distinguish from p-cresol)	108-39-4	0.77	5.6.
		p-Cresol (difficult to distinguish from m-cresol).	1319-77-3	0.88	11.2.
		Cresol-mixed isomers (Cresylic acid) (sum of o-, m-, and p-cresol concentrations)			
		Cyclohexanone	108-94-1	0.36	0.75 mg/l TCLP.
		o-Dichlorobenzene	95-50-1	0.088	6.0.
		Ethyl acetate	141-78-6	0.34	33.
		Ethyl benzene	100-41-4	0.057	10.
		Ethyl ether	60-29-7	0.12	160.
		Isobutyl alcohol	78-83-1	5.6	170.
		Methanol	67-56-1	5.6	0.75 mg/l TCLP.
		Methylene chloride	75-9-2	0.089	30.
		Methyl ethyl ketone	78-93-3	0.28	36.
		Methyl isobutyl ketone	108-10-1	0.14	33.
		Nitrobenzene	98-95-3	0.068	14.
		Pyridine	110-86-1	0.014	16.
		Tetrachloroethylene	127-18-4	0.056	6.0.
		Toluene	108-88-3	0.080	10.
		1,1,1-Trichloroethane	71-55-6	0.054	6.0.
		1,1,2-Trichloroethane	79-00-5	0.054	6.0.
		1,1,2-Trichloro-1,2,2-trifluoroethane.	76-13-1	0.057	30.
Trichloroethylene	79-01-6	0.054	6.0.		
Trichloromonofluoromethane	75-69-4	0.020	30.		
Xylenes-mixed isomers (sum of o-, m-, and p-xylene concentrations).	1330-20-7	0.32	30.		
F003 and/or F005 solvent wastes that contain any combination of one or more of the following three solvents as the only listed F001-5 solvents: carbon disulfide, cyclohexanone, and/or methanol. (formerly § 268.41(c)).	Carbon disulfide	75-15-0	3.8	4.8 mg/l TCLP.	
	Cyclohexanone	108-94-1	0.36	0.75 mg/l TCLP.	
	Methanol	67-56-1	5.6	0.75 mg/l TCLP.	
F005 solvent waste containing 2-Nitropropane as the only listed F001-5 solvent.	2-Nitropropane	79-46-9	(WETOX or CHOXD) fb CARBN; or INCIN.	INCIN.	

TREATMENT STANDARDS FOR HAZARDOUS WASTES—Continued

Waste code	Waste description and treatment/regulatory subcategory ¹	Regulated hazardous constituent		Wastewaters	Nonwastewaters
		Common name	CAS ² No.	Concentration in mg/l ³ ; or technology code ⁴	Concentration in mg/kg ⁵ unless noted as "mg/l TCLP"; or technology code
	F005 solvent waste containing 2-Ethoxyethanol as the only listed F001-5 solvent.	2-Ethoxyethanol	110-80-5	BIODG; or INCIN .	INCIN.
F006	Wastewater treatment sludges from electroplating operations except from the following processes: (1) Sulfuric acid anodizing or aluminum; (2) tin plating on carbon steel; (3) zinc plating (segregated basis) on carbon steel; (4) aluminum or zinc-aluminum plating on carbon steel; (5) cleaning/stripping associated with tin, zinc and aluminum plating on carbon steel; and (6) chemical etching and milling of aluminum.	Cadmium	7440-43-9	0.69	0.19 mg/l TCLP.
		Chromium (Total)	7440-47-3	2.77	0.86 mg/l TCLP.
		Cyanides (Total) ⁷	57-12-5	1.2	590.
		Cyanides (Amenable) ⁷	57-12-5	0.86	30.
		Lead	7439-92-1	0.69	0.37 mg/l TCLP.
		Nickel	7440-02-0	3.98	5.0 mg/l TCLP.
		Silver	7440-22-4	0.43	0.30 mg/l TCLP.
F007	Spent cyanide plating bath solutions from electroplating operations.	Cadmium	7440-43-9	0.69	0.19 mg/l TCLP.
		Chromium (Total)	7440-47-3	2.77	0.86 mg/l TCLP.
		Cyanides (Total) ⁷	57-12-5	1.2	590.
		Cyanides (Amenable) ⁷	57-12-5	0.86	30.
		Lead	7439-92-1	0.69	0.37 mg/l TCLP.
		Nickel	7440-02-0	3.98	5.0 mg/l TCLP.
		Silver	7440-22-4	0.43	0.30 mg/l TCLP.
F008	Plating bath residues from the bottom of plating baths from electroplating operations where cyanides are used in the process.	Cadmium	7440-43-9	0.69	0.19 mg/l TCLP.
		Chromium (Total)	7440-47-3	2.77	0.86 mg/l TCLP.
		Cyanides (Total) ⁷	57-12-5	1.2	590.
		Cyanides (Amenable) ⁷	57-12-5	0.86	30.
		Lead	7439-92-1	0.69	0.37 mg/l TCLP.
		Nickel	7440-02-0	3.98	5.0 mg/l TCLP.
		Silver	7440-22-4	0.43	0.30 mg/l TCLP.
F009	Spent stripping and cleaning bath solutions from electroplating operations where cyanides are used in the process.	Cadmium	7440-43-9	0.69	0.19 mg/l TCLP.
		Chromium (Total)	7440-47-3	2.77	0.86 mg/l TCLP.
		Cyanides (Total) ⁷	57-12-5	1.2	590.
		Cyanides (Amenable) ⁷	57-12-5	0.86	30.
		Lead	7439-92-1	0.69	0.37 mg/l TCLP.
		Nickel	7440-02-0	3.98	5.0 mg/l TCLP.
		Silver	7440-22-4	0.43	0.30 mg/l TCLP.
F010	Quenching bath residues from oil baths from metal heat treating operations where cyanides are used in the process.	Cyanides (Total) ⁷	57-12-5	1.2	590.
		Cyanides (Amenable) ⁷	57-12-5	0.86	30.
F011	Spent cyanide solutions from salt bath pot cleaning from metal heat treating operations.	Cadmium	7440-43-9	0.69	0.19 mg/l TCLP.
		Chromium (Total)	7440-47-3	2.77	0.86 mg/l TCLP.
		Cyanides (Total) ⁷	57-12-5	1.2	590.
		Cyanides (Amenable) ⁷	57-12-5	0.86	30.
		Lead	7439-92-1	0.69	0.37 mg/l TCLP.
		Nickel	7440-02-0	3.98	5.0 mg/l TCLP.
		Silver	7440-22-4	0.43	0.30 mg/l TCLP.
F012	Quenching wastewater treatment sludges from metal heat treating operations where cyanides are used in the process.	Cadmium	7440-43-9	0.69	0.19 mg/l TCLP.
		Chromium (Total)	7440-47-3	2.77	0.86 mg/l TCLP.
		Cyanides (Total) ⁷	57-12-5	1.2	590.
		Cyanides (Amenable) ⁷	57-12-5	0.86	30.
		Lead	7439-92-1	0.69	0.37 mg/l TCLP.
		Nickel	7440-02-0	3.98	5.0 mg/l TCLP.
		Silver	7440-22-4	0.43	0.30 mg/l TCLP.

TREATMENT STANDARDS FOR HAZARDOUS WASTES—Continued

Waste code	Waste description and treatment/regulatory subcategory ¹	Regulated hazardous constituent		Wastewaters	Nonwastewaters
		Common name	CAS ² No.	Concentration in mg/l ³ ; or technology code ⁴	Concentration in mg/kg ⁵ unless noted as "mg/l TCLP"; or technology code
F037	Petroleum refinery primary oil/water/solids separation sludge—Any sludge generated from the gravitational separation of oil/water/solids during the storage or treatment of process wastewaters and oily cooling wastewaters from petroleum refineries. Such sludges include, but are not limited to, those generated in: oil/water/solids separators; tanks and impoundments; ditches and other conveyances; sumps; and stormwater units receiving dry weather flow. Sludge generated in stormwater units that do not receive dry weather flow, sludges generated from non-contact once-through cooling waters segregated from treatment from other process or oily cooling waters, sludges generated in aggressive biological treatment units as defined in § 261.31(b)(2) (including sludges generated in one or more additional units after wastewaters have been treated in aggressive biological treatment units) and K051 wastes are not included in this listing.	Acenaphthene	83-32-9	0.059	3.4.
		Anthracene	120-12-7	0.059	3.4.
		Benzene	71-43-2	0.14	10.
		Benz(a)anthracene	56-55-3	0.059	3.4.
		Benzo(a)pyrene	50-32-8	0.061	3.4.
		bis(2-Ethylhexyl) phthalate	117-81-7	0.28	28.
		Chrysene	218-01-9	0.059	3.4.
		Di-n-butyl phthalate	84-74-2	0.057	28.
		Ethylbenzene	100-41-4	0.057	10.
		Fluorene	86-73-7	0.059	3.4.
		Naphthalene	91-20-3	0.059	5.6.
		Phenanthrene	85-01-8	0.059	5.6.
		Phenol	108-95-2	0.039	6.2.
		Pyrene	129-00-0	0.067	8.2.
		Toluene	108-88-3	0.080	10.
		Xylenes-mixed isomers (sum of o-, m-, p-xylene concentrations).	1330-20-7 7440-47-3 57-12-5	0.32	30.
		Chromium (Total)	7439-92-1	2.77.	0.86 mg/l TCLP.
		Cyanides (Total) ⁷	7440-02-0	1.2	590.
		Lead		0.69	0.37 mg/l TCLP.
		Nickel		3.98	5.0 mg/l TCLP.
F038	Petroleum refinery secondary (emulsified) oil/water/solids separation sludge and/or float generated from the physical and/or chemical separation of oil/water/solids in process wastewaters and oil cooling wastewaters from petroleum refineries. Such wastes include, but are not limited to, all sludges and floats generated in: induced air floatation (IAF) units, tanks and impoundments, and all sludges generated in DAF units. Sludges generated in stormwater units that do not receive dry weather flow, sludges generated from non-contact once-through cooling waters segregated for treatment from other process or oily cooling waters, sludges and floats generated in aggressive biological treatment units as defined in § 261.31(b)(2) (including sludges and floats generated in one or more additional units after wastewaters have been treated in aggressive biological units) and F037, K048, and K051 are not included in this listing.	Benzene	71-43-2	0.14	10.
		Benzo(a)pyrene	50-32-8	0.061	3.4.
		bis(2-Ethylhexyl) phthalate	117-81-7	0.28	28.
		Chrysene	218-01-9	0.059	3.4.
		Di-n-butyl phthalate	84-74-2	0.057	28.
		Ethylbenzene	100-41-4	0.057	10.
		Fluorene	86-73-7	0.059	3.4.
		Naphthalene	91-20-3	0.059	5.6.
		Phenanthrene	85-01-8	0.059	5.6.
		Phenol	108-95-2	0.039	6.2.
		Pyrene	129-00-0	0.067	8.2.
		Toluene	108-88-3	0.080	10.
		Xylenes-mixed isomers (sum of o-, m-, and p-xylene concentrations).	1330-20-7 7440-47-3 57-12-5	0.32	30.
		Chromium (Total)	7439-92-1	2.77	0.86 mg/l TCLP.
		Cyanides (Total) ⁷	7440-02-0	1.2	590.
		Lead		0.69	0.37 mg/l TCLP.
		Nickel		3.98	5.0 mg/l TCLP.

TREATMENT STANDARDS FOR HAZARDOUS WASTES—Continued

Waste code	Waste description and treatment/regulatory subcategory ¹	Regulated hazardous constituent		Wastewaters	Nonwastewaters
		Common name	CAS ² No.	Concentration in mg/l ³ ; or technology code ⁴	Concentration in mg/kg ⁵ unless noted as "mg/l TCLP"; or technology code
F039	Leachate (liquids that have percolated through land disposed wastes) resulting from the disposal of more than one restricted waste classified as hazardous under subpart D of this part. (Leachate resulting from the disposal of one or more of the following EPA Hazardous Wastes and no other Hazardous Wastes retains its EPA Hazardous Waste Number(s): F020, F021, F022, F026, F027, and/or F028.).	Acenaphthylene	208-96-8	0.059	3.4.
Acenaphthene		83-32-9	0.059	3.4.	
Acetone		67-64-1	0.28	160.	
Acetonitrile		75-05-8	5.6	38.	
Acetophenone		96-86-2	0.010	9.7.	
2-Acetylaminofluorene		53-96-3	0.059	140	
Acrolein		107-02-8	0.29	2.9.	
Acrylonitrile		107-13-1	0.24	84.	
Aldrin		309-00-2	0.021	0.066.	
4-Aminobiphenyl		92-67-1	0.13	13.	
Aniline		62-53-3	0.81	14.	
Anthracene		120-12-7	0.059	3.4.	
Aramite		140-57-8	0.36	2.5.	
alpha-BHC		319-84-6	0.00014	0.066.	
beta-BHC		319-85-7	0.00014	0.066.	
delta-BHC		319-86-8	0.023	0.066.	
gamma-BHC		58-89-9	0.0017	0.066.	
Benzene		71-43-2	0.14	10.	
Benz(a)anthracene		56-55-3	0.059	3.4.	
Benzo (b) fluoranthene (difficult to distinguish from benzo (k) fluoranthene).		207-08-9	0.11	6.8.	
Benzo(g,h,i)perylene		191-24-2	0.0055	1.8.	
Benzo(a)pyrene		50-32-8	0.061	3.4.	
Bromodichloromethane		75-27-4	0.35	15.	
Methyl bromide (Bromomethane).		74-83-9	0.11	15.	
4-Bromophenyl phenyl ether		101-55-3	0.055	15.	
n-Butyl alcohol		71-36-3	5.6	2.6.	
Butyl benzyl othalate		85-68-7	0.017	28.	
2-sec-Butyl-4, 6-dinitrophenol (Dinoseb).		88-85-7	0.066	2.5.	
Carbon disulfide		75-15-0	3.8	4.8 mg/l TCLP.	
Carbon tetrachloride		56-23-5	0.057	6.0.	
Chlordane (alpha and gamma isomers).		57-74-9	0.0033	0.26.	
p-Chloroaniline		106-47-8	0.46	16.	
Chlorobenzene		108-90-7	0.057	6.0.	
Chlorobenzilate		510-15-6	0.10	6.6.	
2-Chloro-1, 3-butadiene		126-99-8	0.057	0.28.	
Chlorodibromomethane		124-48-1	0.057	15.	
Chloroethane		75-00-3	0.27	6.0.	
bis(2-Chloroethoxy)methane		111-91-1	0.036	7.2.	
bis(2-Chloroethyl)ether		111-44-4	0.033	6.0.	
Chloroform		67-66-3	0.046	6.0.	
bis(2-Chloroisopropyl)ether		39638-32-9	0.055	7.2.	
p-Chloro-m-cresol		59-50-7	0.018	14.	
Chloromethane (Methyl chloride).		74-87-3	0.19	30.	
2-Chloronaphthalene		91-58-7	0.055	5.6.	
2-Chlorophenol		95-57-8	0.044	5.7.	
3-Chloroprophylene		107-05-1	0.036	30.	
Chrysene		218-01-9	0.059	3.4.	
o-Cresol		95-48-7	0.11	5.6.	
m-Cresol (difficult to distinguish from p-cresol).		108-39-4	0.77	5.6.	
p-Cresol (difficult to distinguish from m-cresol).		106-44-5	0.77	5.6	
Cyclohexanone		108-94-1	0.36	0.75 mg/l TCLP.	
1,2-Dibromo-3-chloropropane.		96-12-8	0.11	15.	
Ethylene dibromide (1,2-Dibromoethane).		106-93-4	0.028	15.	
Dibromomethane		74-95-3	0.11	15.	

TREATMENT STANDARDS FOR HAZARDOUS WASTES—Continued

Waste code	Waste description and treatment/regulatory subcategory ¹	Regulated hazardous constituent		Wastewaters	Nonwastewaters
		Common name	CAS ² No.	Concentration in mg/l ³ ; or technology code ⁴	Concentration in mg/kg ⁵ unless noted as "mg/l TCLP"; or technology code
	2,4-D (2,4-Dichlorophenoxyacetic acid).		94-75-7	0.72	10.
	o,p#-DDD		53-19-0	0.023	0.087.
	p,p#-DDD		72-54-8	0.023	0.087.
	o,p#-DDE		3424-82-6	0.031	0.087.
	p,p#-DDE		72-55-9	0.031	0.087.
	o,p#-DDT		789-02-6	0.0039	0.087.
	p,p#-DDT		50-29-3	0.0039	0.087.
	Dibenz(a,h) anthracene		53-70-3	0.055	8.2.
	Dibenz(a,e)pyrene		192-65-4	0.061	22.
	m-Dichlorobenzene		541-73-1	0.036	6.0.
	o-Dichlorobenzene		95-50-1	0.088	6.0.
	p-Dichlorobenzene		106-46-7	0.090	6.0.
	Dichlorodifluoromethane		75-71-8	0.23	7.2.
	1,1-Dichloroethane		75-34-3	0.059	6.0.
	1,2-Dichloroethane		107-06-2	0.21	6.0.
	1,1-Dichloroethylene		75-35-4	0.025	6.0.
	trans-1,2-Dichloroethylene		156-60-5	0.054	30.
	2,4-Dichlorophenol		120-83-2	0.044	14.
	2,6-Dichlorophenol		87-65-0	0.044	14.
	1,2-Dichloropropane		78-87-5	0.85	18.
	cis-1,3-Dichloropropylene		10061-01-5	0.036	18.
	trans-1,3-Dichloropropylene		10061-02-6	0.036	18.
	Dieldrin		60-57-1	0.017	0.13.
	Diethyl phthalate		84-66-2	0.20	28.
	2,4-Dimethyl phenol		105-67-9	0.036	14.
	Dimethyl phthalate		131-11-3	0.047	28.
	Di-n-butyl phthalate		64-74-2	0.057	28.
	1,4-Dinitrobenzene		100-25-4	0.32	2.3.
	4,6-Dinitro-o-cresol		534-52-1	0.28	160.
	2,4-Dinitrophenol		51-28-5	0.12	160.
	2,4-Dinitrotoluene		121-14-2	0.32	140.
	2,6-Dinitrotoluene		606-20-2	0.55	28.
	Di-n-octyl phthalate		117-84-0	0.017	28.
	Di-n-propylnitrosamine		621-64-7	0.40	14.
	1,4-Dioxane		123-91-1	8.67	170.
	Diphenylamine (difficult to distinguish from diphenylnitrosamine).		122-39-4	0.92	13.
	Diphenylnitrosamine (difficult to distinguish from diphenylamine).		86-30-6	0.92	13.
	1,2-Diphenylhydrazine		122-66-7	0.087	1.5.
	Disulfoton		298-04-4	0.017	6.2.
	Endosulfan I		939-98-8	0.023	0.066
	Endosulfan II		33213-6-5	0.029	0.13.
	Endosulfan sulfate		1-31-07-8	0.029	0.13.
	Endrin		72-20-8	0.0028	0.13.
	Endrin aldehyde		7421-93-4	0.025	0.13
	Ethyl acetate		141-78-6	0.34	33.
	Ethyl cyanide (Propanenitrile).		107-12-0	0.24	360.
	Ethyl benzene		100-41-4	0.057	10.
	Ethyl ether		60-29-7	0.12	160.
	bis(2-Ethylhexyl)phthalate		117-81-7	0.28	28.
	Ethyl methacrylate		97-63-2	0.14	160.
	Ethylene oxide		75-21-8	0.12	0.75.
	Famphur		52-85-7	0.017	15.
	Fluoranthene		206-44-0	0.068	3.4.
	Fluorene		86-73-7	0.059	3.4.
	Heptachlor		76-44-8	0.0012	0.066.
	Heptachlor epoxide		1024-57-3	0.016	0.066.
	Hexachlorobenzene		118-74-1	0.055	10.
	Hexachlorobutadiene		87-68-3	0.055	5.6.
	Hexachlorocyclopentadiene		77-47-4	0.057	2.4.

TREATMENT STANDARDS FOR HAZARDOUS WASTES—Continued

Waste code	Waste description and treatment/regulatory subcategory ¹	Regulated hazardous constituent		Wastewaters	Nonwastewaters
		Common name	CAS ² No.	Concentration in mg/l ³ ; or technology code ⁴	Concentration in mg/kg ⁵ unless noted as "mg/l TCLP"; or technology code
	HxCDDs (All Hexachlorodibenzo-p-dioxins).		NA	0.000063	0.001.
	HxCDFs (All Hexachlorodibenzofurans).		NA	0.000063	0.001.
	Hexachloroethane	67-72-1		0.055	30.
	Hexachloropropylene	1888-71-7		0.035	30.
	Indeno (1,2,3-c,d) pyrene	193-39-5		0.0055	3.4.
	Iodomethane	74-88-4		0.19	65.
	Isobutyl alcohol	78-83-1		5.6	170.
	Isodrin	465-73-6		0.021	0.066.
	Isosafrole	120-58-1		0.081	2.6.
	Kepone	143-50-8		0.0011	0.13.
	Methacrylonitrile	126-98-7		0.24	84.
	Methanol	67-56-1		5.6	0.75 mg/l TCLP.
	Methapyrilene	91-80-5		0.081	1.5.
	Methoxychlor	72-43-5		0.25	0.18.
	3-Methylcholanthrene	56-49-5		0.0055	15.
	4,4-Methylene bis(2-chloroaniline).	101-14-4		0.50	30.
	Methylene chloride	75-09-2		0.089	30.
	Methyl ethyl ketone	78-93-3		0.28	36.
	Methyl isobutyl ketone	108-10-1		0.14	33.
	Methyl methacrylate	80-62-6		0.14	160.
	Methyl methanesulfonate	66-27-3		0.018	4.6.
	Methyl parathion	298-00-0		0.014	4.6.
	Naphthalene	91-20-3		0.059	5.6.
	2-Naphthylamine	91-59-8		0.52	15.
	p-Nitroaniline	100-01-6		0.028	28.
	Nitrobenzene	98-95-3		0.068	14.
	5-Nitro-o-toluidine	99-55-8		0.32	28.
	p-Nitrophenol	100-02-7		0.12	29.
	N-Nitrosodiethylamine	55-18-5		0.40	28.
	N-Nitrosodimethylamine	62-75-9		0.40	2.3.
	N-Nitroso-di-n-butylamine	924-16-3		0.40	17.
	N-Nitrosomethylethylamine	10595-95-6		0.40	2.3.
	N-Nitrosomorpholine	59-89-2		0.40	2.3.
	N-Nitrosopiperidine	100-75-4		0.013	35.
	N-Nitrosopyrrolidine	930-55-2		0.013	35.
	Parathion	56-38-2		0.014	4.6.
	Total PCBs (sum of all PCB isomers, or all Aroclors).	1336-36-3		0.10	10.
	Pentachlorobenzene	608-93-5		0.055	10.
	PeCDDs (All Pentachlorodibenzo-p-dioxins).		NA	0.000063	0.001.
	PeCDFs (All Pentachlorodibenzofurans).		NA	0.000035	0.001.
	Pentachloronitrobenzene	82-68-8		0.055	4.8.
	Pentachlorophenol	87-86-5		0.089	7.4.
	Phenacetin	62-44-2		0.081	16.
	Phenanthrene	85-01-8		0.059	5.6.
	Phenol	108-95-2		0.039	6.2.
	Phorate	298-02-2		0.021	4.6.
	Phthalic anhydride	85-44-9		0.055	28.
	Pronamide	23950-58-5		0.093	1.5.
	Pyrene	129-00-0		0.067	8.2.
	Pyridine	110-86-1		0.014	16.
	Safrole	94-59-7		0.081	22.
	Silvex (2,4,5-TP)	93-72-1		0.72	7.9.
	2,4,5-T	93-76-5		0.72	7.9.
	1,2,4,5-Tetrachlorobenzene	95-94-3		0.055	14.
	TCDDs (All Tetrachlorodibenzo-p-dioxins).		NA	0.000063	0.001.

TREATMENT STANDARDS FOR HAZARDOUS WASTES—Continued

Waste code	Waste description and treatment/regulatory subcategory ¹	Regulated hazardous constituent		Wastewaters	Nonwastewaters
		Common name	CAS ² No.	Concentration in mg/l ³ ; or technology code ⁴	Concentration in mg/kg ⁵ unless noted as "mg/l TCLP"; or technology code
		TCDFs (All Tetrachlorodibenzofurans).	NA	0.000063	0.001.
		1,1,2,2-Tetrachloroethane ...	630-20-6	0.057	6.0.
		1,1,2,2-Tetrachloroethane ...	79-34-6	0.057	6.0.
		Tetrachloroethylene	127-18-4	0.056	6.0.
		2,3,4,6-Tetrachlorophenol ...	58-90-2	0.030	7.4.
		Toluene	108-88-3	0.080	10.
		Toxaphene	8001-35-2	0.0095	2.6.
		Bromoform (Tribromomethane).	75-25-2	0.63	15.
		1,2,4-Trichlorobenzene	120-82-1	0.055	19.
		1,1,1-Trichloroethane	71-55-6	0.054	6.0.
		1,1,2-Trichloroethane	79-00-5	0.054	6.0.
		Trichloroethylene	79-01-6	0.054	6.0.
		Trichloromonofluoromethane	75-69-4	0.020	30.
		2,4,5-Trichlorophenol	95-95-4	0.18	7.4.
		2,4,6-Trichlorophenol	88-06-2	0.035	7.4.
		1,2,3-Trichloropropane	96-18-4	0.85	30.
		1,1,2-Trichloro-1,2,2-trifluoroethane.	76-13-1	0.057	30.
		tris(2,3-Dibromopropyl) phosphate.	126-72-7	0.11	0.10.
		Vinyl chloride	75-01-4	0.27	6.0.
		Xylenes-mixed isomers (sum of o-, m-, and p-xylene concentrations).	1330-20-7	0.32	30.
		Antimony	7440-36-0	1.9	2.1 mg/l TCLP.
		Arsenic	7440-38-2	1.4	5.0 mg/l TCLP.
		Barium	7440-39-3	1.2	7.6 mg/l TCLP.
		Beryllium	7440-41-7	0.82	0.014 mg/l TCLP.
		Cadmium	7440-43-9	0.69	0.19 mg/l TCLP.
		Chromium (Total)	7440-47-3	2.77	0.86 mg/l TCLP.
		Cyanides (Total) ⁷	57-12-5	1.2	590.
		Cyanides (Amenable) ⁷	57-12-5	0.86	30.
		Fluoride	16964-48-8	35	48.
		Lead	7439-92-1	0.69	0.37 mg/l TCLP.
		Mercury	7439-97-6	0.15	0.025 mg/l TCLP.
		Nickel	7440-02-0	3.98	5.0 mg/l TCLP.
		Selenium	7782-49-2	0.82	0.16 mg/l TCLP.
		Silver	7440-22-4	0.43	0.30 mg/l TCLP.
		Sulfide	8496-25-8	14	NA.
		Thallium	7440-28-0	1.4	0.078 mg/l TCLP.
		Vanadium	7440-62-2	4.3	.023.
*	*	*	*	*	*
K006	Wastewater treatment sludge from the production of chrome oxide green pigments (anhydrous).	Chromium (Total)	7440-47-3	2.77	0.86 mg/l TCLP.
		Lead	7439-92-1	0.69	0.37mg/l TCLP.
	Wastewater treatment sludge from the production of chrome oxide green pigments (hydrated).	Chromium (Total)	7440-47-3	2.77	0.86 mg/l TCLP.
		Lead	7439-92-1	0.69	0.37mg/l TCLP.
*	*	*	*	*	*
K018	Heavy ends from the fractionation column in ethyl chloride production..	Chloroethane	75-00-3	0.27	6.0.
		Chloromethane	74-87-3	0.19	30.
		1,1-Dichloroethane	75-34-3	0.059	6.0.
		1,2-Dichloroethane	107-06-2	0.21	6.0.
		Hexachlorobenzene	118-74-1	0.055	10.
		Hexachlorobutadiene	87-68-3	0.055	5.6.
		Hexachloroethane	67-72-1	0.055	30.
		Pentachloroethane	76-01-7	0.055	6.0.
		1,1,1-Trichloroethane	71-55-6	0.054	6.0.
K019	Heavy ends from the distillation of ethylene dichloride in ethylene dichloride production.	bis(2-Chloroethyl)ether	111-44-4	0.033	6.0.
		Chlorobenzene	108-90-7	0.057	6.0.
		Chloroform	67-66-3	0.046	6.0.
		p-Dichlorobenzene	106-46-7	0.090	6.0.
		1,2-Dichloroethane	107-06-2	0.21	6.0.

TREATMENT STANDARDS FOR HAZARDOUS WASTES—Continued

Waste code	Waste description and treatment/regulatory subcategory ¹	Regulated hazardous constituent		Wastewaters	Nonwastewaters
		Common name	CAS ² No.	Concentration in mg/l ³ ; or technology code ⁴	Concentration in mg/kg ⁵ unless noted as "mg/l TCLP"; or technology code
		Fluorene	86-73-7	0.059	3.4
		Hexachloroethane	67-72-1	0.055	30.
		Naphthalene	91-20-3	0.059	5.6.
		Phenanthrene	85-01-8	0.059	5.6.
		1,2,4,5-Tetrachlorobenzene	95-94-3	0.055	14.
		Tetrachloroethylene	127-18-4	0.056	6.0.
		1,2,4-Tetrachlorobenzene	120-82-1	0.055	19.
		1,1,1-Trichloroethane	71-55-6	0.054	6.0
*	*	*	*	*	*
K028	Spent catalyst from the hydrochlorinator reactor in the production of 1,1,1-trichloroethane.	1,1-Dichloroethane	75-34-3	0.059	6.0.
		trans-1,2-Dichloroethylene ..	156-60-5	0.054	30.
		Hexachlorobutadiene	87-68-3	0.055	5.6.
		Hexachloroethane	67-72-1	0.055	30.
		Pentachloroethane	76-01-7	0.055	6.0.
		1,1,1,2-Tetrachloroethane ..	630-20-6	0.057	6.0.
		1,1,2,2-Tetrachloroethane ..	79-34-6	0.057	6.0.
		Tetrachloroethylene	127-18-4	0.056	6.0.
		1,1,1-Trichloroethane	71-55-6	0.054	6.0.
		1,1,2-Trichloroethane	79-00-5	0.054	6.0.
		Cadmium	7440-43-9	0.69	0.19 mg/l TCLP.
		Chromium (Total)	7440-47-3	2.77	0.86 mg/l TCLP.
		Lead	7439-92-1	0.69	0.37 mg/l TCLP.
		Nickel	7440-02-0	3.98	5.0 mg/l TCLP.
*	*	*	*	*	*
K030	Column bodies or heavy ends from the combined production of trichloroethylene and perchloroethylene.	o-Dichlorobenzene	95-50-1	0.088	6.0.
		p-Dichlorobenzene	106-46-7	0.090	6.0.
		Hexachlorobutadiene	87-68-3	0.055	5.6.
		Hexachloroethane	67-72-1	0.055	30.
		Hexachloropropylene	1888-71-7	0.035	30.
		Pentachlorobenzene	608-93-5	0.055	10.
		Pentachloroethane	76-01-7	0.055	6.0.
		1,2,4,5-Tetrachlorobenzene	95-94-3	0.055	14.
		Tetrachloroethylene	127-18-4	0.056	6.0.
		1,2,4-Trichlorobenzene	120-82-1	0.055	19.
*	*	*	*	*	*
K035	Wastewater treatment sludges generated in the production of creosote.	Acenaphthene	83-32-9	0.059	3.4.
		Anthracene	120-12-7	0.059	3.4.
		Benz (a) anthracene	56-55-3	0.059	3.4.
		Benzo (a) pyrene	50-32-8	0.061	3.4.
		Chrysene	218-01-9	0.059	3.4.
		o-Cresol	95-48-7	0.11	5.6.
		m-Cresol (difficult to distinguish from p-cresol).	108-39-4	0.77	5.6.
		p-Cresol (difficult to distinguish from m-cresol).	106-44-5	0.77	5.6.
		Dibenz(a,h)-anthracene	53-70-3	0.055	8.2.
		Fluoranthene	206-44-0	0.068	3.4.
		Fluorene	86-73-7	0.068	3.4.
		Indeno(1,2,3-cd)pyrene	193-39-5	0.0055	3.4.
		Naphthalene	91-20-3	0.059	5.6.
		Phenanthrene	85-01-8	0.059	5.6.
		Phenol	108-95-2	0.039	6.2.
		Pyrene	129-00-0	0.067	8.2.
*	*	*	*	*	*
K048	Dissolved air flotation (DAF) float from the petroleum refining industry.	Benzene	71-43-2	0.14	10.
		Benzo(a)pyrene	50-32-8	0.061	3.4.
		bis(2-Ethylhexyl) phthalate ..	117-81-7	0.28	28.
		Chrysene	218-01-9	0.059	3.4.

TREATMENT STANDARDS FOR HAZARDOUS WASTES—Continued

Waste code	Waste description and treatment/regulatory subcategory ¹	Regulated hazardous constituent		Wastewaters	Nonwastewaters
		Common name	CAS ² No.	Concentration in mg/l ³ ; or technology code ⁴	Concentration in mg/kg ⁵ unless noted as "mg/l TCLP"; or technology code
K049	Slop oil emulsion solids from the petroleum refining industry.	Di-n-butyl phthalate	84-74-2	0.057	28.
		Ethylbenzene	100-41-4	0.057	10.
		Fluorene	86-73-7	0.059	3.4.
		Naphthalene	91-20-3	0.059	5.6.
		Phenanthrene	85-01-8	0.059	5.6.
		Phenol	108-95-2	0.039	6.2.
		Pyrene	129-00-0	0.067	8.2.
		Toluene	108-88-33	0.080	10.
		Xylenes-mixed isomers (sum of o-, m-, and p-xy- lene concentrations).	1330-20-7	0.32	30.
		Chromium (Total)	7440-47-3	2.77	0.86 mg/l TCLP.
		Cyanides (Total) ⁷	57-12-5	1.2	590.
		Lead	7439-92-1	0.69	0.37 mg/l TCLP.
		Nickel	7440-02-0	3.98	5.0 mg/l TCLP.
		Anthracene	120-12-7	0.059	3.4.
		Benzene	71-43-2	0.14	10.
		Benzo(a)pyrene	50-32-8	0.061	3.4.
		bis(2-Ethylhexyl) phthalate ..	117-81-7	0.28	28.
		Carbon disulfide	75-15-0	3.8	4.8 mg/l TCLP.
		Chrysene	2218-01-9	0.059	3.4.
		2,4-Dimethylphenol	105-67-9	0.036	14.
		Ethylbenzene	100-41-4	0.057	10.
		Naphthalene	91-20-3	0.059	5.6.
		Phenanthrene	85-01-8	0.059	5.6.
		Phenol	108-95-2	0.039	6.2.
		Pyrene	129-00-0	0.067	8.2.
		Toluene	108-88-3	0.080	10.
		Xylenes-mixed isomers (sum of o-, m-, and p-xy- lene concentrations).	1330-20-7	0.32	30.
		Cyanides (Total) ⁷	57-12-5	1.2	590.
Chromium (Total)	7440-47-3	2.77	0.86 mg/l TCLP.		
Lead	7439-92-1	0.69	0.37 mg/l TCLP.		
Nickel	7440-02-0	3.96	5.0 mg/l TCLP.		
Benzo(a)pyrene	50-32-8	0.061	3.4		
K050	Heat exchanger bundle cleaning sludge from the petroleum refining industry.	Phenol	108-95-2	0.039	6.2.
		Cyanides (Total) ⁷	57-12-5	1.2	590.
		Chromium (Total)	7440-47-3	2.77	0.86 mg/l TCLP.
		Lead	7439-92-1	0.69	0.37 mg/l TCLP.
		Nickel	7440-02-0	3.98	5.0 mg/l TCLP.
		Acenaphthene	83-32-9	0.059	3.4.
		Anthracene	120-12-7	0.059	3.4.
		Benz(a)anthracene	56-55-3	0.059	3.4.
		Benzene	71-43-2	0.14	10.
		Benzo(a)pyrene	50-32-8	0.061	3.4.
K051	API separator sludge from the petroleum refining industry.	bis(2-Ethylhexyl) phthalate ..	117-81-7	0.28	28.
		Chrysene	2218-01-9	0.059	3.4.
		Di-n-butyl phthalate	105-67-9	0.057	28.
		Ethylbenzene	100-41-4	0.057	10.
		Fluorene	86-73-7	0.059	3.4.
		Naphthalene	91-20-3	0.059	5.6.
		Phenanthrene	85-01-8	0.059	5.6.
		Phenol	108-95-2	0.039	6.2.
		Pyrene	129-00-0	0.067	8.2.
		Toluene	108-88-3	0.08	10.
		Xylenes-mixed isomers (sum of o-, m-, and p-xy- lene concentrations).	1330-20-7	0.32	30.
		Cyanides (Total) ⁷	57-12-5	1.2	590.
		Chromium (Total)	7440-47-3	2.77	0.86 mg/l TCLP.
		Lead	7439-92-1	0.69	0.37 mg/l TCLP.
		Nickel	7440-02-0	3.98	5.0 mg/l TCLP.
		Anthracene	120-12-7	0.059	3.4.
		Benz(a)anthracene	56-55-3	0.059	3.4.
		Benzene	71-43-2	0.14	10.
		Benzo(a)pyrene	50-32-8	0.061	3.4.
		bis(2-Ethylhexyl) phthalate ..	117-81-7	0.28	28.
		Chrysene	2218-01-9	0.059	3.4.
		Di-n-butyl phthalate	105-67-9	0.057	28.
		Ethylbenzene	100-41-4	0.057	10.
Fluorene	86-73-7	0.059	3.4.		
Naphthalene	91-20-3	0.059	5.6.		
Phenanthrene	85-01-8	0.059	5.6.		
Phenol	108-95-2	0.039	6.2.		
Pyrene	129-00-0	0.067	8.2.		
Toluene	108-88-3	0.08	10.		
Xylenes-mixed isomers (sum of o-, m-, and p-xy- lene concentrations).	1330-20-7	0.32	30.		
Cyanides (Total) ⁷	57-12-5	1.2	590.		
Chromium (Total)	7440-47-3	2.77	0.86 mg/l TCLP.		
Lead	7439-92-1	0.69	0.37 mg/l TCLP.		
Nickel	7440-02-0	3.98	5.0 mg/l TCLP.		

TREATMENT STANDARDS FOR HAZARDOUS WASTES—Continued

Waste code	Waste description and treatment/regulatory subcategory ¹	Regulated hazardous constituent		Wastewaters	Nonwastewaters
		Common name	CAS ² No.	Concentration in mg/l ³ ; or technology code ⁴	Concentration in mg/kg ⁵ unless noted as "mg/l TCLP"; or technology code
K052	Tank bottoms (leaded) from the petroleum refining industry.	Benzene	71-43-2	0.14	10.
		Benzo(a)pyrene	50-32-8	0.061	3.4.
		o-Cresol	95-48-7	0.11	5.6.
		m-Cresol (difficult to distinguish from p-cresol).	108-39-4	0.77	5.6.
		p-Cresol (difficult to distinguish from m-cresol).	106-44-5	0.77	5.6.
		2,4-Dimethylphenol	105-67-9	0.036	14.
		Ethylbenzene	100-41-4	0.057	10.
		Naphthalene	91-20-3	0.059	5.6.
		Phenanthrene	85-01-8	0.059	5.6.
		Phenol	108-95-2	0.039	6.2.
		Toluene	108-88-3	0.08	10.
		Xylenes-mixed isomers (sum of o-, m-, and p-xylene concentrations).	1330-20-7	0.32	30.
		Chromium (Total)	7440-47-3	2.77	0.86 mg/l TCLP.
		Cyanides (Total) ⁷	57-12-5	1.2	590.
		Lead	7439-92-1	0.69	0.37 mg/l TCLP.
Nickel	7440-02-0	3.98	5.0 mg/l TCLP.		
*	*	*	*	*	*
K061	Emission control dust/sludge from the primary production of steel in electric furnaces.	Antimony	7440-36-0	1.9	2.1 mg/l TCLP.
		Arsenic	7440-38-2	1.4	5.0 mg/l TCLP.
		Barium	7440-39-3	1.2	7.6 mg/l TCLP.
		Beryllium	7440-41-7	0.82	0.014 mg/l TCLP.
		Cadmium	7440-43-9	0.69	0.19 mg/l TCLP.
		Chromium (Total)	7440-47-3	2.77	0.86 mg/l TCLP.
		Lead	7439-92-1	0.69	0.37 mg/l TCLP.
		Mercury	7439-97-6	0.15	0.025 mg/l TCLP.
		Nickel	7440-02-0	3.98	5.0 mg/l TCLP.
		Selenium	7782-49-2	0.82	0.16 mg/l TCLP.
		Silver	7440-22-4	0.43	0.30 mg/l TCLP.
		Thallium	7440-28-0	1.4	0.078 mg/l TCLP.
		Zinc	7440-66-6	2.61	5.3 mg/l TCLP.
		*	*	*	*
K083	Distillation bottoms from aniline production.	Aniline	62-53-3	0.81	14.
		Benzene	71-43-2	0.14	10.
		Cyclohexanone	108-94-1	0.36	0.75 mg/l TCLP.
		Diphenylamine (difficult to distinguish from diphenylnitrosamine).	122-39-4	0.92	13.
		Diphenylnitrosamine (difficult to distinguish from diphenylamine).	86-30-6	0.92	13.
		Nitrobenzene	98-95-3	0.068	14.
		Phenol	108-95-2	0.039	6.2.
		Nickel	7440-02-0	3.98	5.0 mg/l TCLP.
*	*	*	*	*	*
K086	Solvent wastes and sludges, caustic washes and sludges, or water washes and sludges from cleaning tubs and equipment used in the formulation of ink from pigments, driers, soaps, and stabilizers containing chromium and lead.	Acetone	67-64-1	0.28	160.
		Acetophenone	96-86-2	0.010	9.7.
		bis(2-Ethylhexyl) phthalate	117-81-7	0.28	28.
		n-Butyl alcohol	71-36-3	5.6	2.6.
		Butylbenzyl phthalate	85-68-7	0.017	28.
		Cyclohexanone	108-94-1	0.36	0.75 mg/l TCLP.
		o-Dichlorobenzene	95-50-1	0.088	6.0
		Diethyl phthalate	84-66-2	0.20	28.
		Dimethyl phthalate	131-11-3	0.047	28.
		Di-n-butyl phthalate	84-74-2	0.057	28.
		Di-n-octyl phthalate	117-84-0	0.017	28.
		Ethyl acetate	141-78-6	0.34	33.
		Ethylbenzene	100-41-4	0.057	10.

TREATMENT STANDARDS FOR HAZARDOUS WASTES—Continued

Waste code	Waste description and treatment/regulatory subcategory ¹	Regulated hazardous constituent		Wastewaters	Nonwastewaters
		Common name	CAS ² No.	Concentration in mg/l ³ ; or technology code ⁴	Concentration in mg/kg ⁵ unless noted as "mg/l TCLP"; or technology code
		Methanol	67-56-1	5.6	0.75 mg/l TCLP.
		Methyl ethyl ketone	78-93-3	0.28	36.
		Methyl isobutyl ketone	108-10-1	0.14	33.
		Methylene chloride	75-09-2	0.089	30.
		Naphthalene	91-20-3	0.059	5.6.
		Nitrobenzene	98-95-3	0.068	14.
		Toluene	108-88-3	0.080	10.
		1,1,1-Trichloroethane	71-55-6	0.054	6.0.
		Trichloroethylene	79-01-6	0.054	6.0.
		Xylenes-mixed isomers (sum of o-, m-, and p-xylene concentrations).	1330-20-7	0.32	30.
		Chromium (Total)	7440-47-3	2.77	0.86 mg/l TCLP.
		Cyanides (Total) ⁷	57-12-5	1.2	590.
		Lead	7439-92-1	0.69	0.37 mg/l TCLP.
*	*	*	*	*	*
K088	Spent potliners from primary aluminum reduction.	Acenaphthene	83-32-9	0.059	3.4.
		Anthracene	120-12-7	0.059	3.4.
		Benz(a)anthracene	56-55-3	0.059	3.4.
		Benzo(a)pyrene	50-32-8	0.061	3.4.
		Benzo(b)fluoranthene	205-99-2	0.11	6.8.
		Benzo(k)fluoranthene	207-08-9	0.11	6.8.
		Benzo(g,h,i)perylene	191-24-2	0.0055	1.8.
		Chrysene	218-01-9	0.059	3.4.
		Dibenz(a,h)anthracene	53-70-3	0.055	8.2.
		Fluoranthene	206-44-0	0.068	3.4.
		Indeno(1,2,3-c,d)pyrene	193-39-5	0.0055	3.4.
		Phenanthrene	85-01-8	0.059	5.6.
		Pyrene	129-00-0	0.067	8.2.
		Antimony	7440-36-0	1.9	2.1.
		Arsenic	7440-38-2	1.4	5.0.
		Barium	7440-39-3	1.2	7.6.
		Beryllium	7440-41-7	0.82	0.014.
		Cadmium	7440-43-9	0.69	0.19.
		Chromium (Total)	7440-47-3	2.77	0.86.
		Lead	7439-92-1	0.69	0.37.
		Mercury	7439-97-6	0.15	0.025.
		Nickel	7440-02-0	3.98	5.0.
		Selenium	7782-49-2	0.82	0.16.
		Silver	7440-22-4	0.43	0.30.
		Cyanide (Total)	57-12-5	1.2	590.
		Cyanide (Amenable)	57-12-5	0.86	30.
		Fluoride	16964-48-8	35	48.
*	*	*	*	*	*
K101	Distillation tar residues from the distillation of aniline-based compounds in the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.	o-Nitroaniline	88-74-4	0.27	14.
		Arsenic	7440-38-2	1.4	5.0 mg/l TCLP.
		Cadmium	7440-43-9	0.69	0.19 mg/l TCLP.
		Lead	7439-92-1	0.69	0.37 mg/l TCLP.
		Mercury	7439-97-6	0.15	0.025 mg/l TCLP.
K102	Residue from the use of activated carbon for decolorization in the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.	o-Nitrophenol	88-75-5	0.028	13.
		Arsenic	7440-38-2	1.4	5.0 mg/l TCLP.
		Cadmium	7440-43-9	0.69	0.19 mg/l TCLP.
		Lead	7439-92-1	0.69	0.37 mg/l TCLP.
		Mercury	7439-97-6	0.15	0.025 mg/l TCLP.
*	*	*	*	*	*
K-140	Waste solids and filter cartridges from the production of 2,4,6-tribromophenol.	2,4,6-Tribromophenol	118-79-6	0.035	7.4
		Toluene	108-88-3	0.080	10.

TREATMENT STANDARDS FOR HAZARDOUS WASTES—Continued

Waste code	Waste description and treatment/regulatory subcategory ¹	Regulated hazardous constituent		Wastewaters	Nonwastewaters
		Common name	CAS ² No.	Concentration in mg/l ³ ; or technology code ⁴	Concentration in mg/kg ⁵ unless noted as "mg/l TCLP"; or technology code
*	*	*	*	*	*
K156	Organic waste (including heavy ends, still bottoms, light ends, spent solvents, filtrates, and decantates) from the production of carbamates and carbamoyl oximes.	Acetonitrile	75-05-8	5.6	1.8.
		Acetophenone	96-86-2	0.010	9.7.
		Aniline	62-53-3	0.81	14.
		Benomyl	17804-35-2	0.056	1.4.
		Benzene	71-43-2	0.14	10.
		Carbaryl	63-25-2	0.006	0.14.
		Carbenzadim	10605-21-7	0.056	1.4.
		Carbofuran	1563-66-2	0.006	0.14.
		Carbosulfan	55285-14-8	0.028	1.4.
		Chlorobenzene	108-90-7	0.057	6.0.
		Chloroform	67-66-3	0.046	6.0.
		o-Dichlorobenzene	95-50-1	0.088	6.0.
		Methomyl	16752-77-5	0.028	0.14.
		Methylene chloride	75-09-2	0.089	30.
		Methyl ethyl ketone	78-93-3	0.28	36.
		Naphthalene	91-20-3	0.059	5.6.
		Phenol	108-95-2	0.039	6.2.
		Pyridine	110-86-1	0.014	16.
		Toluene	108-88-3	0.080	10.
		Triethylamine	121-44-8	0.081	1.5.
K157	Wastewaters (including scrubber waters, condenser waters, washwaters, and separation waters) from the production of carbamates and carbamoyl oximes.	Carbon tetrachloride	56-23-5	0.057	6.0.
		Chloroform	67-66-3	0.046	6.0.
		Chloromethane	74-87-3	0.19	30.
		Methomyl	16752-77-5	0.028	0.14.
		Methylene chloride	75-09-2	0.089	30.
		Methyl ethyl ketone	78-93-3	0.28	36.
		o-Phenylenediamine	95-54-5	0.056	5.6.
		Pyridine	110-86-1	0.014	16.
		Triethylamine	121-44-8	0.081	1.5.
K158	Bag house dusts and filter/separation solids from the production of carbamates and carbamoyl oximes.	Benomyl	17804-35-2	0.056	1.4.
		Benzene	71-43-2	0.14	10.
		Carbenzadim	10605-21-7	0.056	1.4.
		Carbofuran	1563-66-2	0.006	0.14.
		Carbosulfan	55285-14-8	0.028	1.4.
		Chloroform	67-66-3	0.046	6.0.
		Methylene chloride	75-09-2	0.089	30.
		Phenol	108-95-2	0.039	6.2.
K159	Organics from the treatment of thiocarbamate wastes.	Benzene	71-43-2	0.14	10.
		Butylate	2008-41-5	0.003	1.5.
		EPTC (Eptam)	759-94-4	0.003	1.4.
		Molinate	2212-67-1	0.003	1.4.
		Pebulate	1114-71-2	0.003	1.4.
		Vemolate	1929-77-7	0.003	1.4.
K160	Solids (including filter wastes, separation solids, and spent catalysts) from the production of thiocarabamates and solids from the treatment of thiocarbamate wastes.	Butylate	2008-41-5	0.003	1.5.
		EPTC (Eptam)	759-94-4	0.003	1.4.
		Molinate	2212-67-1	0.003	1.4.
		Pebulate	t1114-71-2	0.003	1.4.
		Toluene	108-88-3	0.080	10.
		Vemolate	1929-77-7	0.003	1.4.
K161	Purification solids (including filtration, evaporation, and centrifugation solids), baghouse dust and floor sweepings from the production of dithiocarbamate acids and their salts.	Antimony	7440-36-0	1.9	2.1 mg/l TCLP.
		Arsenic	7440-38-2	1.4	5.0 mg/l TCLP.
		Carbon disulfide	75-15-0	3.8	4.8 mg/l TCLP.
		Dithiocarbamates (total).	137-30-4	0.028	28.
		Lead	7439-92-1	0.69	0.37 mg/l TCLP.
		Nickel	7440-02-0	3.98	5.0 mg/l TCLP.
		Selenium	7782-49-2	0.82	0.16 mg/l TCLP.
*	*	*	*	*	*
P003	Acrolein	Acrolein	107-02-8	0.29	2.8.

TREATMENT STANDARDS FOR HAZARDOUS WASTES—Continued

Waste code	Waste description and treatment/regulatory subcategory ¹	Regulated hazardous constituent		Wastewaters	Nonwastewaters
		Common name	CAS ² No.	Concentration in mg/l ³ ; or technology code ⁴	Concentration in mg/kg ⁵ unless noted as "mg/l TCLP"; or technology code
P013	Barium cyanide	Barium	7440-39-3	1.2	7.6 mg/l TCLP.
		Cyanides (Total) ⁷	57-12-5	1.2	590.
		Cyanides (Amenable) ⁷	57-12-5	0.86	30.
P056	Fluorine	Fluoride (measured in wastewaters only).	16964-48-8	35	48.
P127	Carbofuran	Carbofuran	1563-66-2	0.006	0.14.
P128	Mexacarbate	Mexacarbate	315-18-4	0.056	1.4.
P185	Tirpate	Tirpate	26419-73-8	0.056	0.28.
P188	Physostigmine salicylate	Physostigmine salicylate	57-64-7	0.056	1.4.
P189	Carbosulfan	Carbosulfan	55285-14-8	0.028	1.4.
P190	Metolcarb	Metolcarb	1129-41-5	0.056	1.4.
P191	Dimetilan	Dimetilan	644-64-4	0.056	1.4.
P192	Isolan	Isolan	119-38-0	0.056	1.4.
P194	Oxamyl	Oxamyl	23135-22-0	0.056	0.28.
P196	Manganese dimethyldithiocarbamate	Dithiocarbamates (total)	137-30-4	0.028	28.
P197	Formparanate	Formparanate	17702-57-7	0.056	1.4.
P198	Formetanate hydrochloride	Formetanate hydrochloride	23422-53-9	0.056	1.4.
P199	Methiocarb	Methiocarb	2032-65-7	0.056	1.4.
P201	Promecarb	Promecarb	2631-37-0	0.056	1.4.
P202	m-Cumenyl methylcarbamate	m-Cumenyl methylcarbamate.	64-00-6	0.056	1.4.
P203	Aldicarb sulfone	Aldicarb sulfone	1646-88-4	0.056	0.28.
P204	Physostigmine	Physostigmine	57-47-6	0.056	1.4.
P205	Ziram	Dithiocarbamates (total)	137-30-4	0.028	28.
U038	Chlorobenzilate	Chlorobenzilate	510-15-6	0.10	6.6.
U042	2-Chloroethyl vinyl ether	2-Chloroethyl vinyl ether	110-75-8	0.062	5.6.
U093	p-Dimethylaminoazobenzene	p-Dimethylaminoazobenzene.	60-11-7	0.13	29.
U134	Hydrogen fluoride	Fluoride (measured in wastewaters only).	16964-48-8	35	48.
U168	2-Naphthylamine	2-Naphthylamine	91-59-8	0.52	15.
U271	Benomyl	Benomyl	17804-35-2	0.056	1.4.
U277	Sulfallate	Dithiocarbamates (total)	137-30-4	0.028	28.
U278	Bendiocarb	Bendiocarb	22781-23-3	0.056	1.4.
U279	Carbaryl	Carbaryl	63-25-2	0.006	0.14.
U280	Barban	Barban	101-27-9	0.056	1.4.
U364	Bendiocarb phenol	Bendiocarb phenol	22961-82-6	0.056	1.4.
U365	Molinate	Molinate	2212-67-1	0.003	1.4.
U366	Dazomet	Dithiocarbamates (total)	137-30-4	0.028	28.
U367	Carbofuran phenol	Carbofuran phenol	1563-38-8	0.056	1.4.
U372	Carbendazim	Carbendazim	10605-21-7	0.056	1.4.
U373	Propham	Propham	122-42-9	0.056	1.4.
U375	3-Iodo-2-propynyl n-butylcarbamate	3-Iodo-2-propynyl n-butylcarbamate.	55406-53-6	0.056	1.4.
U376	Selenium, tetrakis (dimethyldithiocarbamate).	Dithiocarbamates (total)	137-30-4	0.028	28.
	Selenium	Selenium	7782-49-2	0.82	0.16 mg/l TCLP.
U377	Potassium n-methyldithiocarbamate	Dithiocarbamates (total)	137-30-4	0.028	28.
U378	Potassium n-hydroxymethyl-n-methyldithiocarbamate.	Dithiocarbamates (total)	137-30-4	0.028	28.
U379	Sodium dibutyldithiocarbamate	Dithiocarbamates (total)	137-30-4	0.028	28.

TREATMENT STANDARDS FOR HAZARDOUS WASTES—Continued

Waste code	Waste description and treatment/regulatory subcategory ¹	Regulated hazardous constituent		Wastewaters	Nonwastewaters
		Common name	CAS ² No.	Concentration in mg/l ³ ; or technology code ⁴	Concentration in mg/kg ⁵ unless noted as "mg/l TCLP"; or technology code
U381	Sodium diethyldithiocarbamate	Dithiocarbamates (total)	137-30-4	0.028	28.
U382	Sodium dimethyldithiocarbamate	Dithiocarbamates (total)	137-30-4	0.028	28.
U383	Potassium dimethyl dithiocarbamate	Dithiocarbamates (total)	137-30-4	0.028	28.
U384	Metam Sodium	Dithiocarbamates (total)	137-30-4	0.028	28.
U385	Vemolate	Vemolate	1929-77-7	0.003	1.4.
U386	Cycloate	Cycloate	1134-23-2	0.003	1.4.
U387	Prosulfocarb	Prosulfocarb	52888-80-9	0.003	1.4.
U389	Triallate	Triallate	2303-17-5	0.003	1.4.
U390	EPTC	EPTC	759-94-4	0.003	1.4.
U391	Pebulate	Pebulate	1114-71-2	0.003	1.4.
U392	Butylate	Butylate	2008-41-5	0.003	1.4.
U393	Copper dimethyldithiocarbamate	Dithiocarbamates (total)	137-30-4	0.028	28.
U394	A2213	A2213	30558-43-1	0.003	1.4.
U395	Diethylene glycol, dicarbamate	Diethylene glycol, dicarbamate.	5952-26-1	0.056	1.4.
U396	Ferbam	Dithiocarbamates (total)	137-30-4	0.028	28.
U400	Bis(pentamethylene)thiuram tetrasulfide.	Dithiocarbamates (total)	137-30-4	0.028	28.
U401	Tetramethyl thiuram monosulfide	Dithiocarbamates (total)	137-30-4	0.028	28.
U402	Tetrabutylthiuram disulfide	Dithiocarbamates (total)	137-30-4	0.028	28.
U403	Disulfiram	Dithiocarbamates (total)	137-30-4	0.028	28.
U404	Triethylamine	Triethylamine	101-44-8	0.081	1.5.
U407	Ethyl Ziram	Dithiocarbamates (total)	137-30-4	0.028	28.
U408	2,4,6-Tribromophenol	2,4,6-Tribromophenol	118-79-6	0.035	7.4.
U409	Thiophanate-methyl	Thiophanate-methyl	23564-05-8	0.056	1.4.
U410	Thiodicarb	Thiodicarb	59669-26-0	0.019	1.4.
U411	Propoxur	Propoxur	114-26-1	0.056	1.4.

¹ The waste descriptions provided in this table do not replace waste descriptions in 40 CFR part 261. Descriptions of treatment/regulatory subcategories are provided, as needed, to distinguish between applicability of different standards.

² CAS means Chemical Abstract Services. When the waste code and/or regulated constituents are described as a combination of a chemical with its salts and/or esters, the CAS number is given for the parent compound only.

³ Concentration standards for wastewaters are expressed in mg/l are based on analysis of composite samples.

⁴ All treatment standards expressed as a Technology Code or combination of Technology Codes are explained in detail in 40 CFR 268.42, Table 1—Technology Codes and Descriptions of Technology-Based Standards.

⁵ Except for Metals (EP or TCLP) and Cyanides (Total and Amenable) the nonwastewater treatment standards expressed as a concentration were established, in part, based upon incineration in units operated in accordance with the technical requirements of 40 CFR part 264, subpart O or part 265, subpart O, or based upon combustion in fuel substitution units operating in accordance with applicable technical requirements. A facility may comply with these treatment standards according to provisions in 40 CFR 268.40(d). All concentration standards for nonwastewaters are based on analysis of grab samples.

⁶ Where an alternate treatment standard or set of alternate standards has been indicated, a facility may comply with this alternate standard, but only for the Treatment/Regulatory Subcategory or physical form (i.e., wastewater and/or nonwastewater) specified for that alternate standard.

⁷ Both Cyanides (Total) and Cyanides (Amenable) for nonwastewaters are to be analyzed using Method 9010 or 9012, found in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", EPA Publication SW-846, as incorporated by reference in 40 CFR 260.11, with a sample size of 10 grams and a distillation time of 1 hour and 15 minutes.

Note: NA means not applicable.

19. Section 268.44 is amended by revising paragraph (a) to read as follows:

§ 268.44 Variance from a treatment standard.

(a) Where the treatment standard is expressed as a concentration in a waste or waste extract and a waste cannot be treated to the specified level, or where the treatment technology is not appropriate to the waste, the generator or treatment facility may petition the

Administrator for a variance from the treatment standard. The petitioner must demonstrate that because the physical or chemical properties of the waste differs significantly from wastes analyzed in developing the treatment standard, the waste cannot be treated to specified levels or by the specified methods. The petitioner may also demonstrate that it is treating underlying hazardous constituents in characteristically hazardous

wastewaters by sending the waste to a properly designed and operated BAT/PSES system, which may not be achieving the treatment standards found in § 268.48.

* * * * *

20. In subpart D, § 268.48, the table in paragraph (a) is revised to read as follows:

(a) * * *

§ 268.48 Universal Treatment Standards.

§ 268.48 TABLE UTS—UNIVERSAL TREATMENT STANDARDS

Regulated constituent/common name	CAS ¹ No.	Wastewater standard	Nonwastewater standard
		Concentration in mg/l ²	Concentration in mg/kg ³ unless noted as "mg/l TCLP"
A2213	30558-43-1	0.003	1.4
Acenaphthylene	208-96-8	0.059	3.4
Acenaphthene	83-32-9	0.059	3.4
Acetone	67-64-1	0.28	160
Acetonitrile	75-05-8	5.6	1.8
Acetophenone	96-86-2	0.010	9.7
2-Acetylaminofluorene	53-96-3	0.059	140
Acrolein	107-02-8	0.29	NA
Acrylamide	79-06-1	19	23
Acrylonitrile	107-13-1	0.24	84
Aldicarb sulfone	1646-88-4	0.056	0.28
Aldrin	309-00-2	0.021	0.066
4-Aminobiphenyl	92-67-1	0.13	NA
Aniline	62-53-3	0.81	14
Anthracene	120-12-7	0.059	3.4
Aramite	140-57-8	0.36	NA
alpha-BHC	319-84-6	0.00014	0.066
beta-BHC	319-85-7	0.00014	0.066
delta-BHC	319-86-8	0.023	0.066
gamma-BHC	58-89-9	0.0017	0.066
Barban	101-27-9	0.056	1.4
Bendiocarb	22781-23-3	0.056	1.4
Bendiocarb phenol	22961-82-6	0.056	1.4
Benomyl	17804-35-2	0.056	1.4
Benzene	71-43-2	0.14	10
Benz(a)thracene	56-55-3	0.059	3.4
Benzal choride	98-87-3	0.055	6.0
Benzo(b)florathene (difficult to distinguish from benzo(k)fluoranthene)	205-99-2	0.11	6.8
Benzo(k)fluorathene (difficult to distinguish from benzo(b)fluoranthene)	207-08-9	0.11	6.8
Benzo(g,h,i)perylene	191-24-2	0.0055	1.8
Benzo(a)pyrene	50-32-8	0.061	3.4
Bromodichloromethane	75-27-4	0.35	15
Bromomethane/Methyl bromide	74-83-9	0.11	15
4-Bromophenyl phenyl ether	101-55-3	0.055	15
n-Butyl alcohol	71-36-3	5.6	2.6
Butylate	2008-41-5	0.003	1.4
Butyle benzyl phthalate	85-68-7	0.017	28
2-sec-Butyl-4,6-dinitrophenol/Dinoseb	88-85-7	0.066	2.5
Carbaryl	63-25-2	0.006	0.14
Carbenzadim	10605-21-7	0.056	1.4
Carbofuran	1563-66-2	0.006	0.14
Carbofuran phenol	1563-38-8	0.056	1.4
Carbon disulfide	75-15-0	3.8	4.8 mg/l TCLP
Carbon tetrachloride	56-23-5	0.057	6.0
Carbosulfan	55285-14-8	0.028	1.4
Chlordane (alpha and gamma isomers)	57-74-9	0.0033	0.26
p-Chloroaniline	106-47-8	0.46	16
Chlorobenzene	108-90-7	0.057	6.0
Chlorobenzilate	510-15-6	0.10	NA
2-Chloro-1,3-butadiene	126-99-8	0.057	0.28
Chlorodibromomethane	124-48-1	0.057	15
Choroethane	75-00-3	0.27	6.0
bis(2-Chloroethoxy)methane	111-91-1	0.036	7.2
bis(2-Chloroethyl)ether	111-44-4	0.033	6.0
Chloroform	67-66-3	0.046	6.0
bis(2-Chloroisopropyl)ether	39638-32-9	0.055	7.2
p-Chloro-m-cresol	59-50-7	0.018	14
2-Chloroethyl vinyl ether	110-75-8	0.062	NA
Chloromethane/Methyl chloride	74-87-3	0.19	30
2-Chloronaphthalene	91-58-7	0.055	5.6
2-Chlorophenol	95-57-8	0.044	5.7
3-Chloropropylene	107-05-1	0.036	30
Chrysene	218-01-9	0.059	3.4
o-Cresol	95-48-7	0.11	5.6
m-Cresol (difficult to distinguish from p-cresol)	108-39-4	0.77	5.6
p-Cresol (difficult to distinguish from m-cresol)	106-44-5	0.77	5.6
m-Cumenyl methylcarbamate	64-00-6	0.056	1.4

§ 268.48 TABLE UTS—UNIVERSAL TREATMENT STANDARDS—Continued

Regulated constituent/common name	CAS ¹ No.	Wastewater standard	Nonwastewater standard
		Concentration in mg/l ²	Concentration in mg/kg ³ unless noted as "mg/l TCLP"
Cycloate	1134-23-2	0.003	1.4
Cyclohexanone	108-94-1	0.36	0.75 mg/l TCLP
o,p'-DDD	53-19-0	0.023	0.087
p,p'-DDD	72-54-8	0.023	0.087
o,p'-DDE	3424-82-6	0.031	0.087
p,p'-DDE	72-55-9	0.031	0.087
o,p'-DDT	789-02-6	0.0039	0.087
p,p'-DDT	50-29-3	0.0039	0.087
Dibenz(a,h)anthracene	53-70-3	0.055	8.2
Dibenz(a,e)pyrene	192-65-4	0.061	NA
1,2-Dibromo-3-chloropropane	96-12-8	0.11	15
1,2-Dibromoethane/Ethylene dibromide	106-93-4	0.028	15
Dibromomethane	74-95-3	0.11	15
m-Dichlorobenzene	541-73-1	0.036	6.0
o-Dichlorobenzene	95-50-1	0.088	6.0
p-Dichlorobenzene	106-46-7	0.090	6.0
Dichlorodifluoromethane	75-71-8	0.23	7.2
1,1-Dichloroethane	75-34-3	0.059	6.0
1,2-Dichloroethane	107-06-2	0.21	6.0
1,1-Dichloroethylene	75-35-4	0.025	6.0
trans-1,2-Dichloroethylene	156-60-5	0.054	30
2,4-Dichlorophenol	120-83-2	0.044	14
2,6-Dichlorophenol	87-65-0	0.044	14
2,4-Dichlorophenoxyacetic acid/2,4-D	94-75-7	0.72	10
1,2-Dichloropropane	78-87-5	0.85	18
cis-1,3-Dichloropropylene	10061-01-5	0.036	18
trans-1,3-Dichloropropylene	10061-02-6	0.036	18
Dieldrin	60-57-1	0.017	0.13
Diethylene glycol, dicarbamate	5952-26-1	0.056	1.4
Diethyl phthalate	84-66-2	0.20	28
p-Dimethylaminoazobenzene	60-11-7	0.13	NA
2,4-Dimethyl phenol	105-67-9	0.036	14
Dimethyl phthalate	131-11-3	0.047	28
Dimetilan	644-64-4	0.056	1.4
Di-n-butyl phthalate	84-74-2	0.057	28
1,4-Dinitrobenzene	100-25-4	0.32	2.3
4,6-Dinitro-o-cresol	534-52-1	0.28	160
2,4-Dinitrophenol	51-28-5	0.12	160
2,4-Dinitrotoluene	121-14-2	0.32	140
2,6-Dinitrotoluene	606-20-2	0.55	28
Di-n-octyl phthalate	117-84-0	0.017	28
Di-n-propylnitrosamine	621-64-7	0.40	14
1,4-Dioxane	123-91-1	0.22	170
Diphenylamine (difficult to distinguish from diphenylnitrosamine)	122-39-4	0.92	13
Diphenylnitrosamine (difficult to distinguish from diphenylamine)	86-30-6	0.92	13
1,2-Dephenylhydrazine	122-66-7	0.087	NA
Disulfoton	298-04-4	0.017	6.2
Dithiocarbamates (total)	137-30-4	0.028	28
Endosulfan I	939-98-8	0.023	0.066
Endosulfan II	33213-6-5	0.029	0.13
Endosulfan sulfate	1-31-07-8	0.029	0.13
Endrin	72-20-8	0.0028	0.13
Endrin aldehyde	7421-93-4	0.025	0.13
EPTC	759-94-4	0.003	1.4
Ethyl acetate	141-78-6	0.34	33
Ethyl benzene	100-41-4	0.057	10
Ethyl cyanide/Propanenitrile	107-12-0	0.24	360
Ethyl ether	60-29-7	0.12	160
bis(2-Ethylhexyl) phthalate	117-81-7	0.28	28
Ethyl methacrylate	97-63-2	0.14	160
Ethylene oxide	75-21-8	0.12	NA
Famphur	52-85-7	0.017	15
Fluoranthene	206-44-0	0.068	3.4
Fluorene	86-73-7	0.059	3.4
Formetanate hydrochloride	23422-53-9	0.056	1.4
Formparanate	17702-57-7	0.056	1.4
Heptachlor	76-44-8	0.0012	0.066

§ 268.48 TABLE UTS—UNIVERSAL TREATMENT STANDARDS—Continued

Regulated constituent/common name	CAS ¹ No.	Wastewater standard	Nonwastewater standard
		Concentration in mg/l ²	Concentration in mg/kg ³ unless noted as "mg/l TCLP"
Heptachlor epoxide	1024-57-3	0.016	0.066
Hexachlorobenzene	118-74-1	0.055	10
Hexachlorobutadiene	87-68-3	0.055	5.6
Hexachlorocyclopentadiene	77-47-4	0.057	2.4
HxCDDs (All Hexachlorodibenzo-p-dioxins)	NA	0.00063	0.001
HxCDFs (All Hexachlorodibenzofurans)	NA	0.00063	0.001
Hexachloroethane	67-72-1	0.055	30
Hexachloropropylene	1888-71-7	0.035	30
Indeno (1,2,3-c,d) pyrene	193-39-5	0.0055	3.4
Iodomethane	74-88-4	0.19	65
3-Iodo-2-propynyl n-butylcarbamate	55406-53-6	0.056	1.4
Isobutyl alcohol	78-83-1	5.6	170
Isodrin	456-73-6	0.021	0.066
Isolan	119-38-0	0.056	1.4
Isosafrole	120-58-1	0.081	2.6
Kepone	143-50-8	0.0011	0.13
Methacrylonitrile	126-98-7	0.24	84
Methanol	67-56-1	5.6	0.75 mg/l TCLP
Methapyrilene	91-80-5	0.081	1.5
Methiocarb	2032-65-7	0.056	1.4
Methomyl	16752-77-5	0.028	0.14
Methoxychlor	72-43-5	0.25	0.18
3-Methylcholanthrene	56-49-5	0.0055	15
4,4-Methylene bis(2-chloroaniline)	101-14-4	0.50	30
Methylene chloride	75-09-2	0.089	30
Methyl ethyl ketone	78-93-3	0.28	36
Methyl isobutyl ketone	108-10-1	0.14	33
Methyl methacrylate	80-62-6	0.14	160
Methyl methansulfonate	66-27-3	0.018	NA
Methyl parathion	298-00-0	0.014	4.6
Metolcarb	1129-41-5	0.056	1.4
Mexacarbate	315-18-4	0.056	1.4
Molinate	2212-67-1	0.003	1.4
Naphthalene	91-20-3	0.059	5.6
2-Naphthylamine	91-59-8	0.52	NA
o-Nitroaniline	88-74-4	0.27	14
p-Nitroaniline	100-01-6	0.028	28
Nitrobenzene	98-95-3	0.068	14
5-Nitro-o-toluidine	99-55-8	0.32	28
o-Nitrophenol	88-75-5	0.028	13
p-Nitrophenol	100-02-7	0.12	29
N-Nitrosodiethylamine	55-18-5	0.40	28
N-Nitrosodimethylamine	62-75-9	0.40	2.3
N-Nitroso-di-n-butylamine	924-16-3	0.40	17
N-Nitrosomethylethylamine	10595-95-6	0.40	2.3
N-Nitrosomorpholine	59-89-2	0.40	2.3
N-Nitrosopiperidine	100-75-4	0.013	35
N-Nitrosopyrrolidine	930-55-2	0.013	35
Oxamyl	23135-22-0	0.056	0.28
Parathion	56-38-2	0.014	4.6
Total PCBs (sum of all PCB isomers, or all Aroclors)	1336-36-3	0.10	10
Pebulate	1114-71-2	0.003	1.4
Pentachlorobenzene	608-93-5	0.055	10
PeCDDs (All Pentachlorodibenzo-p-dioxins)	NA	0.000063	0.001
PeCDFs (All Pentachlorodibenzofurans)	NA	0.000035	0.001
Pentachloroethane	76-01-7	0.055	6.0
Pentachloronitrobenzene	82-68-8	0.055	4.8
Pentachlorophenol	87-86-5	0.089	7.4
Phenacetin	62-44-2	0.081	16
Phenanthrene	85-01-8	0.059	5.6
Phenol	108-95-2	0.039	6.2
o-Phenylenediamine	95-54-5	0.056	5.6
Phorate	298-02-2	0.021	4.6
Phthalic acid	100-21-0	0.055	28
Phthalic anhydride	85-44-9	0.055	28
Physostigmine	57-47-6	0.056	1.4
Physostigmine salicylate	57-64-7	0.056	1.4

§ 268.48 TABLE UTS—UNIVERSAL TREATMENT STANDARDS—Continued

Regulated constituent/common name	CAS ¹ No.	Wastewater standard	Nonwastewater standard
		Concentration in mg/l ²	Concentration in mg/kg ³ unless noted as "mg/l TCLP"
Promecarb	2631-37-0	0.056	1.4
Pronamide	23950-58-5	0.093	1.5
Propham	122-42-9	0.056	1.4
Propoxur	114-26-1	0.056	1.4
Prosulfocarb	52888-80-9	0.003	1.4
Pyrene	129-00-0	0.067	8.2
Pyridine	110-86-1	0.014	16
Safrole	94-59-7	0.081	22
Silvex/2,4,5-TP	93-72-1	0.72	7.9
1,2,4,-5-Tetrachlorobenzene	95-94-3	0.055	14
TCDDs (All Tetrachlorobibenzo-p-dioxins)	NA	0.000063	0.001
TCDFs (All Tetrachlorodibenzofurans)	NA	0.000063	0.001
1,1,1,2-Tetrachloroethane	630-20-6	0.057	6.0
1,1,2,2-Tetrachloroethane	79-34-6	0.057	6.0
Tetrachloroethylene	127-18-4	0.056	6.0
2,3,4,6-Tetrachlorophenol	58-90-2	0.030	7.4
Thiodicarb	59669-26-0	0.019	1.4
Thiophanate-methyl	23564-05-8	0.056	1.4
Tirpate	26419-73-8	0.056	0.28
Toluene	108-88-3	0.080	10
Toxaphene	8001-35-2	0.0095	2.6
Triallate	2303-17-5	0.003	1.4
Tribromomethane/Bromoform	75-25-2	0.63	15
2,4,6-Tribromophenol	118-79-6	0.035	7.4
1,2,4-Trichlorobenzene	120-82-1	0.055	19
1,1,1-Trichloroethane	71-55-6	0.054	6.0
1,1,2-Trichloroethane	79-00-5	0.054	6.0
Trichloroethylene	79-01-6	0.054	6.0
Trichloromonofluoromethane	75-69-4	0.020	30
2,4,5-Trichlorophenol	95-95-4	0.18	7.4
2,4,6-Trichlorophenol	88-06-2	0.035	7.4
2,4,5-Trichlorophenoxyacetic acid/2,4,5-T	93-76-5	0.72	7.9
1,2,3-Trichloropropane	96-18-4	0.85	30
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	0.057	30
Triethylamine	101-44-8	0.081	1.5
tris-(2,3-Dibromopropyl) phosphate	126-72-7	0.11	0.10
Vemolate	1929-77-7	0.003	1.4
Vinyl chloride	75-01-4	0.27	6.0
Xylenes-mixed isomers (sum of o-, m-, and p-xylene concentrations)	1330-20-7	0.32	30
Antimony	7440-36-0	1.9	2.1 mg/l TCLP
Arsenic	7440-38-2	1.4	5.0 mg/l TCLP
Barium	7440-39-3	1.2	7.6 mg/l TCLP
Beryllium	7440-41-7	0.82	0.014 mg/l TCLP
Cadmium	7440-43-9	0.69	0.19 mg/l TCLP
Chromium (Total)	7440-47-3	2.77	0.86 mg/l TCLP
Cyanides (Total) ⁴	57-12-5	1.2	590
Cyanides (Amenable) ⁴	57-12-5	0.86	30
Fluoride ⁵	16964-48-8	35	NA
Lead	7439-92-1	0.69	0.37 mg/l TCLP
Mercury-Nonwastewater from Retort	7439-97-6	NA	0.20 mg/l TCLP
Mercury-All Others	7439-97-6	0.15	0.025 mg/l TCLP
Nickel	7440-02-0	3.98	5.0 mg/l TCLP
Selenium	7782-49-2	0.82	0.16 mg/l TCLP
Silver	7440-22-4	0.43	0.30 mg/l TCLP
Sulfide	8496-25-8	14	NA
Thallium	7440-28-0	1.4	0.078 mg/l TCLP
Vanadium ⁵	7440-62-2	4.3	0.23 mg/l TCLP
Zinc ⁵	7440-66-6	2.61	5.3 mg/l TCLP

¹ CAS means Chemical Abstract Services. When the waste code and/or regulated constituents are described as a combination of a chemical with its salts and/or esters, the CAS number is given for the parent compound only.

² Concentration standards for wastewaters are expressed in mg/l are based on analysis of composite samples.

³ Except for Metals (EP or TCLP) and Cyanides (Total and Amenable) the nonwastewater treatment standards expressed as a concentration were established, in part, based upon 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 upon combustion in fuel substitution units operating in accordance with applicable technical requirements. A facility may comply with these treatment standards according to provisions in 40 CFR 268.40(d). All concentration standards for nonwastewaters are based on analysis of grab samples.

⁴Both Cyanides (Total) and Cyanides (Amenable) for nonwastewaters are to be analyzed using Method 9010 or 9012, found in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", EPA Publication SW-846, as incorporated by reference in 40 CFR 260.11, with a sample size of 10 grams and a distillation time of one hour and 15 minutes.

⁵These constituents are not "underlying hazardous constituents" in characteristic wastes, according to the definition at § 268.2(i).

NOTE: NA means not applicable.

21. Appendix XI is added to part 268 to read as follows:

APPENDIX XI TO PART 268.—METAL BEARING WASTES PROHIBITED FROM DILUTION IN A COMBUSTION UNIT ACCORDING TO 40 CFR 268.3(b) ¹

Waste code	Waste description
D004	Toxicity Characteristic for Arsenic.
D005	Toxicity Characteristic for Barium.
D006	Toxicity Characteristic for Cadmium.
D007	Toxicity Characteristic for Chromium.
D008	Toxicity Characteristic for Lead.
D009	Toxicity Characteristic for Mercury.
D010	Toxicity Characteristic for Selenium
D011	Toxicity Characteristic for Silver.
F006	Wastewater treatment sludges from electroplating operations except from the following processes: (1) sulfuric acid anodizing of aluminum; (2) tin plating carbon steel; (3) zinc plating (segregated basis) on carbon steel; (4) aluminum or zinc-plating on carbon steel; (5) cleaning/stripping associated with tin, zinc and aluminum plating on carbon steel; and (6) chemical etching and milling of aluminum.
F007	Spent cyanide plating bath solutions from electroplating operations.
F008	Plating bath residues from the bottom of plating baths from electroplating operations where cyanides are used in the process.
F009	Spent stripping and cleaning bath solutions from electroplating operations where cyanides are used in the process.
F010	Quenching bath residues from oil baths from metal treating operations where cyanides are used in the process.
F011	Spent cyanide solutions from salt bath pot cleaning from metal heat treating operations.
F012	Quenching waste water treatment sludges from metal heat treating operations where cyanides are used in the process.
F019	Wastewater treatment sludges from the chemical conversion coating of aluminum except from zirconium phosphating in aluminum car washing when such phosphating is an exclusive conversion coating process.
K002	Wastewater treatment sludge from the production of chrome yellow and orange pigments.
K003	Wastewater treatment sludge from the production of molybdate orange pigments.
K004	Wastewater treatment sludge from the production of zinc yellow pigments.
K005	Wastewater treatment sludge from the production of chrome green pigments.
K006	Wastewater treatment sludge from the production of chrome oxide green pigments (anhydrous and hydrated).
K007	Wastewater treatment sludge from the production of iron blue pigments.
K008	Oven residue from the production of chrome oxide green pigments.
K061	Emission control dust/sludge from the primary production of steel in electric furnaces.
K069	Emission control dust/sludge from secondary lead smelting.
K071	Brine purification muds from the mercury cell processes in chlorine production, where separately prepurified brine is not used.
K100	Waste leaching solution from acid leaching of emission control dust/sludge from secondary lead smelting.
K106	Sludges from the mercury cell processes for making chlorine.
P010	Arsenic acid H ₃ AsO ₄ .
P011	Arsenic oxide As ₂ O ₅ .
P012	Arsenic trioxide.
P013	Barium cyanide.
P015	Beryllium.
P029	Copper cyanide Cu(CN).
P074	Nickel cyanide Ni(CN) ₂ .
P087	Osmium tetroxide.
P099	Potassium silver cyanide.
P104	Silver cyanide.
P113	Thallic oxide.
P114	Thallium (I) selenite.
P115	Thallium (I) sulfate.
P119	Ammonium vanadate.
P120	Vanadium oxide V ₂ O ₅ .
P121	Zinc cyanide.
U032	Calcium chromate.
U145	Lead phosphate.
U151	Mercury.
U204	Selenious acid.
U205	Selenium disulfide.
U216	Thallium (I) chloride.
U217	Thallium (I) nitrate.

¹A combustion unit is defined as any thermal technology subject to 40 CFR part 264, subpart O; part 265, subpart O; and/or part 266, subpart

PART 271—REQUIREMENTS FOR AUTHORIZATION OF STATE HAZARDOUS WASTE PROGRAMS

22. The authority citation for part 271 continues to read as follows:

Authority: 42 U.S.C. 9602; 33 U.S.C. 1321 and 1361.

23. 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 of final rule in the Federal Register (FR)].	Land Disposal Restrictions Phase III—Decharacterized Waste- waters, Carbamate and Organobromine Wastes, and Spent Aluminum Potliners in § 268.39.	[Insert FR page numbers of final rule].	[Insert date of 90 days from date of publication of final rule].

* * * * *

TABLE 2.—SELF-IMPLEMENTING PROVISIONS OF THE SOLID WASTE AMENDMENTS OF 1984

Effective date	Self-implementing provision	RCRA citation	FEDERAL REGISTER reference
* * *	* * *	* * *	* * *
[Insert date 90 days from date of publication of final rule].	Prohibition on land disposal of newly listed and identified wastes..	3004(g)(4) (C) and 3004(m).	[Insert date of publication of final rule] FR [Insert FR page numbers].
[Insert date 2 years from date of publication of final rule].	Prohibition on land disposal of radioactive waste mixed with the newly listed or identified wastes, including soil and debris.	3004(g)(4) (C) and 3004 (m).	Ditto. Ditto.

* * * * *

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