Federal Register

Friday
June 1, 1990

Part II

Environmental Protection Agency

40 CFR Part 148 et al.

Land Disposal Restrictions for Third Third Scheduled Wastes; Rule

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 148, 261, 262, 264, 265, 268, 270, 271, and 302

[EPA/OSW-FR-90-010; SWH-FRL-3751-1]

RIN 2050-AC73

Land Disposal Restrictions for Third Third Scheduled Wastes

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: The Environmental Protection Agency (EPA) today is promulgating regulations implementing the last of five Congressionally mandated prohibitions on land disposal of hazardous wastes (the third one-third of the schedule of restricted hazardous wastes, hereafter referred to as the Third Third). This action is taken in response to amendments to the Resource Conservation and Recovery Act (RCRA), enacted in the Hazardous and Solid Waste Amendments (HSWA) of 1984. When fully effective in May 1992, this rule, combined with the previous rulemakings, is expected to require treatment of a total of seven million tons of hazardous waste managed in RCRA-regulated facilities.

EFFECTIVE DATE: This final rule is effective on May 8, 1990.

ADDRESSES: The official record for this rulemaking is identified as Docket Number F-90-LD13-FFFFF, and is located in the EPA RCRA Docket, room 2427, 401 M Street SW., Washington, DC 20460. The docket is open from 9 a.m. to 4 p.m., Monday through Friday, except on Federal holidays. The public must make an appointment to review docket materials by calling (202) 475-9327. The public may copy a maximum of 100 pages from any regulatory document at no cost. Additional copies cost $.15 per page.

FOR FURTHER INFORMATION CONTACT: For general information contact the RCRA Hotline at: (800) 424-9346 (toll-free) or (202) 382-3000 locally.

For information on specific aspects of this final rule, contact Richard Kinch or Rhonda Craig, Office of Solid Waste (OS-333), U.S. Environmental Protection Agency, 401 M Street SW., Washington, DC 20460, (202) 382-7917. For specific information on BDAT treatment standards, contact Larry Rosengrant, Office of Solid Waste (OS-322), U.S. Environmental Protection Agency, 401 M Street SW., Washington, DC 20460, (202) 382-7917. For specific information on the Underground Injection Control Program and hazardous waste injection wells, contact Bruce Kobelski, Office of Drinking Water (WH-550), U.S. Environmental Protection Agency, 401 M Street SW., Washington, DC 20460, (202) 382-7275. For specific information on capacity determinations or national variances, contact Jo-Ann Bassi, Office of Solid Waste (OS-322), U.S. Environmental Protection Agency, 401 M Street SW., Washington, DC 20460, (202) 475-6673.

SUPPLEMENTARY INFORMATION:

Expanded Summary

Today's notice promulgates specific treatment standards and effective dates for the Third Third wastes, "soft hammer" First and Second Third wastes, and five newly listed wastes. Today's notice also promulgates treatment standards and effective dates for multi-source leachate and mixed radioactive/hazardous wastes, which were re-scheduled to the Third Third. The Agency has also re-scheduled wastes from the petroleum refining industry, EPA Hazardous Waste Nos. K048-K052, to the Third Third, is revising the treatment standards for these wastes, and is granting a six-month national capacity variance for K048-K052 nonwastewaters. The Agency is also promulgating alternate treatment standards for lab packs.

The Agency is also promulgating treatment standards and effective dates for hazardous wastes that exhibit one or more of the following characteristics: Ignitibility, corrosivity, reactivity or EP toxicity (40 CFR 261.21-261.24). The Agency has revised the proposed treatment standards for these wastes to reflect data submitted during the comment period showing wide variability in the wastestreams. Today's final rule establishes 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 which in many cases will result in treatment below the characteristic level; or (4) a treatment standard of "deactivation" to remove the characteristic, with guidance on technologies the Agency believes will remove the characteristics (see appendix VI to part 268).

In promulgating treatment standards for characteristic wastes, EPA has 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) program, sections 307(b) and 402 of the Clean Water Act (CWA) and the Safe Drinking Water Act (SDWA) programs regulating deep well injection to ensure successful integration of these programs with the regulations being promulgated today. Specifically, the Agency considered the appropriateness of the dilution prohibition for each of the characteristic wastestreams, and the applicability of treatment standards expressed as specified methods.

In general, the Agency believes that the mixing of waste streams to eliminate certain characteristics is appropriate and should be permissible for certain characteristic waste streams (*e.g.*, most wastes that are purely corrosive). Furthermore, EPA believes that the dilution prohibition should not apply to characteristic wastes that are managed in treatment trains regulated under the Pretreatment and National Pollutant Discharge Elimination System (NPDES) programs under sections 307(b) and 402 of the CWA or in Class I underground injection well systems regulated under the Safe Drinking Water Act (SDWA). The Agency believes 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. Similarly, EPA has established a regulatory program 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 source of drinking water, and are subject to minimum location, construction, and operation requirements. The Agency believes that application of dilution rules to these wastes would not further minimize threats to human health and the environment, and that disposal of these wastes by underground injection at the characteristic levels is as sound as the treatment option. However, hazardous effluent, sludges, or other residues generated from these treatment trains, or pretreatment from CWA or SDWA systems, that are subsequently land disposed are subject to the land disposal restriction provisions.

The Agency also is limiting the circumstances under which treatment standards expressed as specified methods apply to wastes regulated under the CWA and SDWA programs. In general, the Agency believes that where a treatment standard is expressed as a specified method, and where application of that method is consistent with and promotes the objectives of the program, it should be

impermissible to dilute these wastes and avoid treating them by the designated treatment method. With respect to existing CWA regulations, the Agency believes that this is true for all specified methods in today's rule. Therefore, the Agency is specifying that dilution is impermissible for these wastes, and that the treatment standards expressed as specified methods apply. The Agency, however, is not requiring treatment of underground injected wastes with the specified methods, based on the previously-stated belief that disposal of such characteristic wastes by this method is as sound as the treatment option. (The Agency emphasizes that any mixture of listed and characteristic wastes is subject to the existing dilution prohibition rule, and must comply with the treatment standard for the listed waste, even if it is a specified method.)

The Agency received comments indicating that generators may be likely to change waste codes and ship their wastes as characteristic wastes rather than as listed wastes as a result of this rulemaking. The Agency is concerned with the potential for mislabeling hazardous wastes, but believes that this incentive has always existed since characteristic wastes may be disposed in a subtitle D facility once they no longer exhibit a hazardous characteristic. Furthermore, the Agency is revising the waste identification requirements of 40 CFR parts 261, 262, 264, and 265 to require that all relevant waste codes must be provided; we believe this revision will enhance the ability to enforce the accurate labeling of hazardous wastes. Finally, the Agency emphasizes that the mislabeling of hazardous wastes is a serious violation of the land disposal restrictions, and potentially a criminal act. The Agency will be modifying the existing Waste Analysis Plan Guidance to aid treatment and disposal facilities in determining whether waste has been properly classified.

The Agency is promulgating certain provisions of general applicability in today's rulemaking, including certain revisions to the existing rule that prohibits dilution of prohibited wastes, amendments to 40 CFR 262.11, which outlines the procedures for identification of hazardous wastes, and modifications to the tracking and recordkeeping requirements of 40 CFR 268.7. In addition, EPA is modifying existing testing requirements for treatment and disposal facilities, and amending subparagraph (c) of 40 CFR 261.33 (commercial chemicals that are hazardous wastes when discarded) due to the possible lack of clarity that became apparent in the course of establishing treatment standards for these wastes. The Agency also is clarifying certain questions of applicability, such as whether wastes formerly excluded by the Bevill Amendment are to be considered newly identified for purposes of the land disposal restrictions, and applicability of California list prohibitions to newly identified and newly lifted hazardous wastes.

Unless a longer national capacity variance is specified, the effective date for compliance with treatment standards for all waste codes in the final rule has been extended to August 8, 1990 by granting a three-month national capacity variance. The effective date is being delayed because the Agency realizes that even where data indicate that sufficient treatment capacity exists, it is not immediately available. Nonetheless, all Third Third wastes become restricted on May 8, 1990 and therefore subject to a number of LDR provisions. For example, if hazardous wastes not treated in compliance with applicable treatment standards are disposed of in surface impoundments or landfills, such units must meet minimum technological requirements. Furthermore, wastes subject to this extension of the effective date must be in compliance with all applicable recordkeeping requirements, and California list prohibitions, if applicable.

Finally, wastes for which treatment standards are being promulgated may be land disposed after their effective dates only if the applicable treatment standards are met, or if disposal occurs in units that satisfy the "no migration" standard.

Outline

I. Background
- A. Summary of the Hazardous and Solid Waste Amendments of 1984 and the Land Disposal Restrictions Framework
  - 1. Statutory Requirements
  - 2. Applicability to Injected Wastes
  - 3. Solvents and Dioxins
  - 4. California List Wastes
  - 5. Disposal of Solvents, Dioxins, and California List Wastes in Injection Wells
  - 6. Scheduled Wastes
  - 7. Newly Identified and Listed Wastes
- B. Regulatory Framework
  - 1. Applicability
  - 2. Treatment Standards
  - 3. National Capacity Variances from the Effective Dates
  - 4. Case-By-Case Extensions of the Effective Dates
  - 5. "No Migration" Exemptions from the Restrictions
  - 6. Variances from the Treatment Standards
  - 7. Exemption for Treatment in Surface Impoundments
  - 8. Storage of Prohibited Wastes
  - 9. "Soft Hammer" Provisions
- C. Pollution Prevention (Waste Minimization) Benefits
- D. Summary of the Proposed Rule
  - 1. Characteristic Wastes
  - 2. Determining When Dilution is Permissible
  - 3. Other Impermissible Dilution Issues
  - 4. Treatment Standards for Multi-Source Leachate
  - 5. Alternate Treatment Standards for Lab Packs
  - 6. Applicability to Mineral Processing Wastes
  - 7. Clarification of "P" and "U" Solid Wastes
  - 8. Treatment/Disposal Facility Testing Requirements
  - 9. Testing of Wastes Treated in 90-Day Tanks or Containers
  - 10. Generator Notification Requirements
  - 11. Storage Prohibition
  - 12. Applicability of California List Prohibitions After May 8, 1990

II. Summary of Today's Final Rule
- A. Applicability of Today's Final Rule
  - 1. Three Month National Capacity Variance for Third Third Wastes
  - 2. Hazardous Waste Injection Wells Regulated Under 40 CFR 148
  - 3. Remaining Scheduled Listed Hazardous Wastes
  - 4. Characteristic Hazardous Wastes
  - 5. Characteristic Wastes Regulated Under the Safe Drinking Water Act (SWDA) and the Clean Water Act (CWA) and RCRA
  - 6. Mineral Processing Wastes
- B. Implementation of Requirements for Characteristic Wastes
  - 1. Overlap of Standards for Listed Wastes that also Exhibit a Characteristic
  - 2. Revisions to Waste Identification Requirements
  - 3. Wastes Subject to a Capacity Variance
  - 4. Use of *TCLP* v. *EP* Analytical Methods for Compliance
  - 5. Newly Identified Toxicity Characteristic (TC) Wastes

6. Further Principles Governing Applicability
C. Amended Tracking System for Characteristic Prohibited Wastes
D. The Dilution Prohibition as it Applies to Centralized Treatment
E. Treatment Standards for Multi-Source Leachate
F. Alternate Treatment Standards for Lab Packs
G. Mixed (Hazardous/Radioactive) Wastes
H. Nationwide Variances from the Effective Date
I. Generator Notification Requirements
J. Waste Analysis Plans and Treatment/Disposal Facility Testing Requirements
K. Testing of Wastes Treated in 90-Day Tanks or Containers
L. Clarification of "P" and "U" Solid Wastes
M. Storage Prohibition
N. Case-by-Case Extension Petitions
O. Applicability of California List Prohibitions After May 8, 1990
P. Analysis of Treated Wastes
Q. Practical Quantitation Limits (PQLs)
R. Best Demonstrated Available Technologies (BDAT)
S. Reformatting of Treatment Standard Tables and Addition of Appendix VII to Part 268, Effective Dates for Prohibited Wastes
T. Relationship of *Hazardous Waste Treatment Council* v. *EPA* to Treatment Standards Promulgated in Today's Final Rule
III.A. Detailed Discussion of Today's Final Rule
1. Development and Identification of Treatment Standards
a. The BDAT Methodology
b. Use of Technologies Identified As BDAT
c. Applicability of Treatment Standards to Treatment Residues Identified as "Derived-From" Wastes and to Waste Mixtures
d. Wastewater Versus Nonwastewater Standards
e. Transfer of Treatment Standards
f. Treatment Standards Based on Single Facility Data, Grab Samples Versus Composite Samples, and Waste Analysis Plans
g. Analytical Requirements, the BDAT List and Relationship of PQLs to BDAT
h. Relationship of Detection Limits to Concentration-Based Standards
i. Relation of *Hazardous Waste Treatment Council* v. *EPA*
III.A.2. Treatment Standards for Certain Characteristic Wastes
a. General Issues on Developing Treatment Standards for Characteristic Wastes
b. Ignitable Characteristic Wastes
c. Corrosive Characteristic Wastes
d. Reactive Characteristic Wastes
e. Effect of Treatment Standards on Disposal Provisions in 40 CFR 264 and 265 for Ignitable and Reactive Wastes
f. EP Toxic Halogenated Pesticide Wastes
III.A.3. Treatment Standards for Metal Wastes
a. Introduction
b. Arsenic [D004, K031, K084, K101, K102, P010, P011, P012, P036, P038, U136]
c. Barium [D005, P013]
d. Cadmium [D006, Cadmium Batteries]
e. Chromium [D007, U032]
f. Lead [D008, K069, K100, P110, U144, U145, U146]
g. Mercury [D009, K071, K106, P065, P092, U151]
h. Selenium [D010, P103, P114, U204, U205]
i. Silver [D011, P099, P104]
j. Thallium [P113, P114, P115, U214, U215, U216, U217]
k. Vanadium [P119, P120]
III.A.4. Treatment Standards for Remaining F and K Wastes
a. F002 and F005
b. F006 and F019
c. F024
d. F025
e. K001 and U051
f. K002, K003, K004, K005, K006, K007, and K008
g. K011, K013, and K014
h. K015
i. K017 and K073
j. K021
k. K022, K025, K026, K035, and K083
l. K028, K029, K095, and K096
m. K032, K033, K034, K041, K097, and K098
n. K036 and K037
o. K042, K085, and K105
p. K044, K045, K046, and K047
q. K048, K049, K050, K051, and K052
r. K060
s. K061
t. K086
III.A.5. Development of Treatment Standards for U and P Wastewaters and Nonwastewaters Excluding Metal Salts and Organo-metallics
a. Concentration-based Standards for Specific Organics
b. Technology-based Standards for Specific Organics
c. U and P Wastes That are Potentially Reactive
d. Gases
e. U and P Cyanogens
III.A.6. Development of Treatment Standards for Multi-Source Leachate
a. Background
b. Final Approach for Regulating Multi-Source Leachate
c. Multi-Source Leachate That Exhibits a Characteristic of Hazardous Waste
d. Multi-Source Leachate Containing Dioxins and Furans
e. Status of Multi-source Leachate that is Mixed with Other Prohibited Wastes
III.A.7. Applicability of Treatment Standards to Soil and Debris
III.A.8. Radioactive Mixed Waste
a. Characterization and Industries Affected
b. Applicable Technologies
c. Determination of BDAT for Certain Mixed Wastes
III.A.9. Alternate Treatment Standards for Lab Packs
B. Capacity Determinations
1. Determination of Alternative Capacity and Effective Dates for Surface Land-Disposed Wastes for which Treatment Standards are Proposed
a. Total Quantity of Land-Disposed Wastes
b. Required Alternative Capacity for Surface Land-Disposed Wastes
c. Capacity Currently Available and Effective Dates
2. Contaminated Soil and Debris Capacity Variance
3. Capacity Determination for Underground Injected Wastes
C. Ninety-Day Capacity Variance for Third Third Wastes
D. Applicability of Land Disposal Restrictions
1. Introduction
2. Legal Authority Over Characteristic Wastes
a. Introduction
b. General Standard for Agency Construction of Statutes
c. Scope of Agency Authority for Treatment Requirements
d. Agency Framework for Addressing Treatment Standards for Characteristic Wastes and Integrating Them with Other Regulatory Programs
3. Treatment Levels
a. Environmental Considerations
(1) Toxic Wastewaters
(2) Toxic Nonwastewaters
(3) Other Characteristic Wastes
b. Regulatory Problems
4. Methods of Treatment
a. Environmental Considerations
b. Regulatory Problems
5. General Dilution Prohibition
a. Environmental Considerations
b. Regulatory Problems
6. Exemption to Dilution Prohibition for Characteristic Wastes Treated for Purposes of Certain Clean Water Act Programs
a. Introduction

b. Environmental Considerations
c. Regulatory Problems
7. Exemption for LDR Prohibitions for Characteristic Wastes Disposed Below Characteristic Levels in Wells Regulated Under the Safe Drinking Water Act
a. Introduction
b. Environmental Considerations
c. Regulatory Problems
E. Implementation of Requirements for Characteristic Wastes
1. Overlap of Treatment Standards for Listed Wastes that also Exhibit a Characteristic
2. Revisions to Waste Identification Requirements
3. Wastes Subject to a Capacity Variance
4. Use of *TCLP* v. *EP* Analytical Methods for Compliance
5. Newly Identified TC Wastes
6. Further Principles Governing Applicability
a. Other Statutory Exemptions or Exclusions
b. Restricted Wastes Versus Prohibited Wastes
c. Changes in Treatability Groups
F. Amended Tracking System for Characteristic Prohibited Wastes
G. The Dilution Prohibition as it Applies to Centralized Treatment
H. Applicability of Today's Final Rule to Mineral Processing Wastes
I. Generator Notification Requirements
J. Waste Analysis Plans and Treatment/Disposal Facility Testing Requirements
K. Testing of Wastes Treated in 90-Day Tanks or Containers
L. Clarification of "P" and "U" Solid Wastes
M. The Storage Prohibition
N. Case-By-Case Extensions
O. Applicability of California List Prohibitions After May 8, 1990
IV. State Authority
A. Applicability of Rules in Authorized States
B. Effect on State Authorizations
C. State Implementation
V. Effect of the Land Disposal Restrictions Program on Other Environmental Programs
A. Discharges Regulated Under the Clean Water Act
B. Discharges Regulated Under the Marine Protection, Research, and Sanctuaries Act
C. Wellhead Protection Regulated Under the Safe Drinking Water Act
D. Air Emissions Regulated Under the Clean Air Act (CAA)
E. Clean-Up Actions Regulated Under the Comprehensive Environmental Response, Compensation, and Liability Act
F. Applicability of Treatment Standards to Wastes from Pesticides Regulated Under the Federal Insecticide, Fungicide, and Rodenticide Act
G. Regulatory Overlap of Polychlorinated Biphenyls (PCBs) Under the Toxic Substances Control Act (TSCA) and Resource Conservation and Recovery Act
VI. Regulatory Requirements
A. Regulatory Impact Analysis—Surface Disposed Wastes
1. Overview of Affected Wastes, Facilities, and Management
a. Quantity of Affected Waste
b. Affected Facilities
c. Waste Management Practices
2. Benefits of the Final Rule
a. Human Health Benefits
b. Safety Benefits
c. Environmental Benefits
3. Costs
4. Economic Impacts
B. Regulatory Flexibility Analysis—Surface Disposed Wastes
C. Regulatory Impact Analysis—Underground Injected Wastes
D. Regulatory Flexibility Analysis—Underground Injected Wastes
E. Paperwork Reduction Act
F. Review of Supporting Documents

I. Background

A. Summary of the Hazardous and Solid Waste Amendments of 1984 and the Land Disposal Restrictions Framework

1. Statutory Requirements

The Hazardous and Solid Waste Amendments (HSWA), enacted on November 8, 1984, prohibit the land disposal of hazardous wastes. Specifically, the amendments specify dates when particular groups of hazardous wastes are prohibited from land disposal unless "* * * it has been demonstrated to the Administrator, to a reasonable degree of certainty, that there will be no migration of hazardous constituents from the disposal unit or injection zone for as long as the wastes remain hazardous" (RCRA sections 3004 (d)(1), (e)(1), (g)(5); 42 U.S.C. 6924 (d)(1), (e)(1), (g)(5)).

The amendments also require the Agency to set "* * * levels or methods of treatment, if any, 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" (RCRA section 3004(m)(1), 42 U.S.C. 6924(m)(1)). Wastes that meet treatment standards established by EPA are not prohibited and may be land disposed. In addition, a hazardous waste that does not meet the treatment standard may be land disposed provided the "no migration" demonstration specified in RCRA sections 3004 (d)(1), (e)(1) and (g)(5) is accepted by EPA.

For the purposes of the restrictions, HSWA defines land disposal "* * * to include, but not be limited to, any placement of such hazardous waste in a landfill, surface impoundment, waste pile, injection well, land treatment facility, salt dome formation, salt bed formation, or underground mine or cave" (RCRA section 3004(k), 42 U.S.C. 6924(k)).

The land disposal restrictions are effective when promulgated unless the Administrator grants a national capacity variance from the otherwise-applicable date and establishes a different date (not to exceed two years beyond the statutory deadline) based on "* * * the earliest date on which adequate alternative treatment, recovery, or disposal capacity which protects human health and the environment will be available" (RCRA section 3004(h)(2), 42 U.S.C. 6924(h)(2)). The Administrator may also grant a case-by-case extension of the effective date for up to one year, renewable once for up to one additional year, when an applicant successfully makes certain demonstrations (RCRA section 3004(h)(3), 42 U.S.C. 6924(h)(3)). A case-by-case extension can be granted whether or not a national capacity variance has been granted.

The statute also allows treatment of hazardous wastes in surface impoundments that meet certain minimum technological requirements (or certain exceptions thereto). Treatment in surface impoundments is permissible provided the treatment residues that do not meet the treatment standard(s) (or applicable statutory prohibition levels) are "* * * removed for subsequent management within one year of the entry of the waste into the surface impoundment" (RCRA section 3005(j)(11)(B), 42 U.S.C. 6925(j)(11)(B)).

In addition to prohibiting the land disposal of hazardous wastes, Congress prohibited storage of any waste which is prohibited from land disposal unless "* * * such storage is solely for the purpose of the accumulation of such quantities of hazardous waste as are necessary to facilitate proper recovery, treatment or disposal" (RCRA section 3004(j), 42 U.S.C. 6924(j)).

2. Applicability to Injected Wastes

As noted above, disposal of hazardous wastes in injection wells is subject to the provisions of HSWA. The injection of hazardous wastes is controlled by two statutes, RCRA and the Safe Drinking Water Act (SDWA). The regulations governing injection of these wastes have been codified along

with other regulations of the Underground Injection Control (UIC) program under the SDWA in parts 124, 144, 145, 146, 147, and 148 of the Code of Federal Regulations.

3. Solvents and Dioxins

Effective November 8, 1986, HSWA prohibited land disposal (except by deep well injection) of solvent-containing hazardous wastes numbered F001–F005 listed in 40 CFR 261.31 and dioxin-containing hazardous wastes numbered F020–F023 and F026–F028 (RCRA sections 3004 (e)(1), (e)(2), 42 U.S.C. 6924 (e)(1), (e)(2)). In response to this mandate, EPA promulgated a final rule (51 FR 40572) on November 7, 1986, implementing RCRA section 3004(e). This rule established the general framework for the land disposal restrictions program, and established treatment standards for the F001–F005 solvent wastes and F020–F023 and F026–F028 dioxin-containing wastes.

4. California List Wastes

Effective July 8, 1987, the statute prohibited further land disposal (except by deep well injection) of the following listed or identified wastes (RCRA section 3001) set out in RCRA sections 3004 (d)(1) and (d)(2) (42 U.S.C. 6924 (d)(1), (d)(2)):

(A) Liquid hazardous wastes, including free liquids associated with any solid or sludge, containing free cyanides at concentrations greater than or equal to 1,000 mg/l.

(B) Liquid hazardous wastes, including free liquids associated with any solid or sludge, containing the following metals (or elements) or compounds of these metals (or elements) at concentrations greater than or equal to those specified below:

(i) Arsenic and/or compounds (as As) 500 mg/l;

(ii) Cadmium and/or compounds (as Cd) 100 mg/l

(iii) Chromium (VI and/or compounds (as Cr VI)) 500 mg/l;

(iv) Lead and/or compounds (as Pb) 500 mg/l;

(v) Mercury and/or compounds (as Hg) 20 mg/l;

(vi) Nickel and/or compounds (as Ni) 134 mg/l;

(vii) Selenium and/or compounds (as Se) 100 mg/l; and

(viii) Thallium and/or compounds (as Tl) 130 mg/l.

(C) Liquid hazardous waste having a pH less than or equal to two (2.0).

(D) Liquid hazardous wastes containing polychlorinated biphenyls (PCBs) at concentrations greater than or equal to 50 ppm.

(E) Hazardous wastes containing halogenated organic compounds (HOCs) in total concentration greater than or equal to 1,000 mg/kg.

On July 8, 1987, EPA promulgated a final rule (52 FR 25760) implementing RCRA section 3004(d). This rule established treatment standards for California list wastes containing PCBs and certain HOCs, and codified the statutory prohibition on liquid corrosive wastes. The statutory prohibition also is in effect for the California list wastes containing free cyanides, metals, and the California list dilute HOC wastewaters.

5. Disposal of Solvents, Dioxins and California List Wastes in Injection Wells

Section 3004(f) of RCRA required that the Administrator prohibit the disposal of solvents, dioxins and California list wastes in deep wells, effective August 8, 1988, unless such disposal had been determined to be protective of human health and the environment for as long as the wastes remained hazardous, or unless a variance had been granted under RCRA section 3004(h). On July 26, 1988, the Agency established effective dates for the prohibition on injection of solvents and dioxin wastes (53 FR 28118). In another regulation, effective August 6, 1988 and published August 16, 1988 in the **Federal Register**, the Agency established effective dates for the prohibition on injection of California list wastes (53 FR 30908).

6. Scheduled Wastes

HSWA required the Agency to prepare a schedule by November 8, 1986, for restricting the land disposal of all hazardous wastes, including underground injected wastes, listed or identified as of November 8, 1984, in 40 CFR part 261, excluding solvent- and dioxin-containing wastes and California list wastes covered under the schedule set by Congress. The schedule, based on a ranking of the listed wastes that considers their intrinsic hazard and their volume, ensures that prohibitions and treatment standards are promulgated first for high volume hazardous wastes with high intrinsic hazard before standards are set for low volume wastes with low intrinsic hazard. The statute further requires that these determinations be made by the following deadlines:

(A) At least one-third of all listed hazardous wastes by August 8, 1988;

(B) At least two-thirds of all listed hazardous wastes by June 8, 1989; and

(C) All remaining listed hazardous wastes and all hazardous wastes identified as of November 8, 1984, by one or more of the characteristics defined in 40 CFR part 261 by May 8, 1990.

Furthermore, if EPA failed to set a treatment standard by the statutory deadline for any hazardous waste in the first or second third of the schedule, should such waste be disposed in a landfill or surface impoundment, that unit must meet the minimum technological requirements specified in RCRA section 3004(o) for new facilities (RCRA section 3004(g)(6)). (**Note:** In the August 17, 1988 First Third final rule, EPA interpreted the term "such facility" in section 3004(g)(6) to refer to the individual surface impoundment or landfill unit.) In addition, prior to disposal in such unit, the generator was required to certify to the Administrator that he had investigated the availability of treatment capacity and had determined that disposal in such landfill or surface impoundment was the only practical alternative to treatment currently available to the generator. This restriction on the use of landfills and surface impoundments that met the minimum technological requirements applied until EPA set a treatment standard for the waste, or until May 8, 1990, whichever was sooner. These requirements were collectively referred to as the soft hammer provisions. Other forms of land disposal, including underground injection, were not similarly restricted, and could continue to be used for disposal of untreated wastes until EPA promulgated a treatment standard, or until May 8, 1990, whichever was sooner.

If the Agency fails to set a treatment standard for any scheduled hazardous waste by May 8, 1990, the soft hammer provisions are superseded by the hard hammer. (**Note:** It is EPA's interpretation that the hard hammer applies to characteristic wastes. See 54 FR 48489.) These wastes are automatically prohibited from all forms of disposal on May 8, 1990, unless the wastes are the subject of a successful "no migration" demonstration (RCRA section 3004(g)(5), 42 U.S.C. 6924(g)(5)). (**Note:** RCRA section 3004(h)(2) permits extensions of the effective date such as national capacity extensions or case-by-case extensions beyond the hard hammer date.)

On May 28, 1986, EPA promulgated the schedule for setting treatment standards for the listed and identified hazardous wastes (51 FR 19300). All wastes that are identified as hazardous by characteristic are scheduled in the Third Third. This schedule is incorporated in 40 CFR 268.10, 268.11 and 268.12.

For the scheduled wastes, the statute does not provide different deadlines for restriction of wastes that are injected underground versus disposed of in surface land units. The Agency did, however, propose and promulgate First Third regulations for surface disposed and injected wastes on separate dates. The First Third final rule, promulgated on August 8, 1988, and published in the **Federal Register** on August 17, 1988 (53 FR 31138), set out the conditions under which wastes included in the first one-third of the schedule of restricted hazardous wastes may continue to be land disposed (other than by injection). Final regulations prohibiting deep well injection of certain First Third wastes were published on August 16, 1988 (53 FR 30908) and on June 14, 1989 (54 FR 25416).

The Second Third final rule, promulgated on June 8, 1989, and published in the **Federal Register** on June 23, 1989, (54 FR 26594) established treatment standards and prohibition effective dates for land disposal and underground injection for certain wastes. In addition, EPA promulgated treatment standards and effective dates for certain First Third soft hammer wastes, Third Third wastes and newly listed wastes.

Today's notice promulgates the conditions under which Third Third wastes may continue to be land disposed. It also promulgates treatment standards for some First and Second Third restricted hazardous wastes, five newly listed wastes (*i.e.,* listed after November 8, 1984), promulgates alternate treatment standards for lab packs, and revises the treatment standards for petroleum refining wastes (EPA Hazardous Waste No. K048–K052). This rule applies to all forms of land disposal, including deep well injection, and finalizes the November 22, 1989 proposed rulemaking (54 FR 48372).

7. Newly Identified and Listed Wastes

RCRA requires the Agency to make a land disposal prohibition determination for any hazardous waste that is newly identified or listed in 40 CFR part 261 after November 8, 1984, within six months of the date of identification or listing (RCRA section 3004(g)(4), 42 U.S.C. 6924(g)(4)). However, the statute does not provide for an automatic prohibition of the land disposal of such wastes if EPA fails to meet this deadline. Today's notice promulgates treatment standards for five newly listed wastes (see section III.A).

B. Regulatory Framework

The November 7, 1986, final rule (51 FR 40572) established the regulatory framework for implementing the land disposal restrictions program. Some changes to the framework were made in the July 8, 1987, final rule (52 FR 25760) that prohibited the land disposal of California list wastes, and in the August 17, 1988, First Third final rule. Some additional changes are also being promulgated in today's final rule, particularly with respect to characteristic wastes. Regulations specifying how the framework applies to injected wastes were promulgated July 26, 1988 (53 FR 28118). The following discussion summarizes the major provisions of the land disposal restrictions framework.

1. Applicability

The land disposal restrictions apply prospectively to the affected wastes. In other words, hazardous wastes land disposed after the applicable effective dates are subject to the restrictions, but wastes land disposed prior to the effective dates are not required to be removed or exhumed for treatment (51 FR 40577). However, if these wastes or contaminated media are excavated and removed, these wastes are subject to the land disposal restrictions. Similarly, only surface impoundments receiving restricted wastes after the applicable deadline are subject to the restrictions on treatment in surface impoundments contained in 40 CFR 268.4 and RCRA section 3005(j)(11). Also, the storage prohibition applies to wastes placed in storage after the effective dates.

The provisions of the land disposal restrictions apply to wastes produced by generators of greater than 1,000 kilograms of hazardous waste per calendar month, as well as small quantity generators of 100 to 1,000 kilograms of hazardous waste (or greater than 1 kilogram of acute hazardous waste) in a calendar month. However, wastes produced by small quantity generators of less than 100 kilograms of hazardous waste (or less than 1 kilogram of acute hazardous waste) per calendar month are conditionally exempt from RCRA, including the land disposal restrictions (see 40 CFR 268.1).

The land disposal restrictions apply to all facilities subject to RCRA, including both interim status and permitted facilities. The requirements of the land disposal restrictions program supersede 40 CFR 270.4(a), which currently provides that compliance with a RCRA permit constitutes compliance with subtitle C of RCRA. Therefore, even though the requirements may not be specified in the permit conditions, all permitted facilities are subject to the restrictions. Moreover, the land disposal restrictions are material conditions or requirements of the interim status standards that may be enforced in either a criminal or civil action. Although EPA attempted to clarify this point in the June 4, 1987 correction notice (54 FR 21010, item #1, and 21016, item #27), the Agency's correction has been viewed as imprecise in that it characterized part 265 as requirements of persons managing wastes pursuant to part 268. Although the Agency believes that this point is already established, EPA is clarifying today that the part 268 provisions should be characterized as material conditions or requirements of part 265. Therefore, 265.1(e) is modified accordingly.

2. Treatment Standards

By each statutory deadline, the Agency must establish the applicable treatment standards under 40 CFR part 268 subpart D for each restricted hazardous waste (RCRA section 3004(m)(1)). After the applicable effective dates, restricted wastes may be land disposed only if they meet the treatment standards, or it has been demonstrated to a reasonable degree of certainty, that there will be no migration of hazardous constituents from the disposal unit or injection zone for as long as the wastes remain hazardous. If EPA does not promulgate treatment standards by the statutory deadlines, such wastes are prohibited from land disposal (with the exception of First and Second Third scheduled hazardous wastes, which were subject to the soft hammer provisions of RCRA section 3004(g)(6) until May 8, 1990).

At present, a treatment standard is based on the performance of the best demonstrated available technology (BDAT) to treat the waste (51 FR 40578). EPA may establish treatment standards either as specific technologies or as performance standards based on the performance of BDAT. Compliance with performance standards may be monitored by measuring the concentration level of the hazardous constituents (or in some circumstances, indicator pollutants) in the waste, treatment residual, or in the extract of the waste or treatment residual. When treatment standards are set as performance levels, the regulated community may use any technology not otherwise prohibited (such as impermissible dilution) to treat the waste to meet the treatment standard. Thus, treatment is not limited to only those technologies considered in determining the treatment standard. However, when treatment standards are

expressed as specific technologies, such technologies must be employed.

3. National Capacity Variances From the Effective Dates

The Agency has the authority to grant national capacity variances from the statutory effective dates, not to exceed two years, if there is insufficient alternative protective treatment, recovery or disposal capacity for the wastes (RCRA section 3004(h)(2)). To make capacity determinations, EPA compares the nationally available alternative treatment, recovery, or protective disposal capacity at permitted and interim status facilities which will be in operation by the effective date with the quantity of restricted waste generated. If there is a significant shortage of such capacity nationwide, EPA will establish an alternative effective date based on the earliest date such capacity will be available. During the period such a capacity variance is in place, if the waste is disposed in a landfill or surface impoundment, such disposal may only be in a unit meeting the minimum technological requirements of RCRA section 3004(o) (53 FR 31186 and 40 CFR 268.5(h)(2)). It should be noted, however, that if a waste subject to a national capacity variance is treated to meet the applicable treatment standards, the land disposal restrictions allow such waste to be disposed in a subtitle C landfill or surface impoundment regardless of whether the unit meets minimum technological requirements. Note, however, that independent RCRA provisions may require such wastes to be disposed in units meeting minimum technological requirement.

4. Case-By-Case Extensions of the Effective Date

The Agency will consider granting up to a one-year extension (renewable only once) of a prohibition effective date on a case-by-case basis. The requirements outlined in 40 CFR 268.5 must be satisfied, including a demonstration that adequate alternative treatment, recovery, or disposal capacity for the petitioner's waste cannot reasonably be made available by the effective date due to circumstances beyond the applicant's control, and that the petitioner has entered into a binding contractual commitment to construct or otherwise provide such capacity. If a waste is placed in a surface impoundment or landfill during the period that such a case-by-case extension is in place, such unit must meet the minimum technological requirements of RCRA section 3004(o).

5. "No Migration" Exemptions From the Restrictions

EPA has the authority to allow the land disposal of a restricted hazardous waste which does not meet the treatment standard provided that the petitioner demonstrates that there will be no migration of hazardous constituents from the disposal unit or injection zone for as long as the waste remains hazardous (40 CFR 268.6). If a petition is granted under 40 CFR part 268, it can remain in effect no longer than ten years for disposal in interim status land disposal units, and for no longer than the term of the RCRA permit for disposal in permitted units (40 CFR 268.6(h)).

However, for injected wastes, 40 CFR 148.20 (promulgated on July 26, 1988, see 53 FR 28118) outlines in detail the Agency's requirements for "no migration" petitions for hazardous waste injection facilities. Briefly, a petitioner is required, through modeling, to demonstrate that there is no migration of hazardous constituents from the injection zone for as long as the waste remains hazardous. This demonstration can be made in one of two ways: the use of flow and transport models to show that injected fluids will not migrate vertically out of the injection zone for a period of 10,000 years; or, use of geochemical modeling to show that the waste is transformed so it will become nonhazardous at the edge of the injection zone. Also, a showing must be made that the well was in compliance with the substantive area of review, corrective action, and mechanical integrity requirements of part 146.

6. Variances From the Treatment Standards

EPA established the variance from the treatment standard to account for those wastes that cannot be treated to meet the applicable treatment standards, even if well-designed and well-operated BDAT treatment systems are used, or if treatment technologies are inappropriate for the waste (40 CFR 268.44). This variance is somewhat analogous to the fundamentally different factors variance in the Agency's Clean Water Act effluent limitations guidelines regulations. Among other things, petitioners must demonstrate that the waste is significantly different from the wastes evaluated by EPA in establishing the treatment standard, and the waste cannot be treated to the level or by the method specified by the treatment standard, or that such standard or method is inappropriate for the waste (51 FR 40605). This variance procedure can result in the establishment of a new treatability group and corresponding treatment standard that applies to all wastes meeting the criteria of the new waste treatability group. A site-specific variance from the treatment standard may also be granted administratively (without rulemaking), but the variance has no generic applicability to other wastes at other sites (53 FR 31199).

7. Exemption for Treatment in Surface Impoundments

Wastes that would otherwise be prohibited from one or more methods of land disposal may be treated in a surface impoundment that meets certain technological requirements (40 CFR 268.4(a)(3)) as long as treatment residuals that do not meet the applicable treatment standard (or statutory prohibition levels where no treatment standards are established) are removed for subsequent management within one year of entry into the impoundment and the wastes are not placed into any other surface impoundment. The owner or operator of such an impoundment must certify to the Regional Administrator that the technical requirements have been met and must also submit a copy of the waste analysis plan to the Regional Administrator that shows the waste analysis plan has been modified to provide for testing of treatment residuals in accordance with § 268.4 requirements.

8. Storage of Prohibited Wastes

Storage of prohibited wastes in tanks and containers is prohibited except where storage is solely for the purpose of accumulating sufficient quantities of wastes to facilitate proper treatment, recovery, or disposal (40 CFR 268.50). A facility that stores a prohibited waste for more than one year bears the burden of proof that such storage is solely for this purpose. *Id.* EPA bears the burden of proof if the Agency believes that storage of a restricted waste by a facility for up to one year is not for the purpose of accumulating sufficient quantities to facilitate proper treatment, recovery, or disposal. *Id.*

9. The "Soft Hammer" Provisions

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. Such land disposal could occur only if certain demonstrations were made, and provided technology requirements of RCRA section 3004(o) (see 53 FR 31181, August 17, 1988). Other types of land

disposal were not similarly restricted (e.g., underground injection). On May 8, 1990, wastes for which EPA has not established treatment standards are prohibited from land disposal (including underground injection). This prohibition is referred to as the hard hammer. Effective May 8, 1990, therefore, the soft hammer provisions are no longer in effect.

C. Pollution Prevention (Waste Minimization) Benefits

EPA's progress over the years in improving environmental quality through its media-specific pollution control programs has been substantial. Over the past two decades, standard industrial practice for pollution control concentrated to a large extent on "end of pipe" treatment or land disposal of hazardous and non-hazardous wastes. However, EPA realizes that there are limits to how much environmental improvement can be achieved under these programs which emphasize management after pollutants have been generated. EPA believes that reducing or eliminating discharges and/or emissions to the environment through the implementation of cost-effective source reduction and environmentally sound recycling practices can provide additional environmental improvements. Many corporations are seeking to incorporate waste minimization planning programs into their strategic planning to lower emission volumes and toxicities as a function of actual plant processes through either recycling or source reduction.

Under sections 3002(b) and 3005(h), hazardous waste generators are required to certify that they have a program in place to reduce the volume or quantity and toxicity of hazardous waste to the degree determined by the generator to be economically practicable. EPA encourages hazardous waste generators to pursue source reduction and environmentally sound recycling wherever possible to reduce the need for and costs of subsequent treatment, storage and disposal. In many cases, there may be economic as well as environmental benefits for companies that pursue pollution prevention options. Waste minimization planning programs have been suggested by EPA and mandated by some state governments. Several EPA documents on waste minimization are available to the public (Draft Guidance to Hazardous Waste Generators on the Elements of a Waste Minimization Program; Notice and Request for Comment, Federal Register Vol. 54, No. 111, June 12, 1989; The EPA Manual for Waste Minimization Opportunity Assessments, EPA 600/2-88/025, April 1988). Several state governments have already enacted waste minimization legislation (Massachusetts Toxics Use Reduction Act of 1989; Oregon Toxics Use Reduction and Hazardous Waste Reduction Act, House Bill 3515, July 2, 1989). About six other states have legislation pending that will mandate some type of waste minimization program and/or facility planning. About 25 other states offer some type of technical assistance to companies that seek alternatives to treatment, storage and disposal of waste.

Many companies have already implemented waste minimization programs. Most of these waste minimization programs have elements in common. The most successful programs have incorporated waste minimization into company policy. It is advantageous for top corporate management and/or individual plant management to provide support for assessing and understanding the economic and regulatory benefits of pursuing waste minimization versus treatment, storage and disposal options. Typically, management supports assessment of the true costs associated with waste production, including the costs of compliance, loss of production potential, and potential liability.

Program success generally requires that each individual, regardless of status or rank, be encouraged to make a contribution to minimize waste. Collective and individual pay incentives can be provided for productivity improvements. Waste minimization circles can be established using self-managing teams chosen from a broad spectrum of production and management personnel. These management teams can be provided with all information necessary to adequately assess waste minimization opportunities. Additionally, it is very beneficial for production personnel to be trained and retrained in optimum use of plant equipment and raw materials.

Some companies set explicitly defined objectives for the reduction of waste volume and toxicity that are achievable within a reasonable time frame. Typically, the objectives should not exceed the ability of the operations personnel to support and maintain them.

In all cases, it is necessary to determine the causes of waste generation. This can be done for individual processes or for several combined processes if the plant process waste streams are particularly complex. Many corporations have implemented this type of "waste minimization assessment" as part of an overall waste minimization program.

For a waste minimization assessment, it is generally necessary to accurately characterize the type of waste generated by volume, toxicity and source(s). Most companies track their waste generation by a variety of means and then normalize the results to account for variations in production rate(s). One State (Massachusetts Toxics Use Reduction Act) requires each generator of a toxic or hazardous substance to track the rate of waste generation and release/transfer per unit of product. The EPA Manual for Waste Minimization Opportunity Assessments aids in tracking waste streams which can be quite difficult to analyze in complex plant operations, where many processes discharge into one waste stream.

Next, individual processes can be examined to search for opportunities for waste reduction such as recycling, substituting less hazardous raw materials, modifying existing equipment, novel technologies, capital improvements, and increasing process efficiency. EPA and State funded technical assistance programs (e.g., Minnesota Technical Assistance Program—MnTAP, California Waste Minimization Clearinghouse, U.S. EPA Pollution Prevention Information Clearinghouse) are becoming increasingly available to identify some of these opportunities. Information is also available through industry trade associations, professional consultants specializing in waste minimization, technical literature, and chemical and equipment vendors.

It is important to realize that waste minimization, especially when incorporated into company policy, is a continual process. Ideally, a waste minimization program becomes an integral part of the company strategic plan to increase manufacturing productivity.

D. Summary of the Proposed Rule

On November 22, 1989, the Agency proposed treatment standards and prohibition effective dates for approximately 350 hazardous wastes, including hazardous wastes listed in 40 CFR 268.12 (Third Third wastes), certain wastes listed in 40 CFR 268.10 and 268.11 (First and Second Third wastes), five newly listed wastes, and wastes exhibiting a characteristic (i.e., ignitability, corrosivity, reactivity, and EP toxicity) as described in 40 CFR 261.21–261.24. In addition, the Agency proposed one modification to the land disposal restrictions regulatory framework and several interpretations of general applicability. Furthermore, the Agency proposed to revise the

treatment standards for wastes from the petroleum refining industry, EPA Hazardous Waste Nos. K048–K052. Today's rulemaking finalizes the November 22, 1989 proposal.

1. Characteristic Wastes

In the November 22, 1989 notice, EPA proposed two alternatives: (1) Set the treatment standards at the characteristic level for all of the characteristic wastes; or (2) set treatment standards at the lowest level which data indicated could be consistently achieved, some of which were below the characteristic levels, and require these standards to be met before the waste could be land disposed (even though the waste was no longer defined as hazardous). This second alternative was based on a reading of the statute that the land disposal prohibitions can attach at the point a waste becomes hazardous, and that the section 3004(m) requirements to treat to a level (or by a method) that minimizes threats to human health and the environment can attach at that point. Waste that is hazardous at the point of generation and destined for land disposal remains subject to the requirements of section 3004(m) regardless of its concentration at any subsequent time. See 54 FR 48490.

In addition, if a waste is identified as carrying more than one characteristic, it would need to meet each treatment standard or utilize each method for those characteristics. If a listed waste could also be identified for one or more characteristic waste codes, EPA proposed that the waste would have to be treated to meet the treatment standards for each of the waste codes. See 54 FR 48491.

2. Determining When Dilution is Permissible

The Agency also clarified the dilution rules as they apply to centralized treatment in the proposed rule. In particular, the Agency indicated that aggregation of wastes for the purpose of treatment in a centralized treatment system must, at a minimum, result in "actual reduction in the toxicity or mobility of at least one BDAT constituent in each prohibited waste that is centrally treated to the extent that these constituents are present in initial concentrations that exceed the treatment standard for that prohibited waste." See 54 FR 48494.

3. Other Impermissible Dilution Issues

The Agency proposed that: (1) Impermissible dilution (as previously defined for listed wastes) of a waste that exhibits a characteristic be prohibited; and (2) impermissible dilution of a listed waste to achieve a delisting level be prohibited. See 54 FR 48495.

4. Treatment Standards for Multi-Source Leachate

On February 27, 1989, the Agency amended the schedule for prohibiting hazardous wastes from land disposal by placing multi-source leachate derived from listed spent solvents and scheduled hazardous wastes (i.e., First, Second, and Third Third) in the Third Third (see 54 FR 8264). In the Third Third proposed rule, the Agency proposed two options for the development of treatment standards for multi-source leachate: (1) Continued application of the treatment standards developed for the underlying wastes from which the leachate is derived; or (2) establishment of one set of wastewater standards and one set of nonwastewater standards which would apply to all multi-source leachate. See 54 FR 48461.

5. Alternative Treatment Standards for Lab Packs

The Agency proposed an approach for lab packs that establishes alternate treatment standards expressed as technologies for those lab packs meeting certain criteria. In particular, EPA proposed incineration as the alternative treatment standard for lab packs containing certain characteristic waste and listed organic hazardous waste codes only, and stabilization for lab packs containing certain EP toxic metals only. The proposed approach was intended to provide administrative relief and simplify the management system for lab pack wastes, because the treatment residue for these wastes would not need to be analyzed for compliance with individual treatment standards. See 54 FR 48470.

6. Applicability to Mineral Processing Wastes

On September 1, 1989 (54 FR 36592), EPA narrowed the scope of the RCRA exclusion for solid wastes from the extraction, beneficiation, and processing of ores and minerals, limiting this exclusion to 25 high volume/low toxicity wastes. On January 23, 1990 (55 FR 23227), the Agency removed five additional wastes from the exclusion based upon additional volume and/or hazard data. In the Third Third proposal, EPA proposed to consider the wastes that were removed from the exclusion to be "newly identified" for the purposes of these provisions, and further proposed not to apply the treatment standards for characteristic wastes to such wastes. Therefore, these wastes would not be subject to the BDAT treatment standards for characteristic wastes. See 54 FR 48492.

7. Clarification of "P" and "U" Solid Wastes

The Agency proposed to modify the existing language of 40 CFR 261.33 to include residues of 40 CFR 261.33(f) materials remaining in containers and in inner liners, in addition to 40 CFR 261.33(e) residues already included in the scope of the commercial chemical product listings.

EPA also proposed that soils and spill residues contaminated with 40 CFR 261.33(d) wastes be considered to be solid wastes unless they are recycled within 90 days of the spill, regardless of intent to recycle in the future. See 54 FR 48493.

8. Treatment/Disposal Facility Testing Requirements

EPA proposed revisions to the facility testing requirements contained in 40 CFR 264.13(a), 265.13(a), 268.7(b), and 268.7(c). Specifically, the Agency proposed two approaches to specify under what circumstances EPA may require the owner/operator of a treatment or disposal facility to analyze a representative sample of a waste: (1) State that the generator may supply waste analysis information only if an EPA approved waste analysis plan allows the generator to do so; or (2) state that the owner/operator is required to test the waste a minimum of once a year, and that the Regional Administrator may require more frequent testing through the waste analysis plan on a site-specific basis. See 54 FR 48497.

9. Testing of Wastes Treated in 90-Day Tanks or Containers

Under 40 CFR 268.7(b), treatment facilities treating prohibited hazardous wastes must test the treatment residues that they generate at a frequency determined by their waste analysis plan in order to ascertain compliance with the applicable treatment standards. There is a regulatory gap, however, with respect to treatment of prohibited wastes that is conducted in 90-day tanks or containers regulated under § 262.34. This is because such tanks or containers are not subject to a waste analysis plan requirement. To close this regulatory gap, EPA proposed that persons treating prohibited wastes in such tanks and containers must prepare a plan justifying the frequency of testing based on a detailed analysis of a representative sample of the prohibited waste. The plan must contain all information necessary to treat the waste

in accordance with part 268, and must be retained as a facility record. See 54 FR 48497.

10. Generator Notification Requirements

EPA proposed to clarify 40 CFR 268.7 by allowing generators to reference the treatment standards in 40 CFR 268.41, 265.42, or 265.43. Such a reference must include the EPA Hazardous Waste No., the treatability group(s) of the waste(s), and the CFR section where the treatment standards appear. The Agency also proposed to amend 40 CFR 268.7 to allow a one-time notification and certification requirement for small quantity generator (SQG) shipments subject to tolling agreements. See 54 FR 48496.

11. Storage Prohibition

Section 3004(j) of RCRA provides that storage of prohibited hazardous waste is itself prohibited "* * * unless such storage is solely for the purpose of the accumulation of such quantities of hazardous waste as are necessary to facilitate proper recovery, treatment, or disposal" (40 CFR 268.50(a)(2) and 51 FR 1709). The Agency proposed an interpretation of this section such that the storage prohibition does not apply where storage precedes legitimate, protective treatment, or recovery. See 54 FR 48496.

12. Applicability of California List Prohibitions After May 8, 1990

The Agency outlined three situations where the California List is still applicable: (1) Liquid hazardous wastes that contain over 50 ppm PCBs, where PCBs are not a regulated constituent in the treatment standards; (2) HOC-containing wastes identified as hazardous by a characteristic property that does not contain HOCs; and (3) liquid hazardous wastes that exhibit a characteristic and also contain over 134 mg/l of nickel and/or 130 mg/l of thallium.

The California list regulatory and statutory prohibitions are superseded by more specific prohibitions and treatment standards. However, EPA solicited comment on a national capacity variance (to May 8, 1992) for injected corrosive wastes, but did not propose a capacity variance for corrosive wastes disposed of in surface impoundments. The legal basis for this approach was that without it, in the case of a waste which received a national capacity variance under the California list rule, EPA would effectively grant a national capacity variance for a California list waste for longer than two years. EPA also proposed to modify the language of 40 CFR 268.32(h) to ensure that there are no periods of time in which neither the California list or superseding HOC standards would operate. See 54 FR 48498.

II. Summary of Today's Final Rule

Today's final rule is the fifth rulemaking required under the land disposal restrictions program as outlined in the 1984 Hazardous and Solid Waste Amendments to RCRA. The Agency is required to promulgate regulations establishing conditions under which the Third Third wastes included in 40 CFR 268.12 may be land disposed by the statutory deadline of May 8, 1990.

A. Applicability of Today's Final Rule

The Agency today is promulgating treatment standards and effective dates for all Third Third wastes, including wastes exhibiting a characteristic as described in 40 CFR 261.21–261.24 (see sections III.A.3 and III.A.4). The Agency also is promulgating treatment standards and effective dates for all First and Second Third soft hammer wastes (previously subject to the requirements of 40 CFR 268.8).

In previous rulemakings, the Agency amended the schedule so that certain First and Second Third wastewater residues, derived-from wastes (*i.e.*, multi-source leachate), and mixtures of scheduled hazardous/radioactive wastes were moved to the Third Third of the schedule (see 53 FR 31214, § 268.12 (b), (c), and (d); 54 FR 8264; and 54 FR 26648, § 268.12 (b) and (c)). The Agency today is promulgating treatment standards for these wastes. In addition, the Agency is promulgating treatment standards for five newly listed wastes (*i.e.*, wastes listed after enactment of the Hazardous and Solid Waste Amendments of 1984); four wastes that fall into the F002 and F005 (spent solvent) waste codes, and F025.

In the Second Third rulemaking, the Agency solicited comments, data, and specific suggestions regarding the regulation of lab packs. In today's rule, the Agency is promulgating alternate treatment standards expressed as specified technologies for lab packs meeting certain criteria.

1. Three-Month National Capacity Variance for Third Third Wastes

The Agency is granting a three-month national capacity variance for all wastes affected by this rule, based on the time required for the regulated community to make adjustments necessary to comply with the new regulations. The prohibitions on land disposal in this final rule, therefore, will be effective on August 8, 1990. During the period between May 8, 1990, and August 8, 1990, wastes (that do not meet the treatment standards) disposed in landfills or surface impoundments, must be disposed in units that meet the minimum technological requirements set out in 40 CFR 268.5(h)(2), and must comply with the California list prohibitions, where applicable. See 52 FR 25760, July 8, 1987. In addition, the recordkeeping requirements of 40 CFR 268.7 (a)(3) and (b)(6) apply to all Third Third wastes during the three-month national capacity variance. See section III.C of today's preamble for a discussion of this capacity variance.

2. Hazardous Waste Injection Wells Regulated Under 40 CFR Part 148

The Agency has, on occasion, proposed and promulgated regulations and effective dates for underground injected hazardous wastes covered under RCRA sections 3004 (f) and (g) separately from regulations addressing wastes disposed in surface facilities. EPA is addressing all methods of land disposal of wastes in today's rulemaking, including hazardous waste injection wells regulated jointly under the Safe Drinking Water Act (SDWA) and RCRA.

3. Remaining Scheduled Listed Hazardous Wastes

Today's final rule establishes treatment standards and effective dates for those listed hazardous wastes included in 40 CFR 268.10–268.12 for which treatment standards have not been promulgated to date. In section III.A, the Agency identifies the waste treatability groups by waste code and identifies the best demonstrated available technology (BDAT) for each. Treatment standards applicable to each treatability group are based on the performance levels achievable by the BDAT identified for each group. The Agency reiterates that any technology not otherwise prohibited (*e.g.*, impermissible dilution) may be used to meet the concentration-based treatment standards.

In addition, EPA is re-scheduling wastes from the petroleum refining industry, K048–K052, to the Third Third, and promulgating revisions to existing treatment standards for these wastes. The Agency is also rescinding all existing treatment standards expressed as "no land disposal" for nonwastewaters. A detailed discussion of the revised treatment standards for these wastes may be found in section III.A.

4. Characteristic Hazardous Wastes

In today's final rule, EPA is promulgating treatment standards and effective dates for hazardous wastes that exhibit one or more of the following characteristics: Ignitibility, corrosivity, reactivity or EP toxicity (40 CFR 261.21–261.24). In the November 22, 1989 notice, the Agency proposed treatment standards based on the performance of best demonstrated available technology without regard to the characteristic level. The standards, however, were transferred from treatment of listed wastes, which after evaluating data submitted by commenters, proved unachievable for characteristic wastes. The Agency today is promulgating treatment standards for these wastes that have been revised to reflect data from treating characteristic wastes submitted during the comment period. These newly-submitted data show wide variability in the wastestreams. Today's final rule establishes treatment standards for the characteristic wastes in one of four forms: (1) A concentration level equal to or greater than the characteristic level for the EP toxic metals; (2) a specified treatment technology; (3) a treatment standard of "deactivation" to remove the characteristic, with guidance on technologies the Agency believes will remove the characteristics (see appendix VI to part 268); or (4) treatment to concentration levels below the characteristic level (typically where the standard can be based on a treatment technology that is not matrix-dependent, or the Agency has sufficient data to find achievability). In addition, the Agency believes that by specifying technologies for certain of the characteristic wastes (i.e., incineration of high-TOC ignitible nonwastewaters and EP toxic pesticide wastewaters), it is requiring treatment below the characteristic levels for wastes where such treatment is technically achievable. A detailed discussion of the treatment standards promulgated for the characteristic wastes is provided in sections III.A.2, III.A.3 and III.D of today's preamble.

5. Characteristic Wastes Regulated Under the Safe Drinking Water Act (SDWA) and the Clean Water Act (CWA) and RCRA

Today's final rule limits the applicability of certain provisions of the land disposal restrictions' framework to characteristic wastes subject to regulation under the Clean Water Act (i.e., discharges permitted under the NPDES or POTW pretreatment regulations), and to characteristic wastes managed in systems which discharge to Class I underground injection wells subject to regulation under the Safe Drinking Water Act. First, the LDR dilution prohibition does not apply to characteristic wastes managed in NPDES or pretreatment systems and subsequently discharged under CWA regulations, *unless* a method of treatment is specified. Second, the LDR dilution prohibition does not apply to wastes disposed of in Class I underground injection wells. Third, where a specified technology is the treatment standard for a characteristic waste, the method need not be utilized if the waste is disposed of in a Class I injection well. Characteristic wastes that are exempt from the dilution prohibition and which are managed and disposed of on-site, are not subject to the full § 268.7 requirements for waste analysis and recordkeeping. The Agency believes that this action is necessary to successfully integrate RCRA and SDWA programs; the underlying rationale for these decisions is provided in section III.D of today's preamble.

6. Mineral Processing Wastes

On September 1, 1989 and January 23, 1990, EPA published final rules in the **Federal Register** (54 FR 36592 and 55 FR 2322, respectively) that removed a number of mineral processing wastes from the so-called "Bevill Exclusion." RCRA section 3001(b)(3)(A)(ii) excludes from the hazardous waste regulations, pending completion of studies by the Agency, solid wastes from the extraction, beneficiation, and processing of ores and metals.

All of these previously excluded mineral processing wastes that exhibit one or more of the characteristics of hazardous waste will be subject to the hazardous waste regulations when the final rules become effective March 1, 1990, and July 23, 1990.

EPA believes that these wastes are "newly identified" for the purposes of determining applicability of the land disposal prohibitions. Although technically the wastes are not being identified by a new characteristic, they are being brought into the subtitle C system after the date of enactment of HSWA on November 8, 1984. The Agency, therefore, is clarifying in today's final rule that these newly identified mineral processing wastes are *not* subject to the BDAT treatment standards promulgated today for characteristic hazardous wastes. A detailed discussion is provided in section III.H.

B. Implementation of Requirements for Characteristic Wastes

In today's final rule, the Agency is promulgating several new provisions, and revising existing regulations to implement the treatment standards for characteristic wastes.

1. Overlap of Standards for Listed Wastes That Also Exhibit a Characteristic

The Agency today is promulgating its proposed approach with respect to determining applicable treatment standards for wastes that carry more than one waste code. Specifically, wastes that carry more than one characteristic waste code must be treated to meet the treatment standard for each characteristic; listed wastes that also exhibit one or more hazardous characteristics must be treated to meet the treatment standard for each of the waste codes, unless the characteristic constituent or property is specifically addressed in the treatment standard for the listed waste. Finally, EPA is specifying that disposal of a waste that exhibits a characteristic at the point of disposal is prohibited unless the treatment standard for that characteristic component is above the characteristic level. See section III.E.1 for a more detailed discussion.

2. Revisions to Waste Identification Requirements

Section 262.11 of 40 CFR currently sets out an either/or scheme where, if the generator determines that a waste is listed, the generator does not need to determine whether the waste exhibits a characteristic. The Agency is amending § 262.11 to indicate that generators must determine whether listed wastes also exhibit characteristics of hazardous waste for purposes of compliance with 40 CFR part 268. In addition, the Agency is amending §§ 261.21 through 261.24 to indicate that wastes that carry characteristic waste codes may also be listed wastes. See section III.E.2 of today's preamble.

3. Wastes Subject to a Capacity Variance

EPA is clarifying the requirements that are applicable to characteristic wastes during the period of a capacity variance. Under the present rule, it is possible for prohibited characteristic wastes which are subject to a national capacity variance to become nonhazardous. If, during the period of the variance the waste is treated to be nonhazardous, arguably the landfill or impoundment unit would have to meet minimum technological requirements.

EPA does not read the statute or the rules this way, and is making this clarification in section III.E.3 of today's preamble.

4. Use of TCLP v. EP Analytical Methods for Compliance

EPA is establishing treatment standards for several characteristic wastes at the characteristic level, and has determined that this level should be measured by the TCLP. This is the protocol which large quantity generators will use to assess the toxicity of their wastes starting on September 25, 1990 (small quantity generators are subject to the revised testing protocol on March 29, 1990), and it is the protocol used to measure the efficacy of stabilization or other immobilization treatment in most of the BDAT standards. A detailed discussion is provided in section III.E.4.

5. Newly Identified Toxicity Characteristic (TC) Wastes

EPA is clarifying that wastes that exhibit the TC but not the EP are not presently prohibited, even if the constituent causing the waste to exhibit the TCLP is also a constituent controlled by the EP. This point is also discussed in section III.E.5 of today's preamble.

In addition, EPA is clarifying that for hazardous wastes that are subject to more than one treatment standard, during the period of a national capacity variance for one of the wastes, the treatment standards for any other waste codes that have not received such an extension must be met. As indicated in previous rulemakings, hazardous wastes that are subject to a capacity extension and contain California list constituents must comply with the California list prohibitions. See 53 FR 31188. A detailed discussion is provided in section III.E.3 of today's preamble.

6. Further Principles Governing Applicability

The Agency notes that the issues in this rulemaking concerning when hazardous wastes become prohibited from land disposal do not change the status of other regulatory or statutory inclusions or exclusions to the definition of solid or hazardous waste found at 40 CFR 261.2–261.6. These provisions can override the LDR point of generation evaluation to keep wastes from being prohibited and subject to a dilution prohibition or treatment standard. Further, those who manage hazardous waste will need to assess what LDR prohibitions apply at different points in the waste management process. The question of whether a given waste is going to prohibited land disposal is complicated by the fact that wastes may change form or treatability groups after undergoing treatment. The Agency explains these decision rules and provides clarifying examples in section III.E.6 of today's final rule.

C. Amended Tracking System for Characteristic Prohibited Wastes

EPA's decisions concerning characteristic wastes necessitate certain modifications of the tracking provisions contained in 40 CFR 268.7. These changes are summarized below, and a detailed discussion of each of these provisions is provided in section III.F of today's preamble.

1. Clarification of and Changes to Generally Applicable Recordkeeping Requirements

Most of the existing provisions of § 268.7 contemplate that restricted wastes are being shipped off-site for treatment or disposal (see §§ 268.7 (a)(2) and (a)(3), and §§ 268.7 (b)(4) and (b)(5)). The Agency is clarifying in today's rulemaking that for wastes managed on-site, generators must determine if the waste is restricted, and keep some documentation of that determination, plus some documentation of where the restricted waste was treated, stored, or disposed—whether treatment, storage, or disposal occurs on-site or off-site. This requirement applies to characteristic wastes, even when the hazardous characteristic is removed prior to disposal, or when the waste is excluded from the definition of hazardous or solid waste under 40 CFR 261.2–261.6. The Agency also notes that those wastes exempted from all of part 268 under 40 CFR 268.1 (b) and (e) are not subject to any recordkeeping requirements.

2. Tracking (*i.e.*, Notification/Certification) Provisions Applicable to Generators

EPA believes that the existing tracking system requires some modification for characteristic waste that the generator has treated to meet the treatment standard before it is sent off-site (and therefore, in most cases may be land disposed in a subtitle D facility). The Agency believes that under the present rule, sending the tracking forms to subtitle D facilities could have counterproductive effects, and has determined that the tracking forms should not accompany shipments from generators to subtitle D facilities. By deciding that tracking documents for prohibited characteristic wastes that no longer exhibit a characteristic should not go to these facilities, however, the Agency is *not* deciding that notifications and certifications should not be prepared for such wastes. EPA believes that the notifications and certifications should be sent to the appropriate EPA Regional Administrator or his delegated representative, or to a state authorized to implement the land disposal restrictions. EPA is making some slight modifications in the notification form that would be sent to EPA (or to an authorized State), because the existing notification refers to the waste's ID number and manifest number when shipped, neither of which are available for wastes no longer exhibiting a characteristic. While the revised notification form would not contain hazardous waste codes, it must contain a complete and accurate description of the waste, including its former hazardous waste classification, and must identify the facility receiving the waste. EPA is not amending the tracking requirements for those characteristic wastes that still exhibit a characteristic when they are sent off-site.

3. Tracking Provisions Applicable to Treaters

EPA is adopting the same approach for treaters of characteristic wastes as it is for generators. Thus, tracking forms for shipments of characteristic wastes that meet a treatment standard, and no longer exhibit a characteristic of hazardous waste, would be sent to EPA or to an authorized state.

4. Land Disposal Facilities

Under existing rules, subtitle C disposal facilities receiving prohibited wastes must keep copies of the notification and certification prepared by the generator and/or the treater, must test wastes (or waste extracts) at a frequency specified in their waste analysis plan (as modified in today's rule), and must dispose of certain types of wastes in minimum technology units. 40 CFR 268.7(c) (1), (2), and (3). These requirements do not fit well for the characteristic wastes prohibited in today's rule. The Agency is thus indicating that the requirements of § 268.7(c) do not apply to subtitle D disposal facilities receiving wastes that no longer exhibit a characteristic.

5. Changes in Certification to Reflect Dilution Prohibition

EPA is amending the certifications of compliance required of treaters and generators in § 268.7 to state that the treatment standard was not achieved by a form of impermissible dilution.

D. The Dilution Prohibition as it Applies to Centralized Treatment

The existing rules on dilution and EPA's interpretive statements regarding those rules indicate that the dilution prohibition has a two-fold objective: (1) To ensure that prohibited wastes are actually treated; and (2) to ensure that prohibited wastes are treated by methods that are appropriate for that type of waste. EPA has acknowledged that prohibited wastes which are aggregated are not diluted impermissibly if they are treated legitimately in centralized treatment systems, irrespective of the dilution inherent in such a system. Thus, if "dilution" is a legitimate type of treatment, or a necessary pretreatment step in a legitimate treatment system, such dilution is permissible. Conversely, prohibited wastes that are "treated" by inappropriate methods, or sent to treatment systems that do not treat the wastes, are diluted impermissibly.

In applying these principles to characteristic wastes, EPA encountered two major difficulties: First, the interface with regulatory systems established pursuant to the Clean Water Act and Safe Drinking Water Act, and second, difficulties in being able to quantify the proposal in a meaningful way. Given these problems and complications, EPA has decided that the most constructive course is to provide additional interpretive guidance on the existing dilution prohibition contained in § 268.3, and to explain more fully how those rules would apply in specific situations.

In all cases, the Agency has determined that for non-toxic hazardous characteristic wastes, it should not matter how the characteristic property is removed so long as it is removed. Thus, dilution is an acceptable treatment method for such wastes. In most cases, EPA has determined also not to apply a dilution prohibition to characteristic wastes that are managed in treatment systems regulated under the Clean Water Act or the Safe Drinking Water Act. However for aggregation of listed wastestreams or toxic characteristic wastestreams not included above, the Agency is able to provide limited additional guidance today on the issue of when centralized treatment methods involving dilution are permissible. As a general rule, if the wastes are all legitimately amenable to the same type of treatment, and this method of treatment is utilized for the aggregated wastes, the aggregation step does not constitute impermissible dilution.

E. Treatment Standards for Multi-Source Leachate

On February 27, 1989, the Agency amended the schedule for prohibiting hazardous wastes from land disposal by placing multi-source leachate derived from hazardous wastes in the Third Third (see 54 FR 8264). The Agency took this step to study more fully the most appropriate treatment standards for such leachate. The Agency's original approach to multi-source leachate was that the leachate carries the waste codes of all of the listed hazardous wastes from which it is derived and, therefore, is subject to each of the prohibitions and treatment standards for those wastes. In the event a particular constituent in the leachate is present in more than one prohibited waste, the stricter treatment standard would apply (53 FR 31138, August 17, 1988).

The Agency today is promulgating a fixed set of wastewater treatment standards and a set of nonwastewater treatment standards for all multi-source leachate and residues derived from the treatment of multi-source leachate. The Agency is promulgating treatment standards for these wastes under EPA Hazardous Waste Code No. F039. The Agency has identified treatment levels for the entire BDAT list of hazardous constituents in the wastewater and nonwastewater treatability groups.

The Agency is also specifying that leachate derived solely from F020–F023 and F026–F028 (dioxin) wastes, and no other listed wastes, is considered to be single-source leachate and must comply with the treatment standards for those wastes and continue to be classified under those waste codes.

The Agency is not promulgating separate standards for multi-source leachate that exhibits a characteristic of hazardous waste because, by promulgating standards for all of the BDAT list constituents, the treatment standards will address all of the constituents and properties that the treatment standards for characteristic wastes address. Should multi-source leachate or residues derived from the treatment of multi-source leachate exhibit a characteristic at the point of disposal, however, it would have to be treated to meet the treatment standards for that characteristic. A detailed discussion of the treatment standards for multi-source leachate is contained in section III.A.6 of today's final rule.

F. Alternate Treatment Standards for Lab Packs

The Agency is today promulgating alternate treatment standards for lab packs that contain certain prohibited organometallic and organic wastes specified in appendix IV and appendix V to 40 CFR part 268, respectively. The alternate treatment standards are expressed as a specified technology for each of the waste categories: (1) Incineration followed by treatment to meet the treatment standards for certain EP toxic metals for the organometallic wastes identified in appendix IV; and (2) incineration as a specified method for the organic hazardous wastes identified in appendix V. In addition, the Agency is allowing certain unregulated wastes to be included in lab packs utilizing the alternate treatment standards. The Agency is not promulgating the proposed alternate treatment standard for inorganic wastes due to concerns about unverified stabilization of variable waste streams.

The Agency believes that the alternate treatment standards provide some administrative relief, while minimizing the threats posed by land disposal of these small volumes of hazardous waste. Section III.A.9 of today's preamble contains a detailed discussion of the alternate treatment standards for these wastes.

G. Mixed (Hazardous/Radioactive) Wastes

EPA is granting a two-year national capacity variance under section 3004(h)(2) for mixed scheduled hazardous/radioactive wastes subject to today's rulemaking. The Agency bases the national variance for these wastes upon a determination that there is inadequate treatment capacity available for these wastes. The Agency is continuing to evaluate the volumes, characteristics, and treatment options for such wastes. A detailed discussion of EPA's approach for mixed wastes subject to today's rulemaking is provided in section III.A.8 of today's preamble.

The Agency is also establishing four separate treatability groups for specific types of mixed waste that could not be treated with the technologies determined to be BDAT for the corresponding nonradioactive wastes. The BDAT treatment standard for high-level radioactive wastes generated during the reprocessing of fuel rods is vitrification. For radioactive lead solids, the BDAT treatment standard is macroencapsulation. The BDAT treatment standard for radioactive elemental mercury is amalgamation. For radioactive hydraulic oil contaminated with mercury, BDAT is incineration.

H. Nationwide Variances From the Effective Date

Due to lack of sufficient treatment or recovery capacity, EPA is promulgating a two-year national capacity variance for the surface-disposed and deep well-injected hazardous wastes listed in Tables 1 and 2. In addition to the wastes listed in Tables 1 and 2, EPA is also granting a two-year national capacity extension to: mixed hazardous/radioactive wastes; naturally occurring radioactive materials that are mixed with RCRA hazardous wastes; soil and debris contaminated with Third Third wastes for which the treatment standard is based on incineration, mercury retorting, vitrification, or wet-air oxidation; and inorganic debris as defined in § 268.2(a)(7) (which also applies to chromium refractory bricks carrying the EPA Hazardous Waste Nos. K048–K052). The Agency is also granting a six-month capacity variance to nonwastewaters from the petroleum refining industry, EPA Hazardous Waste Nos. K048–K052. See section III.B of today's preamble for a detailed discussion of this six-month capacity variance.

Determinations of available capacity are based on a comparison of the volumes of wastes requiring treatment to the amount of capacity available for such treatment. Although EPA does not require that BDAT technologies be used to meet the applicable treatment standards, unless otherwise specified, EPA assesses available capacity by evaluating the availability of technologies identified as BDAT.

TABLE 1. SUMMARY OF TWO-YEAR NATIONAL CAPACITY VARIANCES FOR SURFACE-DISPOSED WASTES [1]

Required alternative treatment technology	Waste code/ physical form	
Acid Leaching and Chemical Precipitation.	D009	Low Mercury Nonwastewater.
	K106	Low Mercury Nonwastewater.
	P065	Low Mercury Nonwastewater.
	P092	Low Mercury Nonwastewater.
	U151	Low Mercury Nonwastewater.
Combustion of Sludge/Solids.	F039 [2]	Nonwastewater.
	K048 [3]	Nonwastewater.
	K049	Nonwastewater.
	K050	Nonwastewater.
	K051	Nonwastewater.
	K052	Nonwastewater.
Mercury Retorting	D009	High Mercury Nonwastewater.
	K106	High Mercury Nonwastewater.
	P065	High Mercury Nonwastewater.
	P092	High Mercury Nonwastewater.
	U151	High Mercury Nonwastewater.
Secondary Smelting.	D008	Lead Materials Stored before Secondary Smelting.
Thermal Recovery	P087	Nonwastewater/ wastewater.
Vitrification	D004	Nonwastewater.
	K031	Nonwastewater.
	K084	Nonwastewater.
	K101	Nonwastewater.
	K102	Nonwastewater.
	P010	Nonwastewater.
	P011	Nonwastewater.
	P012	Nonwastewater.
	P036	Nonwastewater.
	P038	Nonwastewater.
	U136	Nonwastewater.

[1] EPA is granting these wastes a two-year national capacity variance, except for K048–K052 nonwastewaters. This table does not include mixed radioactive wastes, certain contaminated soil and debris, or inorganic debris as defined in 268.2(a)(7) which are receiving two-year national capacity variances.
[2] Multi-source Leachate.
[3] For K048–K052 petroleum-refining nonwastewaters, EPA is granting a six-month variance.

TABLE 2. SUMMARY OF TWO-YEAR NATIONAL CAPACITY VARIANCES FOR UNDERGROUND INJECTED WASTES

Required alternative treatment technology	Waste code/ physical form	
Acid Leaching and Chemical Precipitation.	D009	Low Mercury Nonwastewater.
Alkailine Chlorination.	D003 [1]	Wastewater/ Nonwastewater.
Chemical Oxidation followed by Chemical Precipitation.	D003 [2]	Wastewater/ Nonwastewater.
Chemical Oxidation followed by Chromium Reduction and Chemical Precipitation.	D003 [3]	Wastewater/ Nonwastewater.
Chromium Reduction followed by Chemical Precipitation.	D007	Wastewater/ Nonwastewater.
Mercury Retorting	D009	Nonwastewater.
Neutralization	D002 [4]	Wastewater/ Nonwastewater.
Wet-Air Oxidation	K011	Wastewater.
	K013	Wastewater.
	K014	Wastewater/ Nonwastewater.
Wet-Air Oxidation Followed by Carbon Adsorption Followed by Chemical Precipitation; Biological Treatment Followed by Chemical Precipitation.	F039 [5]	Wastewater.

[1] D003 (Cyanides).
[2] D003 (Sulfides).
[3] D003 (Explosives, water reactives, and other reactives).
[4] Deepwell injected D002 liquids with a pH less than 2.0 must meet the California list prohibitions on August 8, 1990.
[5] Multi-Source Leachate.

I. Generator Notification Requirements

The generator notification requirements set forth in 40 CFR 268.7 specify that when the generator has determined that the waste is restricted and does not meet the applicable treatment standards, the generator must, with each shipment of waste, notify the treatment facility in writing of the appropriate treatment standards. This notice must include, among other items, the applicable treatment standard and all applicable prohibitions set forth in § 268.32 or RCRA section 3004(d). If the waste being shipped is restricted, but can be land disposed without further treatment, the generator must submit to the land disposal facility the same information, as well as a certification stating that the waste meets the applicable treatment standards (40 CFR 268.7(a)(2)).

In today's final rule, the Agency is amending § 268.7 to allow referencing of the treatment standards. The following information must be included in the reference: EPA Hazardous Waste Number, the subcategory of the waste code (*e.g.*, D003, reactive cyanide subcategory), the treatability group(s) of the waste(s) (*e.g.*, wastewater or nonwastewater), and the section where the treatment standards appear. This change does not apply to spent solvents (F001–F005), multi-source leachate (F039), or California list wastes because these waste categories each contain a number of individual constituents or waste groups.

In addition, the Agency is amending § 268.7 to allow a one-time notification

and certification for SQG shipments subject to tolling agreements. A detailed discussion of these changes is provided in section III.I of today's preamble.

J. Waste Analysis Plans and Treatment/ Disposal Facility Testing Requirements

The Agency today is promulgating modifications to the waste analysis plan requirements which incorporate elements of both approaches proposed on November 22, 1989. Under the final approach, treatment and disposal facilities must conduct periodic detailed physical and chemical analyses of their wastestreams to assure that the appropriate 40 CFR part 268 treatment standards are being met. Today's final rule amends the comment in 40 CFR 264.13(a)(2) and 265.13(a)(2) to clarify that the generator or treater may supply part of the waste analysis information, and that waste analysis requirements are not superseded if the treatment or disposal facility is supplied information by the generator or treater. See section III.J for a detailed discussion.

K. Testing of Wastes Treated in 90-Day Tanks or Containers

The Agency is promulgating testing requirements for wastes treated to comply with the BDAT treatment standard in so-called 90-day tanks (or containers) as proposed. A regulatory gap existed with respect to treatment of prohibited wastes in such tanks or containers regulated under § 262.34 because they were not subject to the waste analysis plan requirements. Thus, there was no regulatory vehicle for determining testing frequency in such circumstances.

In order to close this regulatory gap, EPA is requiring that persons treating prohibited wastes in such tanks and containers must prepare a plan justifying the frequency of testing that they choose to adopt. The Agency is also clarifying that these wastes are subject to the 40 CFR 268.7 recordkeeping requirements. A detailed discussion of these requirements is provided in section III.K of today's preamble.

L. Clarification of "P" and "U" Solid Wastes

The Agency is amending 40 CFR 261.33(c) to clarify the regulations pertaining to "P" and "U" hazardous wastes. The amendment will add residues of § 261.33(f) materials remaining in containers and in inner liners to the residues already included in the scope of the commercial chemical product listings. The existing regulatory language is partially in error, and the Agency is correcting it with today's revisions.

In the November 22, 1989 proposal, the Agency also proposed amendments to § 261.33 regarding soil, water and spill debris contaminated with § 261.33 (e) and (f) (P and U wastes) materials. Specifically, the Agency proposed that residues of spills of commercial chemical products will be considered solid waste if they are not recycled within 90 days of the spill. The Agency has decided not to promulgate this revision as the desired effect can be achieved through interpretation of existing regulations.

Finally, during the comment period, several commenters requested clarification of the exception to the mixture rule for *de minimis* losses of "P" and "U" wastes (§ 261.3(a)(iv)(D)) to underground injection units. Today's notice provides this clarification. A detailed discussion of these issues is provided in section III.L of today's final rule.

M. Storage Prohibition

Section 3004(j) provides that storage of prohibited hazardous waste is prohibited " * * * unless such storage is solely for the purpose of the accumulation of such quantities of hazardous waste as are necessary to facilitate proper recovery, treatment or disposal." See § 268.50(a)(2), and 51 FR 1709, January 14, 1986. This language applies only to storage of prohibited wastes in non-land based storage units (*e.g.*, tanks and containers), as land-based storage is a form of disposal. In the November 22, 1989, notice, the Agency proposed an interpretation that the storage prohibition does not apply where storage precedes legitimate, protective treatment, recovery, or disposal. The Agency is not pursuing a definitive reinterpretation in today's final rule as proposed. The Agency continues to believe, however, that the statutory prohibition was designed to prevent the use of storage as a means of avoiding a treatment standard, and will continue to enforce the storage prohibition with that intention in mind. EPA is aware of the difficulties posed by the applicability of the section 3004(j) storage prohibition to mixed (radioactive/hazardous) wastes, as there is little disposal or treatment capacity available. EPA is further evaluating the legal, policy and factual issues relevant to these wastes, and expects to issue policy on these issues within the next 90 days. A detailed discussion is provided in section III.M of today's preamble.

N. Case-by-Case Extension Petitions

In granting a case-by-case extension, there is a statutory requirement that a binding contractual commitment to construct or otherwise provide alternative treatment, recovery, or disposal capacity that meets the treatment standards be in place. RCRA section 3004(h)(3). EPA today is clarifying that this requirement may be satisfied by EPA proposing to grant a no-migration petition or a treatability variance. See preamble section III.N for a more detailed discussion.

O. Applicability of California List Prohibitions After May 8, 1990

With the promulgation of the Third Third final rule, almost all of the California list prohibitions will be superseded by more specific prohibitions and treatment standards when they become effective.[1] The only continued applicability of the California list appears to be (1) for liquid hazardous wastes that contain over 50 ppm PCBs; (2) for HOC-containing wastes identified as hazardous by a characteristic property that does not involve HOCs, as, for example, an ignitable waste that also contains greater than 1000 ppm HOCs (but not an EP toxic waste that exhibits the characteristic because it contains one of the six chlorinated organic pesticides covered by the EP toxicity characteristic); and (3) for liquid hazardous wastes that exhibit a characteristic and also contain over 134 mg/l of nickel and/or 130 mg/l of thallium.

Today's final rule also addresses several issues that were raised in the November 22, 1990, proposal. First, EPA is restating that the California list prohibitions apply to wastes that receive national capacity variances in later rulemakings. The Agency believes these more general prohibitions serve as a minimum requirement. EPA notes, however, that the California list prohibitions do not apply to newly listed or identified wastes (*i.e.*, wastes identified or listed after November 8, 1984) as the statute does not compel a contrary interpretation. A more detailed discussion of these issues appears in section III.O of today's preamble.

P. Analysis of Treated Wastes

The Agency today is using the same approach to waste analysis promulgated in the First and Second Third final rules

[1] See 52 FR 29993 (August 12, 1987) and 52 FR 25773 (July 8, 1987); see also 40 CFR 268.32(h) (HOC prohibition superseded by treatment standard and effective date for a particular HOC).

(53 FR 31146 and 54 FR 26594). (The following discussion and later preamble discussion are included for purposes of information and do not reopen the issue for judicial review.) Where BDAT is a destruction or removal technology, a total waste analysis is required because it is most appropriate for measuring such destruction or removal. The legislative history indicates a strong preference for treatment that destroys hazardous constituents (see, *e.g.*, 130 Cong. Rec., S9179, daily ed. July 25, 1984, statement of Senator Chafee), and the only reliable way to verify that destruction has occurred is to measure the total waste. Similarly, where BDAT is identified as an immobilization technology such as stabilization, analysis of a TCLP waste extract is required because it is the most appropriate measure of immobilization. In cases where both technologies are identified as BDAT, both types of waste analysis are required.

In order to determine whether the waste meets the applicable treatment standards as generated, the original generator should perform an analysis of the waste. The waste extract is analyzed if the applicable treatment standards appear in 40 CFR 268.41, and a total waste analysis is performed if the applicable treatment standards appear in § 268.43. The generator may also make this determination based on knowledge of the waste, provided there is a reasonable basis for doing so (for example, the generator uses so little of a key constituent that it could not be found in the waste at levels exceeding a treatment standard). All supporting data used to make the determination must be retained on-site in the generator's files. See 40 CFR 268.7(a)(5). The Agency has discussed this principle in past rulemakings, and is repeating it here for the reader's convenience.

Q. Practical Quantitation Limits (PQLs)

As noted above, where BDAT is based on a destruction/removal technology, total waste analysis is performed to measure compliance with the BDAT levels. Several commenters have raised concerns that, in certain cases, analytical problems may prevent demonstrating compliance with the treatment standards. They contend that the BDAT concentration levels are, in some cases, below the practical quantitation limit (PQL)—the lowest level of quantitation that the Agency believes a competent laboratory can reliably achieve.

The Agency is currently developing guidance material on waste analysis which the Agency believes will resolve many of these problems. In the interim, the Agency believes that where a waste has been treated with a combustion BDAT process (*i.e.*, incineration or fuel substitution unit), and if the person has made a good faith effort to achieve the maximum analytical sensitivity, in certain cases the Agency will consider the person to have demonstrated compliance with the treatment standard for the respective organic constituents in the waste. For a more complete discussion of these issues, see section III.A.1 of today's final rule.

R. Best Demonstrated Available Technologies (BDAT)

Today's rule defines waste treatability groups by waste code, and identifies the Best Demonstrated Available Technology (BDAT) for each waste code within the treatability group (see section III.A.1). Treatment standards are based on the performance levels achievable by the BDAT identified for each waste code. Any technology not otherwise prohibited (*e.g.*, impermissible dilution) may be used to meet the concentration-based treatment standards. Where treatment standards are expressed as a technology, the waste must be treated using the specified technology prior to land disposal.

S. Reformatting of Treatment Standard Tables and Addition of Appendix VII to Part 268, Effective Dates for Prohibited Wastes

The Agency is reformatting all of the tables of treatment standards in 40 CFR part 268 subtitle D and is providing the subpart D treatment standard tables in their entirety, including both previously promulgated standards and the treatment standards being promulgated today. The reformatted tables (*i.e.*, 40 CFR 268.41, 268.42, and 268.43) are arranged according to waste code in alphanumeric order and include the CAS number identifying each regulated constituent, whether the standard is based on analyses of grab or composite samples, cross-references, and several other clarifying features that will make determining applicable treatment standards easier for the reader. The treatment standards finalized for the first time today are included in the tables. No substantive changes are being made to the treatment standards that were previously promulgated in the November 7, 1986, the July 8, 1987, the August 17, 1988, and the June 23, 1989, final rules except as discussed in other preamble sections of today's rule. (As an example, regulated constituents are being added to the wastes K048–K052, as well as F002 and F005, wastes for which certain treatment standards were previously promulgated. See preamble section III.A.4.a. for a discussion of F002 and F005 and section III.A.4.o. for a discussion of K048–K052.)

In addition, the Agency is providing a complete list of waste codes regulated to date under the land disposal restrictions (including the waste codes included in today's rulemaking), as appendix VII to part 268. The appendix is provided for the reader's convenience; no substantive changes have been made to the dates, except as discussed in the preamble of today's rule.

T. Relationship of Hazardous Waste Treatment Council v. *EPA to Treatment Standards Promulgated in Today's Final Rule*

A number of commenters raised the issue of whether the treatment standards being adopted are below levels at which threats to human health and the environment are minimized, citing portions of the recent opinion *Hazardous Waste Treatment Council* v. *EPA*, 886 F.2d 355 (D.C. Cir. 1989) (HWTC III). In that case, the Court upheld EPA's existing technology-based approach to establishing treatment standards as a reasonable construction of the statute, but remanded the case to the Agency in order for the Agency to explain properly why it had chosen this approach. EPA's explanation was published in the **Federal Register** on February 26, 1990, and was accepted by the Court, which dismissed all petitions for review on March 15, 1990 The standards EPA is adopting in this rule are also technology-based, which the Agency believes is warranted at this time due to the uncertainties associated with hazardous waste land disposal and the Agency's present inability to quantify precisely *de minimis* levels of hazardous constituents that would determine when threats to human health and the environment from disposal of prohibited wastes are minimized. 55 FR 6642. Further discussion of this point may be found in section III.A.1.i of today's preamble. As discussed in section III.D, EPA believes that HWTC III is not dispositive on the issue of appropriate treatment standards for characteristic wastes.

III.A. Detailed Discussion of Today's Final Rule

1. Development and Identification of Treatment Standards

Today's rule promulgates treatment standards for the remaining Third Third scheduled wastes, and for the First Third and Second Third wastes which heretofore were subject to the "soft hammer" provisions of 40 CFR 268.8.

Development and identification of the treatment standards are presented on a waste code basis in sections III.A.2. through III.A.5. of today's notice. Section III.A.6. presents the development of treatment standards for wastes identified as F039, multi-source leachate. Section III.A.7. discusses the applicability of today's treatment standards to contaminated soil and debris. Section III.A.8. presents the Agency's approach to regulating radioactive waste that is mixed with hazardous wastes.

The following discussion has appeared in previous preambles and is being repeated here as an aid to the reader's understanding of the land disposal restrictions program. Comments were not solicited in the proposed rule on the following discussion; however, comments were received pertaining to various issues discussed below. These comments, and the Agency's responses, are found in the Response to BDAT-Related Comments Document, Volume 1, in the RCRA Docket.

a. The BDAT Methodology

The first step in the development of treatment standards is to divide the wastes to be regulated into groups based on similar physical and chemical properties. These waste treatability groups take into account differences in the applicability and effectiveness of treatment for those particular wastes. The Agency initially decides how wastes should be grouped by examining whether the wastes are generated by similar industries or from similar processes. This is a valid starting point because the waste characteristics that affect treatment performance are expected to be similar for these wastes even though the wastes themselves are somewhat different.

The next step in the development of treatment standards is to identify the Best Demonstrated Available Technology (BDAT) for each treatability group. A treatment technology is considered to be "demonstrated" primarily based on data from full-scale treatment operations that are currently being used to treat the waste (or a similar waste). Once the "demonstrated" technologies have been identified, the Agency determines whether these technologies may be considered "available". To be "available", the technology itself or the services of the technology must be able to be purchased, and the technology must substantially diminish the toxicity of the waste or reduce the likelihood of migration of the waste's hazardous constituents. EPA prefers to base BDAT on technologies that further the statutory goals of waste minimization and recycling. EPA may select this type of technology as BDAT over more conventional treatment if the disparity in performance of the technologies is not too pronounced, and the technology selected minimizes threats to human health and the environment by substantially diminishing waste toxicity and reducing mobility of toxic constituents.

Treatent data from "demonstrated" "available" technologies are then screened with regard to the design and operation of the equipment, the quality assurance/quality control (QA/QC) analyses of the performance and operating data, and the accuracy and precision of the analytical tests used to assess treatment performance. After this screening, the treatment data are adjusted for each constituent based on the analytical recovery of that constituent from the treatment residuals. The Agency has chosen to perform this adjustment in order to account (in part) for analytical interferences associated with the chemical makeup of the treatment residual. Where data for more than one treatment technology exist, the individual performance data for each of the various treatment technologies are then statistically evaluated. The mean concentrations of the constituents in the treatment residuals from each technology are then compared using an analysis of variance (ANOVA) test in order to determine if one technology performed significantly better than the other. (A detailed discussion of the methodology for identification of BDAT and the ANOVA test is provided in the November 7, 1986 final rule (51 FR 40572).) Where data exist for only one technology, the Agency uses best engineering judgment to assess whether that technology represents the best applicable technology for that particular waste and whether the data indicate that the treatment system was well-designed and well-operated.

After BDAT is identified, EPA develops the treatment standard for certain constituents in the waste. Treatment standards are expressed as maximum constituent-specific concentrations allowed in the waste (or in an extract of the treated waste), as a specific technology (or group of technologies), or as a combination of these. Although the statute provides discretion to establish treatment standards as either levels or methods of treatment, EPA normally attempts to set concentration-based treatment standards whenever possible, because they provide the regulated community with flexibility in choosing treatment technologies and also allow the investigation and development of new and alternative technologies. In addition, establishing concentration-based standards provides a means of ensuring that treatment technologies are operated at conditions that will result in the best demonstrated performance.

b. Use of Technologies Identified As BDAT

Compliance with a concentration-based treatment standard requires only that the treatment level be achieved; once achieved, the waste may be land disposed. The waste need not be treated by the BDAT technology; in fact, a concentration-based treatment standard provides maximum flexibility in one's choice of treatment technology because any treatment, including recycling or any combination of treatment technologies, unless prohibited (e.g., impermissible dilution) or unless defined as land disposal (e.g., land treatment), can be used to achieve these standards.

Some treatment standards in today's rule, however, are expressed as a treatment method rather than as a concentration-based standard. EPA typically establishes a treatment method as the standard when it has no means of calculating valid concentration-based standards. In such cases, the specified technology must be used to treat that particular waste (including any mixture that contains the waste). After the waste is treated using the specified method, it may be land disposed, unless EPA has specified otherwise in the rule, or if the residue exhibits a hazardous waste characteristic and does not meet the treatment standard for that characteristic. In situations where wastes subject to concentration-based standards are mixed with wastes subject to treatment standards expressed as a method, the mixture must be treated by the specified method and must also meet the concentration-based treatment standards for any other prohibited waste contained in the matrix (see generally 53 FR 31146–7, August 17, 1988).

When EPA requires the use of a technology (or technologies), a generator or treater may demonstrate that an alternative treatment method can achieve the equivalent level of performance as that of the specified treatment method (40 CFR 268.42(b)). This demonstration is typically both waste-specific and site-specific and may be based on: (1) The development of a concentration-based standard that utilizes a surrogate or indicator compound that guarantees effective

treatment of the hazardous constituents; (2) the development of a new analytical method for quantifying the hazardous constituents; and (3) other demonstrations of equivalence for an alternative method of treatment based on a statistical comparison of technologies, including a comparison of specific design and operating parameters.

c. Applicability of Treatment Standards to Treatment Residues Identified as Derived-From Wastes and to Waste Mixtures

(1) *Derived-From Wastes.* All residues from treating the original listed F, K, U or P wastes are likewise usually considered to be the listed waste by virtue of the derived-from rule found in 40 CFR 261.3(c)(2). Consequently, all wastes generated in the course of treatment are prohibited from land disposal unless they comply with the treatment standard or are otherwise exempted from the prohibition, such as through a no-migration determination or by a capacity variance. Residues from the treatment of characteristic wastes, however, are not automatically considered the characteristic waste; these residues are considered characteristic if they still display the original characteristic, or if they display another characteristic.

Treatment operations, including those identified as BDAT, typically generate wastewater and nonwastewater residuals that may require further treatment. EPA has not tested every possible waste that may result from every subsequent part of the treatment train. However, since the treatment standards promulgated today are generally based on treatment of a relatively concentrated form of the waste (i.e., the "original" waste), the Agency believes that residues from subsequent treatment will be less difficult to treat.

The Agency is investigating de minimis levels for certain hazardous constituents in listed wastes below which the waste will no longer be a hazardous waste for purposes of subtitle C regulation. The Agency has yet to propose these de minimis levels. The Agency has indicated, however, that these de minimis levels will cap treatment standards if they are higher than the treatment standards (55 FR 6640; Feb. 26, 1990).

(2) *Mixtures of Different Hazardous Waste Streams.* Today's treatment standards apply to mixtures of different waste streams. Where a waste mixture consists of listed wastes and has more than one applicable concentration-based treatment standard for a particular constituent, the most stringent standard must be met prior to land disposal (see 40 CFR 268.41(b)). In the event that such a waste mixture cannot be treated to meet the most stringent standard, one may petition the Agency for a variance from the treatment standard pursuant to 40 CFR 268.44.

d. Wastewater Versus Nonwastewater Standards

In today's rule, the treatment standards (both concentration-based and specified methods) are generally presented as applicable to wastewaters or to nonwastewaters (see 40 CFR 268.2). Wastewaters are defined as those wastes (listed wastes, including wastes generated as a result of the mixture and derived-from rules) that contain less than 1% total organic carbon (TOC) *and* less than 1% total suspended solids (TSS), except for those wastes identified as F001, F002, F003, F004, and F005 solvent-water mixtures. (See 53 FR 31145 (August 17, 1988) which adopts this definition for most First Third wastes, and 51 FR 40579 (November 7, 1986) for the definition of F001, F002, F003, F004, and F005 solvent-water mixtures.) Those wastes (listed wastes, including wastes that are hazardous as a result of the mixture and derived-from rules) that do not meet these criteria are defined as nonwastewaters and thus contain greater than or equal to 1% TOC, *or* greater than or equal to 1% TSS. (Note, however, the discussion in III.B. of further subcategorization of nonwastewaters for purposes of national capacity variances based on a lack of solids incineration capacity.)

(1) *Impermissible Switching of Wastewater and Nonwastewater Standards for Listed Wastes.* (See also discussion at III.D. below for issues associated with characteristic wastes.) It is not permissible to dilute or partially treat a prohibited listed waste in order to switch the applicability of a nonwastewater standard to a wastewater standard, or vice versa (see 52 FR 21012 (June 4, 1987); but see 52 FR 25767 (July 8, 1987) noting special circumstances when California list wastes are involved). The Agency has established this principle because technologies applicable to nonwastewaters are not generally applicable to wastewaters, or require special designs (in the case of incineration) in order to simultaneously handle wastewaters. Furthermore, treatment residues meeting the definition of nonwastewaters must comply with all applicable nonwastewater treatment standards; likewise, residual wastewaters must comply with all applicable wastewater treatment standards.

The Agency recognizes, however, that certain technologies are specifically designed to separate wastewaters from nonwastewaters. Such technologies may or may not be considered partial treatment under this principle, as discussed in the following paragraphs.

Dewatering technologies such as filtration and centrifugation are typically designed to remove suspended solids (TSS) from aqueous wastes. When these technologies are applied to a nonwastewater that contains greater than 1% TSS but less than 1% TOC, the resultant liquid residue will probably meet the definition of a wastewater (i.e., it will probably contain less than 1% TSS and less than 1% TOC). The Agency does not consider this impermissible switching of applicable treatment standards. (Note: For the purposes of applying BDAT treatment standards, the Agency does not consider carbon adsorption a dewatering technology even though it may act as a filter for suspended material.)

When the suspended material is organic and the overall untreated waste contains greater than 1% TOC, these dewatering technologies are also not precluded from use. The resultant residuals (i.e., the removed solids and the liquids) must comply with the applicable wastewate or nonwastewater treament standards depending on their TOC and TSS content. If the liquid residues from these dewatering technologies meet the definition of wastewaters, the Agency does not consider this to be impermissible switching of applicable standards.

The importance of the TOC level in determining impermissible switching of applicable wastewater or nonwastewater treatment standard is apparent in the scenario of treatment of a waste containing less than 1% TSS and slightly more than 1% TOC (such as 2 or 3% TOC), and thereby being a nonwastewater by definition. If EPA has established concentration-based treatment standards for the corresponding wastewater form of this waste, it would be permissible to use carbon adsorption to treat this nonwastewater, so long as these concentration-based treatment standards for the wastewaters are ultimately achieved (i.e., if the residual wastewater contains hazardous constituents at levels above the concentration-based wastewater treatment standards, additional treatment with other technologies is necessary prior to land disposal.) However, if EPA has established a

wastewater treatment standard expressed as Carbon Adsorption as a Method of Treatment for this waste code, the nonwastewater described above must comply with the standard for the nonwastewater form, despite the fact that the TOC content is only slightly greater than 1%. This is not just a mechanical application of the requirement that treatment must be conducted by the specified method, with the treatability group determined at the point of generation. EPA established Carbon Adsorption as a Method of Treatment standard for certain wastewaters based on the assumption that wastewaters typically contain TOC levels much less than 1%, so that removal of the organic constituents from these wastewaters was anticipated to be effective. If the nonwastewater previously described is subjected to carbon adsorption as a method of treatment, there would be no means of assuring optimum removal of the hazardous constituents. Thus, in such a situation, the use of carbon adsorption for this nonwastewater, is not permitted as a means of complying with BDAT. The Agency considers this an impermissible switching of applicable treatability groups and treatment standards.

When EPA specifies a treatment method as the treatment standard, residues resulting from the required treatment method are no longer prohibited from land disposal unless EPA should otherwise specify. In the Second Third final rule (see generally 54 FR 26625, 26630, June 23, 1989), the Agency presented specific guidelines on this. (This summary is repeated here for the reader's convenience.) Where EPA has established Incineration as the treatment standard for nonwastewaters and/or wastewaters, or where EPA has established Carbon Adsorption the treatment standard for wastewaters, the following statements concerning residuals from treatment trains incorporating these technologies are true: (1) Scrubber waters from incinerators in compliance with the substantive provisions of 40 CFR part 264 subpart O or part 265 subpart O are considered to meet the treatment standard and can be land disposed; (2) the scrubber waters from incinerators in compliance with the sustantive provisions of 40 CFR part 264 subpart O or part 265 subpart O are not required to undergo Carbon Adsorption as a Method of Treatment when this specified wastewater treatment method also has been established; (3) incinerator ashes and residues from the subsequent treatment of scrubber waters from incinerators in compliance with the substantive provisions of 40 CFR part 264 subpart O or part 265 subpart O are considered to meet the treatment standard, and can be land disposed; (4) Incinerator equipment (such as fire brick) derived from sections of the incinerator that have been directly subjected to the high temperatures of the incinerator that was operated in compliance with the substantive provisions of 40 CFR part 264 subpart O or part 265 subpart O, or are downstream from the high temperature zones, are considered to meet the treatment standards for the wastes that were incinerated and can be land disposed (this does not include incinerator equipment such as refractory bricks that, as manufactured, contain metals that may be characteristic wastes by virtue of the EP toxicity test when discarded); (5) wastewater effluent and any subsequent nonwastewater treatment residues from carbon adsorption units treating wastewater forms of these wastes (i.e., wastes from downstream from the carbon column) are considered to meet the specified treatment standard and can be land disposed; and, (6) where EPA specifies carbon adsorption as the treatment method for wastewaters, spent carbon, as well as any other nonwastewater residues from the wastewater treatment preceding carbon adsorption, are *not* considered to meet the treatment standard; such spent carbon and nonwastewater residues must be treated by the specified nonwastewater method prior to land disposal.

e. Transfer of Treatment Standards

Rather than testing the performance of BDAT on evey waste, in certain cases, the Agency transfers treatment standards from a tested waste to a similar untested waste. EPA believes that transferring treatment performance data for untested wastes is technically valid, particularly when the untested wastes are generated from similar industries or similar processing steps. EPA also believes that transferring treatment performance data for tested constituents in one waste to untested constituents in another similar waste is technically valid, particularly when the constituents and wastes have similar chemical and physical properties.

To determine whether wastes generated by different processes can be treated to the same performance levels, EPA reviews data on waste characteristics to identify parameters that are expected to affect treatment selection. When this analysis suggests that an untested waste can be treated with the same technology as a tested waste, the Agency examines a more comprehensive list of constituents that represent the most important waste characteristics that will affect treatmen performance.

The complete methodology for transferring treatment standards, however, depends upon the waste itself and often differs from treatability group to treatability group. For a detailed discussion of the transfer methodology for the wastes presented in today's rule, refer to the background documents for each waste or treatability group and the background documents for the wastes from which the treatment standards were transferred.

EPA notes further that in the case of transferring standards based on performance of incineration, EPA is most often transferring standards that were based on the ability of the incinerator to achieve destruction of organics to detection limits as measured in the ash and scrubber water. This is supported by data from approximately fourteen different test burns for a variety of different RCRA hazardous wastes. These wastes contained varying concentrations of many BDAT list organics. In developing concentration-based treatment standards for the U and P wastes, the Agency considered all of the detection limits and determined which were the most representative of U and P wastes. In order to account for the anticipated variability in waste characteristics of untreated U and P wastes, the Agency typically selected the highest detection limits for the constituent that corresponded to the chemical represented by the U or P code. Thus, the Agency believes the resultant treatment standards should be achievable on a routine basis for the majority of U and P wastes.

When developing ccncentration-based treatment standards for certain F and K wastes containing organics, the Agency considered all of the data and determined which particular waste was the most representative of that particular F or K waste based on the availability of waste characterization data. As a result, the Agency often transferred treatment standards that were significantly lower than those developed for the U and P wastes. The Agency believes that these lower treatment standards are achievable for these F and K wastes based on the ability to achieve detection limits for organics in the waste matrix from which the standard was transferred.

f. Treatment Standards Based on Single Facility Data, Grab Samples Versus Composite Samples, and Waste Analysis Plans

(1) *Single Facility Data.* As discussed in the August 17, 1988 final rule for First Third wastes, the Agency believes that the use of a small number of data sets from a single treatment facility can be representative of the treatment achieved by the particular treatment system. This is particularly true when no other treatment data are available, or when data exist but there is no verification that the treatment process from which the data were obtained was well-designed or well-operated. It is not possible for the Agency to sample every facility generating the waste or every treatment system treating the waste. For the purposes of determining treatment standards, the Agency has established a methodology for selecting particular facilities and treatment systems that it considers to be well-designed and well-operated. The Agency also selects wastes that are representative of those most difficult to treat.

The Agency recognizes that there is variability inherent in every treatment system, as well as variability in the characteristics of the wastes. The Agency accounts for these by multiplying the mean of the constituent concentrations by a variability factor. This factor is derived through a quantitative procedure that determines the statistical 99th percentile for the treatment standard. This establishes a treatment standard that should be achievable 99 percent of the time by a well-designed, well-operated system. The Agency further adjusts the treatment standard to account for variabilities due to analytical recovery. In addition, all analyses of hazardous constituents are performed in accordance with an established QA/QC plan as outlined in the BDAT Generic Quality Assurance Project Plan.

Standards based on incineration are always established above the limit of detection for that particular waste rather than at the detection limit. This is because the Agency prefers to account for the variability inherent in the treatment system and in the analysis of the recovery data. Therefore, following EPA's methodology for establishing treatment standards, the data are adjusted through use of the variability factor (typically 2.8) and an adjustment for recovery of a spiked analyte (or surrogate). The resulting treatment standards for the organic constituents are above the detection limits. The standards are thus greater than the achievable levels (which are at or below the detection limits) and should be easily met by a well-designed, well-operated incineration system.

(2) *Grab versus Composite Samples.* Where performance data exist based on both the analysis of composite samples and the analysis of grab samples, the Agency establishes the treatment standards based on the analysis of grab samples. Grab samples normally reflect maximum process variability, and thus would reasonably characterize the range of treatment system performance.

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

(3) *Waste Analysis Plans.* The waste analysis plan provides the basis for monitoring a disposal facility's compliance with the promulgated treatment standards. This plan must be adequate to assure compliance with part 268. The disposal facility is, however, ultimately responsible if it disposes of a waste that does not meet a treatment standard. Therefore, a disposal facility might violate the land disposal restrictions while at the same time comply with the provisions of its waste analysis plan. Put another way, a waste analysis plan may be written to authorize types of sampling and monitoring different from those used to develop the treatment standard(s). In such an instance, the disposal facility must demonstrate that the waste analysis plan (and the specific deviating feature) is adequate to assure compliance with part 268 (see 40 CFR 264.13). This might require, for example, a demonstration of statistical equivalence between a composite sampling protocol and one based on grab sampling, or a demonstration of why monitoring for a subset of pollutants would assure compliance of those not monitored. In any case, enforcement of the land disposal restrictions is based on grab samples (except as described in the previous section) and analysis of all constituents regulated by the applicable treatment standands, not on the facility's waste analysis plan. (See preamble section III.G. for further discussion of WAPs.)

g. Analytical Requirements, the BDAT List, and Relationship of PQLs to BDAT

(1) *Waste Analysis Requirements.* In today's rule, BDAT has been identified as a destruction technology for organic constituents and cyanides in many wastes. The best measure of treatment performance for these wastes is one that reflects the extent to which these organics and cyanides have been destroyed. This approach is consistent with the Congressional preference to destroy hazardous wastes where possible. See, e.g., 130 Cong. Rec. S 9178–9179 (July 25, 1984) (statement of Sen. Chaffee) (wastes with high organic content should be incinerated). This approach is also consistent with the strong Congressional goal of eliminating uncertainty from the land disposal of hazardous waste. See, e.g., RCRA section 3004(d)(1), because it ensures removal of hazardous constituents from the land disposal environment. The corresponding treatment standards for these constituents are based, therefore, on an analysis of total constituent concentrations in a representative sample of the treated waste.

(**Note:** The land disposal restrictions for solvent waste codes F001–F005 (51 FR 40572) require analysis of waste extracts obtained from the Toxicity Characteristic Leaching Procedure (TCLP) as a measure of performance. At the time that the treatment standards for F001–F005 were promulgated, useful data were not available on total constituent concentrations in treated residuals and, as a result, the TCLP was considered to be the best available measure to evaluate performance of the treatment technology.)

In cases where treatment standards for metals in nonwastewaters are based on stabilization, the use of the TCLP is typically required as the measure of the performance of the treatment technology. Where treatment standards for nonwastewaters are based on multiple treatment processes due to mixtures of organics and metals, or where recovery of metals is the basis of the treatment standards, analysis of total constituent concentrations and analysis of the TCLP extract (or EP extract depending upon the standard) must be performed prior to land disposal.

(2) *The BDAT List.* The Agency has established a list of chemicals made up primarily from the constituents in 40 CFR part 261 appendix VII and appendix VIII, that are evaluated for regulation as BDAT constituents (i.e., for purposes of concentration-based treatment standards) when they are

present in a listed waste. The rationale for selection of the particular constituents to be regulated can be found in the background document for each waste or waste treatability group. The Agency believes that it is not limited to regulating only those constituents for which a waste is listed (40 CFR part 261 appendix VII). Appendix VII sets forth only the constituents that were the basis for the listing and is not an exhaustive list of hazardous constituents in each waste. Additional support for taking this approach is found in RCRA section 3001(f), which specifies that EPA must consider additional hazardous constituents other than those for which the waste was listed when evaluating delisting petitions. Section 3001(f) thus acknowledges that appendix VII is only a partial list of the hazardous constituents that can be present in a listed waste.

(3) *Relationship of Treatment Standards to PQLs.* In proposed revisions to the September 1986 edition of *Test Methods for Evaluating Solid Wastes* (also known as and herein referred to as SW-846), the Agency defines practical quantitation limits (PQLs) as "* * * the lowest level of quantitation that the Agency believes a competent laboratory can be expected to reliably achieve." PQLs are directly related to the amount of interferences that are present in different waste matrices, and the PQLs listed in SW-846 are not always achievable for constituents as measured in untreated wastes. Most treatment processes, however, particularly destructive technologies such as incineration, destroy not only the hazardous constituents of the waste but also other organics that typically interfere with the analysis for constituents in untreated wastes. Thus, PQLs typically are significantly lower for treatment residuals such as incinerator ash than for untreated wastes. Such differences in PQLs for untreated versus treated wastes are demonstrated by the data for almost every incineration test burn performed by the Agency in developing the treatment standards.

Potential users of PQLs should keep in mind that the PQLs in SW-846 were established to provide guidance for the analysis of waste samples by acting as minimum performance criteria for analytical laboratories. The PQLs do not necessarily represent the lowest limits of analytical performance achievable for any given waste.

The PQLs in SW-846 were intended to be broadly applied to groups of wastes. As a result, matrix dependent correction factors were not developed for any particular waste code, and do not specifically apply to any particular treatment residuals (i.e., only correction factors for matrices identified as ground water, low-level soil, high-level soil, and non-water miscible waste were specified in Method 8250 of SW-846). Furthermore, the Agency is currently modifying and expanding the matrix correction factors, as well as modifying the detection limits from which the PQLs are derived.

The PQLs listed in SW-846 for some constituents are less stringent than some of the treatment standards. This apparent anomaly results primarily from the fact that the PQLs in SW-846 were not based on the same waste matrices (i.e., treatment residues) that were tested in developing the treatment standards. The treatment standards for a given waste code are based on analysis of the treatment residuals of the waste (or in some cases, a similar waste from which the treatment standards are transferred). Consequently, the resulting treatment standards appropriately reflect the level of analytical performance achievable for that waste. Thus, the PQLs in SW-846 are generally not used directly in developing the Part 268 treatment standards.

Today's promulgated concentration-based nonwastewater standards based on combustion derive from detection limits from EPA's 14 test burns (which generated the data supporting virtually all of the proposed rule's concentration-based standards) plus a data set submitted by a commenter representing the hazardous waste treatment industry. This comment is discussed at length in subsequent paragraphs.

This commenter submitted a study that was undertaken to verify whether industry labs can reliably quantify regulated constituents at the level of both the existing and the proposed concentration-based standards. The study's secondary purpose was to identify any regulated constituents for which the concentration-based treatment standards may be inappropriate. The study consisted of analyzing regulated constitutents in incinerator ash at levels near the concentration-based standards.

In the commenter's opinion, the data and observations indicate that many treatment standards are inappropriate, and also made three major assertions with respect to PQLs. First, the commenter asserted that based on the PQLs calculated using his data, certain previously promulgated concentration-based standards are not achievable. EPA rejects this assertion because no specific treatment data were received in either this study or during the comment period for the appropriate rulemaking that indicated *on a waste-specific basis* that these treatment standards could not be achieved. (Note: The Agency is not precluded, however, from promulgating revisions to these standards in a later rulemaking after giving sufficient public notice.)

Second, the commenter asserted that certain of the proposed Third Third concentration-based standards are not achievable because they are based on detection levels below the PQLs calculated from his study. EPA evaluated the commenter's detection limit data rather than his PQLs and has determined that the majority of the commenter's detection limits demonstrate compliance with the concentration-based standards that were proposed, and all but a very few, comply with the standards being promulgated in today's rule. Because of this, and for reasons discussed below, the Agency has generally rejected the use of the PQLs calculated by the commenter in promulgating treatment standards.

However, several nonwastewater standards promulgated in today's rule reflect revisions based on the commenter's detection limit and recovery data. EPA has indicated where these data were used to revise specific standards in later sections of today's preamble. Although EPA revised these standards based on some data from this study, EPA generally found flaws with the commenter's study (such as: Incomplete untreated waste characterization; probable analytical interferences; and incomplete incinerator process documentation) that precluded incorporation of much of the data into the treatment standards for nonwastewaters. For example, BDAT analytes were detected at levels above the detection level (i.e., at measurable quantities) in several of the commenter's ash samples. Also, different ash samples appeared to have different compositions of these BDAT analytes, apparently indicating that these ashes differ significantly from one another. (See detail responses of these data in the Response to BDAT-Related Comments Background Document for Third Land Disposal Restrictions in the administrative record for today's rule.)

Third, the commenter stated that EPA had inappropriately calculated nonwastewater treatment standards in terms of both numerical detection levels and the best procedure for calculating standards, specifically, considering the

use of PQLs. The commenter chose to use a methodology adapted from the Clean Water Act regulations to calculate alternative concentration-based standards for ash which they asked EPA to consider. Regardless of the validity of the commenter's data, EPA is not deviating from the calculation methodology of the Generic Quality Assurance Project Plan for Land Disposal Restrictions Program ("BDAT") promulgated in conjunction with the November 11, 1986 regulatory framework. The Agency therefore is retaining its established methodology.

h. Relationship of Detection Limits to Concentration-Based Standards

Several commenters raised the issue that, in certain cases, analytical problems (i.e., difficulties in reliable quantitation at detection limits near the concentration-based treatment standards) may prevent demonstrating compliance with the proposed treatment standards for Third Third wastes. They also pointed out that this same problem already may exist for some First and Second Third wastes.

EPA has examined the data submitted to the Agency in support of these comments. (See discussion of these data as they relate to PQLs in the preceding section of the preamble.) While the Agency does not believe that the currently available data is conclusive, EPA acknowledges that there can be situations where lack of available analytical methods may prevent demonstration of compliance with the treatment standards.

EPA is dealing with this potential problem in a number of ways. First, EPA has examined detection limit data submitted by the commenters and compared them to the data used to develop the proposed standards. After a thorough technical evaluation, the Agency incorporated a portion of these data into the promulgated standards in today's rule. In addition, the Agency has reevaluated the existing BDAT data generated by the Agency, the transfer procedures used for some of the wastes, and recently available information and data on recovery of the BDAT organic constituents. Thus, EPA concurred with the commenters and concluded that many of the other proposed concentration-based treatment standards may not be achievable. As a result, EPA is promulgating revised treatment standards for some organics in nonwastewaters that are higher than the proposed standards. In doing so, the majority of the commenters' concerns over ability to measure at concentrations near the standards are no longer applicable. (Note: The Agency is continuing to study this issue and, if warranted, may adjust other standards, including some for First and Second Third wastes, after sufficient public notice.)

Second, in certain situations where compliance with a standard cannot be demonstrated for a particular waste due to problems with analytical detection limits and where the treatment technology employed was considered by the Agency to be BDAT (see specific instances below), the Agency has decided that reliance upon the treatability variance petition process would place an unnecessary burden on both the regulated and regulatory communities. The Agency believes that where a waste has been treated with a combustion BDAT process (i.e., incineration or fuel substitution unit), and if the person has made a good faith effort to achieve maximum analytical sensitivity, the Agency will consider the person to have demonstrated compliance with the treatment standard for the respective organic constituents in the waste.

In order to demonstrate compliance in such cases, the person will have had to make a good faith effort to demonstrate that the analyte of concern is not present in the waste at, or above, the treatment standard. To provide a more concrete basis for making such demonstrations, EPA intends to develop and issue guidance on what constitutes a good faith effort to achieve such analytical sensitivity within the near future. This guidance is anticipated to be available at or near the effective date for the Third Third treatment standards (August 8, 1990).

In developing the treatment standards in today's rule, the Agency selected the treatment data (i.e., detection limit data) that best represented what the majority of wastes could meet. (Note: Most of these data were from incinerator units that were considered well-designed and well-operated.) However, the Agency rejected detection limit data for some wastes, because the Agency determined that these wastes were not necessarily representative of the treatability of other wastes. After reexamination of all of the available detection limit data, the Agency has found that the majority of the detection limit data for these wastes will generally not exceed the promulgated treatment standards by more than one order of magnitude. The Agency also points out that there is an inherent three-fold difference in detection limits that may arise due to difference in sample size taken for analysis.

Thus, until this formal guidance is available, the Agency will consider that, if an analytical sensitivity (i.e., detection limit) within an order of magnitude of the organic constituent treatment standard has been achieved, compliance with such treatment standard will be considered to have been demonstrated provided the data represents the use of a combustion process (i.e., restricted to incineration or fuel substitution in a unit in compliance with all applicable technical operating requirements under 40 CFR part 264 subpart O and part 265 subpart O. Thus, it is likely that the combustion unit is being operated properly). The Agency believes that this is consistent with RCRA section 3004(m), in that, as an alternative to specifying a concentration-based standard for these wastes, the Agency could have promulgated a method of treatment specifying the use of incineration or fuel substitution.

One commenter requested that persons with untreated wastes also be allowed to certify compliance if analytical problems prevent their demonstrating compliance with the treatment standards. The Agency emphatically disagrees. This situation has a substantial potential to mask the presence of hazardous constituents. Untreated wastes, and wastes treated by other than the aforementioned combustion processes (e.g., biotreatment), typically contain many materials that interfere with achieving low detection limits. Such wastes can, thus, contain significant levels of hazardous constituents even when the treatment process is operating properly. Allowing land disposal of such wastes would be contrary to the objectives of the land disposal restrictions statutory provisions. In addition, the rules already allow generators to certify compliance based on their knowledge of the waste, rather than by testing (section 268.7(a)(2)). If a generator believes, for example, that as a result of mass balance information a waste meets the treatment standard, it can certify compliance even if it is not possible to analytically demonstrate compliance with the standard.

EPA is thus amending §§ 268.7 and 268.43 to state that where a treatment standard for organics in nonwastewaters is based on the aforementioned combustion technologies (i.e., incineration or fuel substitution in units operated in accordance with the technical operating requirements of 40 CFR part 264 subpart O and part 265 subpart O) and a waste has been treated using that treatment method, the treatment facility may

certify compliance with the organic constituent standard if a good faith effort has been made to analytically demonstrate compliance with this standard and a detection limit within an order of magnitude of the organic constituent standard has been achieved. This includes all waste codes in the First, Second, and Third Thirds where standards for organics are based on such combustion processes or were transferred from wastes based on such combustion processes. These standards are specifically indicated in Table CCW of § 268.43.

The Agency points out that in cases where a facility believes that waste-specific treatment standards cannot be met because their laboratory is still unable to achieve detection limits below the treatment standards on specific treatment residuals, and: (1) The facility complies with all the other conditions mentioned above; or (2) a facility utilizes a combustion technology other than incineration or fuel substitution; or (3) a facility utilizes a technology other than combustion that can be demonstrated to be equivalent, the facility may submit a petition for a variance from the treatment standards for that particular waste code (EPA construes 40 CFR 268.44 as encompassing such petitions). The facility must demonstrate that the analyses are in compliance with all other BDAT QA/QC provisions (as outlined in the BDAT Generic Quality Assurance Project Plan (EPA/530–SW–87–011, March 1987). Moreover, the petitioner must also demonstrate that the treatment process is a well-designed and well-operated BDAT process.

i. Relation of *Hazardous Waste Treatment Council* v. *EPA*

A number of commenters raised the issue of whether the treatment standards being adopted are below levels at which threats to human health and the environment are minimized, citing portions of the recent opinion *Hazardous Waste Treatment Council* v. *EPA*, 886 F. 2d 355 (D.C.Cir. 1989) (HWTC III). In that case, the Court upheld EPA's existing technology-based approach to establishing treatment standards as a reasonable construction of the statute, but remanded the case to the Agency in order for the Agency to properly explain why it had chosen this approach. EPA's explanation was published in the **Federal Register** on February 26, 1990 and was accepted by the Court, which dismissed all petitions for review on March 15, 1990.

The standards EPA is adopting in this rule are also technology based. However, as discussed in detail in section III.D. below, the Agency believes that with respect to disposal of prohibited characteristic wastes that are no longer "hazardous" under the regulations, the Agency must harmonize the competing considerations of section 3004(g) and 1006 (b) (relating to a regulatory framework for subtitle D systems) with those of section 3004(m) (relating to treatment to fully minimize threats) before determining the extent of the prohibition.

EPA notes further that it believes that treatment standards established below characteristic levels can result in nonredundant minimization of threats to human health and the environment and thus be permissible under RCRA section 3004(m) and the Court's opinion. Indeed, the Court itself noted that characteristic levels do not serve as a bar to further treatment (886 F. 2d at 363). The treatment standards for characteristic wastes in today's rule thus are not premised on any finding that the characteristic level, in and of itself, creates a bar to further treatment.

2. Treatment Standards for Certain Characteristic Wastes

This section of today's preamble presents a discussion of D001 Ignitable, D002 Corrosive, and D003 Reactive characteristic wastes, as well as the six EP Toxic pesticides (D012 through D017). Treatment standards for the eight EP Toxic metals are found in section III.A.3. of this preamble.

a. General Issues on Developing Treatment Standards for Characteristic Wastes

There were a number of options proposed for developing treatment standards for the characteristic wastes. One option considered by the Agency was to promulgate concentration-based standards (for those characteristic wastes that were defined by a level) based on available data. A second option was to promulgate a treatment standard expressed as a required method. A third option was to simply establish the characteristic level as the treatment standard, and a fourth option was to establish a method of treatment along with a required performance level.

The Agency received extensive comments discussing these options, particularly the option of setting treatment standards expressed as the characteristic levels. A few commenters strongly supported establishing treatment standards for characteristic wastes at levels below the characteristic levels, stating that available performance data supported such an approach. The majority of commenters, however, supported limiting the treatment standards at the characteristic levels.

The Agency found some of the technical issues raised by these commenters persuasive. (Discussion of the policy issues associated with setting treatment standards for characteristic wastes is found in preamble section III.D.) The Agency agrees with commenters that argued that characteristic wastes may be generated in many matrices, and thus, can take any number of different forms; transferring data from specific listed wastes to these variable characteristic wastes, the commenters indicated, may not account for such differences.

In addition, for certain D001, D002, and D003 treatability groups, there are currently no available analytical methods to quantify residual ignitability, corrosiveness, and reactivity. Until EPA can develop analytical methods capable of accurately determining quantitative characteristic hazards, industry must judiciously make qualitative technical decisions dependent on the waste definition. Treaters must complete treatment until qualitative technical judgement indicates that the waste or waste residual no longer exhibits the characteristic hazard specified by the definition.

Many commenters supported the Agency's approach for setting treatment standards for Ignitable, Corrosive, and Reactive (with the exception of Reactive Cyanides) wastes expressed as a required method of treatment: Deactivation. The Agency, therefore, is promulgating the Deactivation treatment standard and is providing suggested deactivation methods to remove the characteristic for the various Ignitable, Corrosive, and Reactive treatability groups in appendix VI to 40 CFR part 268.

No comments were received on the proposed approach for regulating the EP Toxic pesticides (D011–D017). The Agency is promulgating concentration-based treatment standards for the nonwastewater forms of these wastes and methods of treatment for the wastewaters. The Agency is taking this action based on data indicating that incineration can remove organic constituents to non-detectable levels in nonwastewaters as evidenced by incineration data available for certain halogenated pesticides. Further discussion of issues associated with promulgating treatment standards for these characteristic wastes is found in the following sections of today's preamble.

b. Ignitable Characteristic Wastes

Under 40 CFR 261.21, there are four criteria for identifying a waste as D001 Ignitable. Paraphrasing these criteria, a waste is a D001 Ignitable if: (1) It is a liquid with a flash point less than 140 °F; (2) it is an ignitable compressed gas; (3) it is not a liquid and is capable of causing fire through friction, absorption of moisture, or spontaneous chemical changes and when ignited burns vigorously and persistently; or (4) it is an oxidizer. EPA has determined that these four criteria translate directly into four major D001 subcategories (although EPA has further subcategorized the ignitable liquid subcategory into three treatability groups). If a waste is classified as D001 because it fits under more than one D001 subcategory, the waste must be treated by a treatment method or treatment methods that will remove all characteristics of ignitability for each applicable subcategory.

(1) *Ignitable Liquids Subcategory.* The first D001 subcategory, the Ignitable Liquids Subcategory, refers to those D001 wastes that exhibit the properties listed in § 261.21(a)(1). Commenters specifically questioned whether the determination of liquid under § 261.21(a)(1) was based on the paint filter test ("free liquid" Method 9095), the EP test (Method 1310), or the releasable liquids test in Method 9096. While the Agency has defined liquids both as materials expressed from wastes in Step 2 of Method 1310 (EP), and in Methods 9095 and 9096, there is not a specific definition of liquid with respect to this characteristic in the regulations. Therefore, the generator of a potentially ignitable waste may use any method for determining whether the waste is classified as a liquid for which he can provide an appropriate scientific or technical justification.

One commenter requested clarification regarding the D001 liquid exclusion for aqueous alcohol wastes which is found in 40 CFR 261.21(a). This provision states that a solid waste exhibits the characteristic of ignitability if "it is a liquid, other than an aqueous solution containing less than 24 percent alcohol by volume, and has a flash point less than 60 °C (140 °F) * * *" The Agency notes that, in this definition, the term alcohol refers to any alcohol or combination of alcohols. (**Note:** If the alcohol has been used for solvent properties and is one of the alcohols specified in EPA Hazardous Waste No. F003 or F005, the waste must be coded with these Hazardous Waste Numbers (which cover the hazard of ignitability).)

Data indicate that the majority of all D001 wastes generated fall into the D001 Ignitable Liquids Subcategory and are typically described as solvents, paint thinners, contaminated oils, and various organic hydrocarbons. Some of these wastes may contain organic constituents that are potential carcinogens or otherwise toxic. Typically, the major organic constituents in these wastes are volatile, flammable hydrocarbons or oxygenated hydrocarbons that provide the characteristic of ignitability to the waste (i.e., a flash point of less than 140 °F). (**Note:** Currently, the length of time over which combustion is sustained at a temperature of less than 140 °F is not specified although such a regulatory change may be appropriate in the future. This issue assumes relevance when considering the large volume of solvent-containing wastewaters that flashes but does not sustain combustion.)

For purposes of BDAT determination, most of the ignitable liquid wastes are typically classified as nonwastewaters because of their high organic content (usually greater than 1 percent TOC). Technologies applicable for treatment of these organic nonwastewaters include incineration, fuel substitution, and recovery processes such as distillation or liquid-liquid extraction. Thermal destruction technologies such as incineration and reuse as a fuel completely remove the characteristic of low flash point by completely destroying the volatile organic compounds (VOCs), thereby rendering the waste nonignitable. Recovery processes also remove the characteristic but recover the ignitable material for reuse instead of destroying the material. Furthermore, the Agency believes such technologies are both demonstrated and available because EPA has data showing that the majority (i.e., 75%) of D001 Ignitable Liquids are already treated by incineration, reused as a fuel substitute because of their high BTU content, or recovered for reuse through processes such as distillation. Based on the fact that these demonstrated, available technologies remove the characteristic of ignitability permanently and completely, as well as destroying a number of hazardous constituents, EPA proposed a treatment standard of "Incineration, Fuel Substitution, or Recovery as Methods of Treatment" for D001 nonwastewaters in the Ignitable Liquids Subcategory (54 FR 48420).

At the time of proposal, the Agency was unable to determine whether any D001 wastes in the Ignitable Liquids Subcategory, as initially generated, conformed to EPA's regulatory definition of wastewaters (i.e., wastes containing less than 1 percent TOC and 1 percent TSS). Accordingly, EPA did not believe that wastewater treatment technologies such as biodegradation were applicable for treatment of any waste forms in the D001 Ignitable Liquids Subcategory because of the high organic contents and large BTU values thought to be inherent in these wastes, as well as the concern for air emissions caused by the release of untreated VOCs during dilution and aeration steps associated with most wastewater treatment technologies. Consequently, EPA proposed that the standard for nonwastewaters apply to any wastewaters as well, since the end result would be the removal of the ignitability characteristic and destruction of the hazardous constituents. See 54 FR 48420–22.

Concerning the issue of wastewater generation, the Agency received many comments indicating that there are wastes in the D001 Ignitable Liquids Subcategory that consist primarily of water. The commenters also emphasized that most of these low-organic, aqueous D001 wastes are best treated using wastewater treatment technologies even though such aqueous streams may contain greater than 1 percent TOC and may thus be classified as nonwastewaters. With respect to wastewater treatment technologies being appropriate methods of treating aqueous ignitable wastes, some commenters said that biological treatment is applicable for some of the D001 aqueous wastes that contain water-soluble organics. Other commenters indicated that wet air oxidation and carbon adsorption are also applicable forms of treatment for D001 aqueous wastes. Nonetheless, the Agency is still concerned about possible air emissions associated with the aeration and dilution steps that are often part of wastewater treatment processes such as biodegradation. However, EPA believes that such emissions can be controlled by altering operating parameters (e.g., aeration rates, temperatures) and by performing process steps such as aeration and dilution steps in controlled environments such as tanks equipped with air pollution control devices. The Agency believes some facilities are already practicing these precautions. For example, one commenter mentioned a biodegradation system used to treat D001 that was anaerobic and kept any air emissions contained inside the system.

After evaluation of all the appropriate waste characterization data and treatment performance data presented in the comments, the Agency decided that wastewater treatment technologies

that are capable of providing legitimate treatment for such aqueous wastes do exist. Next, EPA investigated information about technology treatment capabilities corresponding to the organic and water contents of wastes. For example, the Agency has information indicating that incineration is generally applied to those wastes having greater than 10 percent organic content and that technologies such as air stripping, wet air oxidation, and solvent extraction can be applied to streams containing up to 10 percent organic content. Using this information, along with the Agency's regulatory definitions of wastewaters and nonwastewaters, EPA determined that the D001 Ignitable Liquids Subcategory should be further subcategorized by division into three treatability groups as follows: (1) D001 Ignitable Liquids High TOC Nonwastewaters, (2) D001 Ignitable Liquids Low TOC Nonwastewaters, and (3) D001 Ignitable Liquids Wastewaters.

The Ignitable Liquids High TOC Nonwastewater Subcategory is defined as ignitable liquid wastes that contain greater than or equal to 10 percent TOC as generated. These wastes have large organic concentrations, high BTU content, and low water content. It is common practice to recover reusable organic materials from these wastes using processes such as distillation, steam stripping, and liquid-liquid extraction. Also, many of these wastes are excellent candidates for fuel substitution because of high BTU values. (Additional discussion on fuel substitution as a treatment method for these wastes is contained in the discussion of national capacity variances in section III.B.) The Agency is promulgating "Incineration (INCIN), Fuel Substitution (FSUBS), or Recovery (RORGS) a Method of Treatment" for this treatability group. See § 268.42 Table 1 in today's rule for a detailed description of the technology standard referred to by the five letter technology code in parentheses.

The Agency believes it appropriate to require that these wastes be treated by some type of destruction and recovery technology given that they often contain high concentrations of toxic organic constituents that provide the ignitability characteristic to the waste. The toxics in these wastes might not be destroyed if the waste could be land disposed so long as it is not ignitable at the point of disposal. Additionally, the Agency notes that this is an instance illustrating how a point-of-generation approach (i.e., the treatment method applies if the waste is in the treatability group when generated) ensures that the objectives of section 3004(m) are satisfied. EPA also notes that if an Ignitable Liquids High TOC Nonwastewater is commingled with other waste streams, the entire mixture must be treated by one of the methods prescribed for Ignitable Liquids High TOC Nonwastewater Subcategory 268.41(b). This is an instance of how the rules seek to ensure that wastes are not commingled if the treatment method is not appropriate for each commingled waste. Put another way, commingling of Ignitable Liquids High TOC Nonwastewaters with non-incinerable wastes is normally a type of impermissible dilution. See 52 FR 25766 (July 8, 1987).

The Ignitable Liquids Low TOC Nonwastewater Subcategory is defined as wastes that contain greater than 1% but less than 10% TOC as generated. The Ignitable Liquids Wastewater Subcategory is defined as wastes that contain less than 1 percent TOC and less than 1 percent TSS as generated. The Agency believes that some of these wastes can be effectively treated (i.e., remove the characteristic of ignitability by either destroying or recovering the organic constituents that gave the waste its ignitable character) using technologies applicable for treatment of aqueous wastes. In some cases, these wastewaters and low TOC nonwastewaters may need to be mixed with other wastewaters to achieve an organic concentration desirable for proper operation of a treatment system for aqueous wastes. For instance, wastewaters destined for biological treatment are often commingled to achieve an organic concentration that is optimal for the microorganisms. Fuel substitution is not considered practical since wastes in both these categories generally do not have high BTU contents because they contain mostly water. Most of these wastes can be treated with wastewater technologies; however, incineration may also be applicable, especially for the Low TOC Nonwastewaters. EPA is promulgating "Deactivation (DEACT) to Remove the Characteristic of Ignitability" for both the Ignitable Liquids Low TOC Nonwastewater Subcategory and the Ignitable Liquids Wastewater Subcategory. See section 268 appendix VI of today's rule for a list of applicable technologies that used alone or in combination can achieve this standard. (See also § 268.42 Table 1 for a technical description of these technologies. A five letter code (acronym) for each technology has been established in order to simplify the tables.)

One commenter requested clarification on whether phase separation followed by recovery or use as a fuel of the organic phase could be considered a permissible type of deactivation treatment for ignitible wastes. EPA considers processes that separate an organic phase to be recovery (or in some cases pretreatment) and, hence, acceptable treatment provided the separated organic phase is reused or further treated by a technology that will remove the characteristic of ignitability. The aqueous phase would not require further treatment unless it still exhibited the ignitability characteristic (assuming the aqueous phase is not hazardous for any other reason). See also discussion of permissible switching of applicable wastewater and nonwastewater standards 54 FR 48383 (November 22, 1989). (Additionally, this is in keeping with the general principle established in these rules that determination of whether a characteristic waste achieves BDAT must be reevaluated whenever a treatment residual is generated. Put another way, each new treatability group is a new point of generation for a characteristic waste. See section III.D. below.)

EPA is aware that some D001 Ignitable Liquids have been shown to contain organic constituents that are also constituents in F001–F005 solvents. The Agency studied the option of transferring the standards for these constituents from the corresponding F001–F005 standards promulgated in the November 7, 1986, final rule (51 FR 40642). The Agency received comments for and against this option. However, the Agency believes that this option would create an unnecessary burden on the regulated community since the majority of D001 wastes in the Ignitable Liquids Subcategory should not contain these constituents and that most wastes containing F001–F005 constituents are probably cases of misclassification. Misclassifying F001–F005 waste as D001 is currently one of the largest enforcement issues in the RCRA program. Such misclassification is, of course, illegal and a serious infraction. It avoids the Congressionally mandated treatment standards for the prohibited solvent wastes. Indeed, solvents were the wastes Congress prioritized for prohibition and treatment. EPA believes, however, that the problem is best handled through enforcement rather than establishing treatment standards for the misclassified wastes because it seems an unreasonable burden to require generators of authentic D001 wastes to conduct the significant amount of testing and certification required under the land disposal

restrictions when it is likely that the constituents will not be present in most true D001 wastes. Therefore, the Agency is not promulgating concentration-based D001 treatment standards based on a transfer of F001–F005 data at this time, although it may reevaluate this decision in the future.

(2) *Ignitable Compressed Gases Subcategory.* The second subcategory, the Ignitable Compressed Gases Subcategory, refers to those D001 wastes that exhibit the properties listed in § 261.21(a)(3). The Agency has limited information on the generation and characterization of D001 wastes in this subcategory, but suspects that although these wastes are generated, it is unlikely that they require placement in any type of land disposal unit. The Agency believes that there are no gas cylinders containing compressed ignitable gases placed in surface impoundments and that it is physically impossible to dispose of them by means of deep well injection. Some cylinders containing D001 ignitable gases may be placed in waste piles; however, such placement of a container in a storage unit is not land disposal under section 3004(k). See 54 FR 48439. In addition, these types of cylinders are usually returned to distribution facilities to be refilled. The Agency does not intend to prevent short-term storage of cylinders prior to refilling.

The Agency proposed several options as treatment standards for compressed ignitable gases. The first option was that of recovery by direct reuse since, typically, the cylinders are directly refilled. The second option was incineration by venting the gas into an incinerator. The Agency proposed a treatment standard of "Recovery or Incineration of Vented Ignitable Gases" for these wastes.

EPA continues to believe that both incineration and recovery are applicable technologies for treatment of most compressed gases. However, several commenters presented information about the limitations of the proposed technologies and provided information about additional technologies that the Agency also believes to be applicable treatment methods for removing the characteristic of ignitability for this subcategory.

In regard to the feasibility of the recovery option, one commenter stated that it is viable within the compressed gas industry, except for cases such as cylinders that have defective valves, that have lost the identity of the manufacturer, that are lecture bottle size, or that are damaged. In any of these four cases, the contents in the cylinders must instead be treated. The commenter also stated that the most prevalent treatment method is to feed the ignitable gas into a furnace as a fuel source. The Agency did not propose fuel substitution as a method because EPA's knowledge about the use and suitability of these wastes as fuels was limited. However, the characterization data submitted during the comment period indicate that most of the waste gases currently treated by fuel substitution are gases that can be used efficiently and safely as fuels.

With respect to "incineration of vented gases" as a treatment method, EPA believes that there may be cases when it is preferable to vent the gas into an appropriate adsorbent material (e.g., water, solvents, activated carbon) and then to incinerate the adsorbed gas/adsorbent material combination to permanently remove the characteristic. Additionally, a commenter said that for small volume containers of ignitable compressed gases (e.g., aerosol cans of 18 oz. or less), the containers can be fed directly into the kiln and vented within the kiln itself by the melting of the small cans. The vented gases are then incinerated in the kiln or afterburner.

One commenter described a method of treatment for pyrophoric gases. Typical gases in this class include tributyl aluminum, dimethylzine, triethylborane, and tetramethylin. The commenter claimed that these gases, because of their air reactive characteristics, cannot be vented into an incinerator without considerable risk. The commenter's method of treatment for such gases has been by remote control penetration and detonation under a column of appropriate scrubbing solution.

Another method of treatment described by the commenters to deactivate the ignitable characteristic in some compressed gases is to chemically oxidize them in an aqueous medium. The commenters claimed that carbonyl sulfide and methyl mercaptans are efficiently treated by oxidation. Chemical oxidation and chemical reduction technologies include reactions with reagents in aqueous mediums that will oxidize or reduce the hazardous constituents.

The Agency believes that all these technologies can remove the characteristic of ignitability and is promulgating a treatment standard of "Deactivation (DEACT) to Remove the Characteristic of Ignitability" for the Ignitable Compressed Gas Subcategory. The Agency has established this standard to allow the regulated community the flexibility to use the "best" technology for the specific gaseous waste. See section 268 Appendix VI of today's rule for a list of applicable technologies that used alone or in combination can achieve this standard. (See also § 268.42 Table 1 for a technical description of these technologies. A five letter code (acronym) for each technology has been established in order to simplify the tables.) This treatment standard will apply to all forms of wastes in the Ignitable Compressed Gases Subcategory since the definitions of wastewater and nonwastewater do not apply to this group of wastes.

(3) *Ignitable Reactives Subcategory.* The third subcategory, the Ignitable Reactives Subcategory, refers to those D001 wastes that exhibit the properties listed in § 261.21(a)(2). These wastes are typically generated on a sporadic basis in low volumes and are characterized as primarily inorganic solids or wastes containing reactive materials. Ignitable reactive materials include reactive alkali metals or metalloids (such as sodium and potassium) and calcium carbide slags. Most of these are very reactive with water and will generate gases that can ignite as the result of heat generated from the reaction with water. Other reactive ignitable solids in this subcategory include metals such as magnesium and aluminum that, when finely divided, can vigorously react with the oxygen in the air when ignited.

There appears to be an overlap between wastes in this D001 subcategory and certain D003 (characteristic of reactivity) wastes. A close examination of the definitions in § 261.21(a)(2) for ignitable wastes and §§ 261.23(a) (2), (3), and (6) for reactive wastes reveals the distinction between these two groups. The key difference is in the definition of ignitable wastes, which states: " * * * when ignited, burns vigorously and persistently." This phrase implies that the hazard is due primarily to the ignition potential rather than to the extreme reactivity.

The Agency proposed a treatment standard of "Deactivation as a Method of Treatment" for wastes in the D001 Ignitable Reactive Subcategory. The Agency took this approach for these wastes since the hazardous characteristic is based on imminent hazard (i.e., ignition and violent reaction) rather than on other criteria such as levels of hazardous constituents and since technologies exist that can completely remove this characteristic.

Current management practices for some of these wastes, such as calcium carbide slag, involve controlled deactivation with water. Other D001 Ignitable Reactives, such as those containing reactive alkali metals

(sodium or potassium) are sometimes chemically deactivated using chemical oxidation or chemical reduction technologies. Several commenters stated that incineration is also an appropriate treatment method for these wastes. Additionally, other commenters have indicated that recovery technologies are applicable for some wastes in this subcategory. EPA also believes that stabilization is an established deactivation technique for safe and equivalent management of reactive ignitable materials since it accomplishes results equivalent to those of other technologies by isolating and encapsulating the pyrophoric metal fines and precluding conditions that could cause ignition or reaction of the material.

The Agency believes that chemical oxidation, chemical reduction, incineration, and recovery are all applicable technologies for waste forms in the D001 Ignitable Reactives Subcategory because these technologies will remove the characteristic of ignitability. However, the Agency believes that because of the diversity in physical and chemical forms of the wastes in the Ignitable Reactives Subcategory it is not possible to determine a "best" technology for all wastes. EPA is promulgating a treatment standard of "Deactivation (DEACT) to Remove the Characteristic of Ignitability" for the Ignitable Reactives Subcategory. See section 268 Appendix VI of today's rule for a list of applicable technologies that used alone or in combination can achieve this standard. (See also § 268.42 Table 1 for a technical description of these technologies. A five letter code (acronym) for each technology has been established in order to simplify the tables.) This treatment standard is established only for nonwastewaters since ignitable reactive wastes are described as being very reactive with water and hence cannot exist as wastewaters.

(4) *Oxidizers Subcategory.* The fourth subcategory, the D001 Oxidizers Subcategory, refers to those D001 wastes that exhibit the properties listed in § 261.21(a)(4) and meet the definitions in 49 CFR 173.151. Several commenters have asked for an elaboration of the oxidizer definition because the DOT definition is not definitive but rather lists examples of oxidizing compounds. EPA believes that D001 wastes in the Oxidizers Subcategory are primarily inorganic and include such things as waste peroxides, perchlorates, and permanganates. The Agency has very limited information on the generation and characterization of D001 wastes in this subcategory. Currently, generators must assess wastes for oxidizing hazards by considering known oxidizing constituents contained within the wastes, and by the definition as outlined in 49 CFR 173.151 which states:

> "An oxidizer for the purpose of this subchapter is a substance such as a chlorate, permanganate, inorganic peroxide, or a nitrate, that yields oxygen readily to stimulate the combustion of the organic matter."

In other words, the presence of *any* amount of the above substances does not indicate that a material is an oxidizer, rather one or more of these substances must be present in a quantity sufficient to yield oxygen and stimulate combustion.

The Agency believes recovery for reuse to be an applicable treatment for wastes in this subcategory since it is possible that certain aqueous solutions of waste oxidizers could be useful in the treatment of other hazardous wastes. These wastes must, however, be used as treatment reagents in tanks and not in surface impoundments because of the potential release of heat and volatile organics during the oxidation/reduction reactions (see 40 CFR 264.229 and 265.229).

Several commenters wrote about different technologies that are applicable to wastes in the oxidizer subcategory. One commenter generates calcium hypochlorite and trichlorocyanuric acid wastes that fit into the oxidizer subcategory. They are both off-spec or contaminated swimming pool chlorination chemicals. The wastes are normally generated as solids and routinely disposed of through deactivation by adding the material to large quantities of water (similar to its use in swimming pools). Following the deactivation, the waste is further treated in a wastewater treatment facility. During deactivation and treatment, there is no release of chlorine gas. EPA considers mixing with water followed by chemical treatment to be applicable for oxidizer wastes.

Additionally, the commenter pointed out that both hydrogen peroxide and nitric acid are oxidizers and that the standard treatment for these chemicals is dissolution in water followed by neutralization. In the case of nitric acid, the diluting in water is needed to prevent an adverse reaction. Other commenters use recovery and incineration as treatment methods. The Agency believes that all these technologies are applicable for treatment of oxidizer wastes since they will remove the characteristic of ignitability.

The Agency proposed a treatment standard of "Deactivation" for wastes in the D001 Oxidizers Subcategory. The Agency took this approach for these wastes since the hazardous characteristic of these wastes is based on imminent hazard. (i.e., oxidizers can react violently with organics or other materials and result in the rapid generation of fires) rather than on other criteria such as levels of hazardous constituents and since technologies exist that can completely remove this characteristic. EPA continues to believe that this standard is appropriate for wastes in the D001 Oxidizer Subcategory and is promulgating a treatment standard of "Deactivation (DEACT) to Remove the Characteristic of Ignitability" for the D001 Oxidizers Subcategory. See section 268 appendix VI of today's rule for a list of applicable technologies that used alone or in combination can achieve this standard. (See also § 268.42 Table 1 for a technical description of these technologies. A five letter code (acronym) for each technology has been established in order to simplify the tables.) This standard will allow the regulated community the flexibility to determine the "best" treatment based on the physical and chemical characteristics of the oxidizer wastes.

BDAT TREATMENT STANDARDS FOR D001 IGNITABLE LIQUIDS 261.21(a)(1)

[Nonwastewaters]—[High TOC Ignitable Liquids Subcategory—Greater than or equal to 10% total organic carbon]

Incineration (INCIN), fuel substitution (FSUBS), or recovery (RORGS) as a method of treatment*

BDAT TREATMENT STANDARDS FOR D001 IGNITABLE LIQUIDS 261.21(a)(1)

[Nonwastewaters]—[Low TOC Ignitable Liquids Subcategory—Less than 10% total organic carbon]

Deactivation (DEACT) to remove the characteristic of ignitability*

BDAT TREATMENT STANDARDS FOR D001 IGNITABLE LIQUIDS 261.21(a)(1)

[Wastewaters]

Deactivation (DEACT) to remove the characteristic of ignitability*

BDAT TREATMENT STANDARDS FOR D001 IGNITABLE COMPRESSED GASES 261.21(a)(3)
Deactivation (DEACT) to remove the characteristic of ignitability*

BDAT TREATMENT STANDARDS FOR D001 IGNITABLE REACTIVES 261.21(a)(2)
[Nonwastewaters]
Deactivation (DEACT) to remove the characteristic of ignitability*

BDAT TREATMENT STANDARDS FOR D001 OXIDIZERS 261.21(a)(4)
[Wastewaters and Nonwastewaters]
Deactivation (DEACT) to remove the characteristic of ignitability*

* See § 268.42 Table 1 in today's rule for a detailed description of all technologies referred to by a five letter technology code. See also part 268 appendix VI for a list of applicable technologies that used alone or in combination can achieve deactivation of ignitability.

c. Corrosive Characteristic Wastes

Paraphrasing the criteria for defining a D002 Corrosive waste (40 CFR 261.22), a waste can be a D002 waste if it is aqueous and has a pH less than or equal to 2; or it is aqueous and has a pH greater than or equal to 12.5; or it is a liquid and corrodes steel at a specified rate and temperature. EPA tentatively determined at proposal that these criteria translated into three subcategories, the Acid Subcategory, the Alkaline Subcategory, and the Other Corrosives Subcategory (54 FR 48422). In general, commenters supported this subcategorization of D002 wastes. Therefore, EPA is adopting this classification scheme in the final rule.

(1) *D002 Acid and Alkaline Subcategories.* The Acid Subcategory and the Alkaline Subcategory, refer to those D002 wastes that exhibit the properties listed in 40 CFR 261.22(a)(1) and are distinguishable by the appropriate pH specifications. The Acid Subcategory is defined as those wastes with a pH of less than or equal to 2.0, and the Alkaline Subcategory is defined as those wastes with a pH of greater than or equal to 12.5. Also by definition in § 261.22, D002 wastes in these two subcategories only include wastes which are considered to be "aqueous", due to the fact that standard pH measurements can only be performed in the presence of significant amounts of water (i.e., pH is the measure of the concentration of hydronium ions in water).

D002 wastes in the Acid Subcategory typically include concentrated spent acids, acidic wastewaters, and spent acid strippers and cleaners. Wastes in the Alkaline Subcategory typically include concentrated spent bases, alkaline wastewaters, and spent alkaline strippers and cleaners. These wastes represent a significant portion of all hazardous wastes generated by almost every industry.

EPA proposed a treatment standard of "Base Neutralization to a pH 6 to 9 and Insoluable Salts" for the D002 Acidic Subcategory (54 FR 48422). Likewise, EPA proposed a treatment standard of Acid Neutralization to a pH 6 to 9 and Insoluble Salts" for the D002 Alkaline Subcategory (54 FR 48422).

(i.) Comments Concerning the Proposed pH Requirements. Treatment of acids and bases is generally referred to as "neutralization". In the proposed rule, the Agency interpreted this to mean a pH range of 6 to 9. This range was selected based on a rounding off of the pH range found in fresh water aquatic ecosystems through natural carbonate/bicarbonate buffering (i.e., pH 5.5 to 8.5). While a "true" neutral pH is equal to 7, by proposing the pH 6 to 9 range, the Agency was recognizing that even in natural systems, pH can fluctuate significantly. Thus, the Agency's underlying premise was that treatment of corrosive wastes should result in a pH range (i.e., pH 6 to 9) that was referred to as "neutral".

In addition, the Agency expressed concern on whether a waste with a pH 2 to 6 could have a negative impact on the effectiveness of a clay liner in mitigating the mobility of hazardous constituents from surface impoundments. In fact, this was one of the major concerns of Congress with respect to the statutory land disposal restrictions imposed by HSWA on all hazardous wastes with pH less than 2. (See generally 52 FR 25760 through 25792 (July 8, 1987) where EPA codified these restrictions for all corrosive wastes (without specifically referring solely to D002 wastes.)).

EPA received many comments pertaining to the impact that the pH range of 6 to 9 would have on generators and treaters of D002 wastes. Commenters documented that enormous disruptions of existing wastewater treatment systems would occur if the standard were promulgated with the proposed pH restrictions. For example, every surface impoundment or injection well receiving commingled wastes (some of which were D002 corrosive wastes at the point of generation, but once commingled were above pH 2 (or below pH 12.5) and therefore no longer considered hazardous by section 261.22) that were outside of the pH 6 to 9 range would be in violation of the standard. This would effect thousands of such units (most of which are RCRA subtitle D units and hence not presently affected by RCRA subtitle C).

With regard to the proposed pH 6 to 9 requirement for underground injection units, several commenters stated that the proposed pH range would cause problems in many of the injection units and wells, because some metals tend to precipitate out of solution at these pH ranges resulting in plugging in either the injection unit itself or further inside the well. Commenters also stated that specific pH ranges are typically required in permits for many underground injection wells and are typically at levels less than pH 6 to ensure that the injected fluid flows properly through the injection zone without plugging.

Another commenter remarked that they treat an acidic D002 waste only to a pH of 4.5 prior to commingling with other wastes that require biodegradation. This is done in order to counter the production of alkaline ammonia during the biodegradation process, and thereby aids in maintaining a "neutral" pH in the biodegradation process.

Other commenters pointed out that a pH of 10 is often considered the optimum pH for removal of most metals from wastewaters and that requiring a pH of 6 to 9 would cause severe disruptions in most metals removal treatment systems. These treatment systems generally consist of chemical precipitation in tanks to remove metals followed by neutralization of the effluent in surface impoundments prior to discharge.

As a result of all of the comments on pH ranges mentioned above and for the reasons mentioned below, the Agency is not promulgating the proposed pH range of 6 to 9. While the Agency maintains that in some cases a pH of 6 to 9 may be considered desirable, the Agency believes the Clean Water Act, end-of-pipe, NPDES limitations will address these specific situations, where water quality issues are of concern (specifically where discharges of such neutralized wastewaters are into fresh water ecosystems). (**Note:** The Agency points out that pH is commonly already regulated for such discharges.)

The Agency also notes that liquids are not allowed in subtitle C landfills under section 3004(c). As mentioned by the

commenters (and discussed above), requiring a pH range of 6 to 9 before discharge to most surface impoundments will cause severe disruptions in existing treatment operations. Additionally, the Agency believes that its concern regarding the impact of corrosive wastes on the integrity of clay liners is addressed mostly by the statutory restrictions on a pH of less than 2. The Agency currently has little data on the impact that wastes containing pH of 2 to 6 may have on clay liners. Finally, regarding the proposed pH range, the Agency did not intend to interfere with optimum pH levels desired for treatment of metals in tanks, nor did it intend for these standards to interfere with other legitimate wastewater treatment operations (such as the biotreatment processes mentioned by the commenter).

(ii.) Comments Concerning the Proposed Acid and Base Requirements. EPA additionally proposed that "neutralization" of wastes in the D002 Acidic and Alkaline subcategories be accomplished specifically through the use of the corresponding neutralization chemicals (i.e., acids to neutralize the Alkaline Subcategory and bases to neutralize the Acidic Subcategory). As commenters quickly pointed out, almost all chemicals (including water which dissociates into hydronium and hydroxide ions) have some acid character and some basic character depending upon the reference chemical. That is what is historically been taught in academia as the "Lewis Acid Theory". The Agency never intended to dispute basic chemical theory, but was merely stating its preference to neutralize the corrosive characteristic of these wastes with chemicals that would result in an overall reduction in total dissolved solids in effluent (i.e., the use of these chemicals is coupled with the concept of the proposed requirement to create insoluble salts rather than the concept of neutralization to a specific pH). (See also the discussion on insoluble salts in the preamble discussion following this one.)

With respect to the use of these chemicals (i.e., acids and bases) to achieve the treatment standard, several commenters stated that it is not always necessary to use chemicals that are specifically identified as commercial acids or bases to achieve treatment of D002 wastes. In fact many facilities generate both acidic and alkaline wastes (often from different processes) and commonly use them to neutralize each other. This situation also occurs at commercial hazardous waste treatment facilities, ir that the facilities will take acid wastes from various generators and will neutralize them with alkaline wastes from other generators. In general, commercial acids and bases are used to complete the neutralization processes and often are used only for pH adjustment of the final wastewater discharges. Many commenters also pointed out that the mixing of D002 corrosive wastes with other wastewaters (even other acidic, noncorrosive wastes) will contribute to an overall neutralization due to the resultant change in pH. This is because pH is merely a measure of the concentration of hydronium ions (H^+) in water and is dependent upon the equilibrium constant for the dissociation of water into hydronium and hydroxide ions. As more water is present, the equilibrium will be shifted and thereby increase the pH; resulting in "neutralization." Because of this, EPA is specifically allowing mixing of D002 wastes with each other and with other wastewaters to remove the characteristic of corrosivity (i.e., resulting in a pH between 2 and 12.5). However, EPA's allowance of mixing wastes to remove corrosivity does not override other prohibitions on dilution of wastes for other purposes (i.e., this does not override other dilution prohibitions that may be applicable for other wastes).

Many commenters declared that incineration should also be allowed as treatment for D002 wastes, especially for organic acids, mixed D001/D002 waste streams, and other D002 wastes with organics. Pollution control devices on incinerators will remove corrosive gases from the burning of these D002 wastes. Alkaline scrubber waters are often employed in these air pollution control devices in order to neutralize acidic emissions. These scrubber waters are then further neutralized if necessary. The Agency agrees with the commenters that incineration is an applicable treatment method for some D002 wastes and is thus not precluding incineration as treatment of D002 wastes.

(iii.) Comments Concerning the Insoluble Salt Requirement. The Agency proposed that neutralization of wastes in the D002 Acid and Alkaline Subcategories should be required to result in insoluble salts. The reason was that the Agency felt that the overall dissolved solids loading on fresh water aquatic systems could be reduced by establishing such a standard, even though it would result in an insoluble sludge that would require landfilling. The Agency believed that such a standard would discourage the generation of D002 acids and alkaline wastes and thereby promote minimization/source reduction as well as recycling of acids (either directly or after some form of pretreatment). While the Agency maintains that the goal behind the proposed standard is consistent with national policy on waste minimization and the Agency's overall concerns on cross-media impacts of both hazardous and nonhazardous constituents on the entire environment, many commenters presented technical complications with the proposed requirement on insoluble salts that the Agency has found persuasive.

The Agency received numerous comments concerning this proposed requirement indicating that neutralization and formation of insoluble salts is either impractical or technically impossible for some of the most commonly used acids and bases that become D002 wastes (such as nitric acid, hydrochloric acid, sodium hydroxide, potassium hydroxide, other acid halides). Because the salts generated from the neutralization of these particular acids and bases are very soluble in water, the proposed requirement to generate insoluble salts would result in treatment with exotic chemicals in order to comply (if there are any methods at all to create insoluble salts). The Agency concurs with the commenters. This is further supported by the fact that almost all nitrate and chloride salts of the major metals are very soluble in water.

Other commenters stated that requiring the formation of insoluble salts often will negate the use of alkaline and acidic process wastes that are generated on-site for neutralization. This would in effect, result in double the volume of insoluble salts that would have to be disposed and use up valuable virgin commercial acids and bases that otherwise would not be needed. As stated in the preceding sections of this discussion on corrosive wastes, the Agency never intended to preclude such on-site neutralization with wastes, and agrees that this would probably result in an unnecessary use of virgin materials for waste treatment.

Additionally, one commenter points out that in many cases neutralization of D002 wastes that contain organics, is often a necessary pretreatment step fo other treatment processes (such as steam stripping, biological treatment and/or carbon adsorption) that remove or destroy the organics in the waste. If a sludge must be formed during the neutralization process, organic constituents that could have been destroyed or removed while in the wastewaters are instead being

transferred to the solid phase where they will be either disposed of untreated or where they may require treatment with incineration. The Agency shares the commenters concerns on treatment of organics in D002 wastes.

As a result, the Agency is withdrawing the requirement for neutralization to insoluble salts for wastes in the D002 Acid and Alkaline subcategories. In doing so, the Agency's concerns of using acids and bases to provide neutralization is a moot point.

(iv.) Promulgated Treatment Standards. For the reasons outlined in the previous discussions, the Agency is withdrawing the proposed treatment standards for D002 Acid and Alkaline Subcategories. The Agency considered promulgating a treatment standard as a specified technology, namely "Neutralization". However, the Agency found that in certain cases, "incineration" and "recovery" processes were also quite applicable to wastes in these subcategories.

In addition, many D002 wastes also are hazardous for other reasons, and may require that additional treatment processes be employed besides neutralization, incineration, or recovery. For example, a facility may have interpreted that biodegradation would have been precluded from use, for a D002 waste that also contained organics. Since biodegradation may have actually been a technically viable alternative for this waste, the facility would have had to submit a petition for a treatability variance. While the Agency probably would have granted it, the variance process would have created an unnecessary burden on both the regulatory and regulated community, and probably without incurring any additional protection of human health and the environment.

As a result, EPA is promulgating a general treatment standard for wastes in the D002 Acid and Alkaline Subcategories that allows the use of any appropriate treatment technology, namely: "Deactivation (DEACT) to Remove the Characteristic of Corrosivity". This means that the facility may use any treatment (including neutralization achieved through mixing with other wastewaters) that results in a pH above 2 but less than 12.5, and thereby removes the characteristic of corrosivity. See section 268 Appendix VI of today's rule for a list of applicable technologies that used alone or in combination can achieve this standard. (See also § 268.42 Table 1 for a technical description of these technologies. A five letter code (acronym) for each technology has been established in order to simplify the tables.)

EPA has adopted this standard, in part, to avoid the massive disruptions to wastewater treatment systems that would have resulted from the proposed standard (which impacts far exceeded any others that would have resulted under the proposed rule), and because the final standard does require the removal of the property of corrosivity. Corrosivity is not defined in the same way EP Toxic wastes are defined. Corrosivity is not based on a toxic constituent, where the environmental concern is mass-loading in the environment. With respect to the issue of toxics present in these corrosive wastes, EPA notes that if a corrosive waste also exhibits the toxicity characteristic, it must be treated to meet the treatment standard for the toxic constituent as well (see generally section III.A.1. of this preamble).

The Agency received many comments regarding non-liquid wastes that are corrosive and the applicability of treatment technologies for aqueous and liquid corrosive wastes to treat non-liquid corrosive wastes. The proposal did not specifically address corrosive solids because there is not a definition of corrosive solids in § 261.22 at this time. Until the Agency amends § 261.22 to include a definition for corrosive solids and promulgates a treatment technology, generators must prudently handle wastes with regard to known hazards. Although not required under current regulations, many generators of corrosive solids prefer to classify these wastes as D002 corrosives and choose waste management and disposal protocols accordingly in an added effort to protect the environment.

(2) *Other D002 Corrosives.* The third major subcategory is classified as the Other Corrosives Subcategory and is defined as those D002 wastes that exhibit corrosivity to steel as defined in § 261.22(a)(2). They often are nonaqueous corrosive wastes such as certain organic liquids, but can represent inorganic chemicals as well.

Wastes in the Other D002 Corrosives Subcategory are generated on a sporadic basis and generally in low volumes. The Agency suspects that these wastes are often identified as corrosive without performing the specified testing with steel (i.e., the corrosivity of the waste may be assumed due to the presence of known corrosive constituents). This may also be due, in part, to the high cost of testing and to the difficulties in identifying laboratories that are experienced in steel corrosion testing.

The physical and chemical characteristics of this group of wastes vary greatly. The wastes may be aqueous or they may be primarily organic. In addition, a large variety of corrosive chemicals may appear as constituents in this type of corrosive waste. Depending on the concentration of these corrosive chemicals, they may corrode SAE 1020 steel. Examples of chemicals that may contribute to corrosivity include ferric chloride. benzene sulfonyl chloride, benzotrichloride, acetyl chloride, formic acid, hydrofluoric acid, some catalysts, various resins, metal cleaners, and etchants. Highly concentrated acids that have no water may also be included in this subcategory, since pH measurements are not possible on these wastes.

Wastes in the Other Corrosives Subcategory are often treated by deactivating the corrosive constituents of the waste with an appropriate chemical reagent. Wastes that contain high concentrations of corrosive organics are often incinerated; however, due to the great variety of potential corrosive organics, the Agency does not believe that it should establish concentration-based standards based on incineration for these D002 wastes. Removal and recovery of either organic or inorganic corrosive constituents may also be applicable technologies, since recovery could extract the corrosive constituents until the waste itself is no longer corrosive to steel.

EPA proposed a treatment standard of "Deactivation" for D002 wastes in the Other Corrosives Subcategory. The Agency took this approach for these wastes since the hazardous characteristic is based on imminent hazard (i.e., the corrosivity to steel may cause rupture of a tank or container, thus releasing the contents either suddenly or through leaks) rather than on other criteria such as levels of hazardous constituents, and that technologies exist that can completely remove this characteristic.

EPA continues to believe that the proposed standard is appropriate for wastes in the D002 Other Corrosives Subcategory and is promulgating a treatment standard of "Deactivation (DEACT) to Remove the Characteristic of Corrosivity". See section 268 Appendix VI of today's rule for a list of applicable technologies that used along or in combination can achieve this standard. (See also § 268.42 Table 1 for a technical description of these technologies. A five letter code (acronym) for each technology has been established in order to simplify the tables.) This standard will allow the use of the "best" treatment based on the

chemical and physical characteristics of the waste.

BDAT TREATMENT STANDARDS FOR D002 ACID SUBCATEGORY 261.22(a)(1)
Deactivation (DEACT) to remove the characteristic of corrosivity*

BDAT TREATMENT STANDARDS FOR D002 ALKALINE SUBCATEGORY 261.22(a)(1)
Deactivation (DEACT) to remove the characteristic of corrosivity*

BDAT TREATMENT STANDARDS FOR D002 OTHER CORROSIVES 261.22(a)(2)
Deactivation (DEACT) to remove the characteristic of corrosivity*

*See section 268 appendix VI of today's rule for a list of applicable technologies that used alone or in combination can achieve this standard. See also § 268.42 Table 1 for a description of the technologies indicated by a five letter code.

d. Reactive Characteristic Wastes

According to 40 CFR 261.23, there are eight criteria for defining a waste as a D003 Reactive waste. Paraphrasing these criteria, a waste can be a D003 waste if: (1) It is unstable and readily undergoes violent changes without detonating; or (2) it reacts violently with water; or (3) it forms potentially explosive mixtures with water; or (4) when mixed with water, it generates toxic gases; or (5) it is a cyanide or sulfide bearing waste which under certain conditions can generate toxic gases; or (6) it is capable of detonation or explosive reaction if it is subjected to a strong initiating source or if heated under confinement; or (7) it is readily capable of detonation or explosive decomposition or reaction at standard temperature and pressure; or (8) it is a forbidden explosive, a Class A explosive, or a Class B explosive.

EPA tentatively determined at proposal that these eight criteria translated into five subcategories for D003 wastes (54 FR 48424). Commenters concurred with these classifications. The first subcategory is classified as the Reactive Cyanides subcategory and refers to those D003 wastes that exhibit the properties listed in § 261.23(a)(5) for cyanide. The second subcategory is classified as the Explosives subcategory and refers to those D003 wastes that exhibit the properties listed in §§ 261.23(a)(6) through 261.23(a)(8). The third subcategory is classified as the Water Reactive subcategory and refers to those D003 wastes that exhibit the properties listed in §§ 261.23(a)(2) through 261.23(a)(4). The fourth subcategory is classified as the Reactive Sulfides subcategory and refers to those D003 wastes that exhibit the properties listed in § 261.23(a)(5) for sulfide. The fifth subcategory is classified as the Other Reactives subcategory and refers to those D003 wastes that exhibit the properties listed in § 261.23(a)(1).

For all subcategories of D003 wastes except the Reactive Cyanides, the Agency believes that development of concentration-based treatment standards would be difficult because there are no known analytical tests that are specifically designed to measure the particular reactivity associated with each D003 treatability subcategory, nor is there a test that distinguishes the reactive chemical from the deactivated chemical.

The Agency solicited comments and data on the physical and chemical characterization of all five subcategories of D003 wastes. The Agency also requested comment on the applicability of chemical deactivation, incineration, and any other type of chemical or physical deactivation technology to these wastes.

(1) *Reactive Cyanides.* D003 wastes in the Reactive Cyanides Subcategory are by definition those cyanide-bearing wastes that generate toxic gases (assumed to be hydrogen cyanide) when exposed to pH conditions between 2 and 12.5, in a sufficient quantity to present a danger to human health and the environment (40 CFR 261.23(a)(5)). Commenters requested clarification of which analytical methods should be used to determine reactive cyanide and associated toxic gas liberation. EPA's approved analytical procedures can be found in SW-846 Vol. 1C, Chapter 7 which defines the characteristic and regulation of reactive wastes. Specifically, Section 7.3.3.2 describes the "Test Method to Determine Hydrogen Cyanide Released from Wastes" which outlines the correct procedure of hydrogen cyanide gas liberation from reactive wastes. Method 9010 is the analytical method for quantitatively determining reactive cyanide concentrations.

The reactive cyanide wastes typically are generated by the electroplating and metal finishing industries, and include mixed cyanide salts, cyanide solutions, and cyanide-bearing sludges. Most of the volume of all D003 wastes that are generated can be identified as wastes belonging to the Reactive Cyanides Subcategory. Reactive cyanide wastes are not typically placed directly in most types of land disposal units without treatment; however, it is possible that some untreated wastes are placed in surface impoundments.

Reactive cyanide wastes (like other reactive wastes) are already subject to special requirements prior to disposal in landfills, surface impoundments, and waste piles under existing regulations. Also, as a July 8, 1987 (the statutory deadline for the California list prohibitions), liquid hazardous wastes having a free cyanide concentration in excess of 1,000 mg/kg (ppm) were prohibited from land disposal. No one has suggested, however, that these existing regulations and prohibitions are sufficient to apply to the Reactive Cyanides Subcategory. The statute did not specifically identify the California list cyanides as D003 wastes, and furthermore, it did not specify a required method of treatment, nor did it establish the 1,000 mg/kg prohibition level as a "treatment standard".

The Agency believes that simple cyanides (e.g. NaCN, KCN) are more likely to react to liberate hydrogen cyanide gas since they are soluble and have weaker bond energies than complex cyanides (e.g., $Fe_3[Fe(CN)_6]_2$, $Ni[Fe(CN)]_2$, $Zn_2Fe(CN)_6$). Consequently, EPA believes that simple cyanide rather than complex cyanide is the cyanide form most likely to give a waste containing cyanide the characteristic of reactivity. Accordingly, the Agency believed at the time of proposal that most D003 nonwastewaters resembled wastes containing simple cyanides (i.e., F011, F012 and P030) rather than wastes containing complex cyanides (i.e., F006, F007, F008, F009). Treatment technologies applicable for treatment of D003 reactive cyanide wastes include electrolytic oxidation, alkaline chlorination and wet air oxidation.

The Agency proposed to transfer the treatment performance of simple cyanide nonwastewaters (i.e., mixture of F011 and F012) using electrolytic oxidation followed by alkaline chlorination developed in the Second Third final rule (54 FR 26594, June 23, 1989), the nonwastewaters in the Reactive Cyanides Subcategory (54 FR 48425). In other words, the Agency believed all D003 reactive cyanide nonwastewaters could be treated to a total cyanide level of 110 mg/kg and an amenable cyanide level of 9.1 mg/kg representing treatment of wastes containing simple cyanides (i.e., F011 and F012) instead of a total cyanide level of 590 mg/kg and an amenable

cyanide level of 30 mg/kg representing treatment performance of wastes containing complexed cyanides (i.e., F006–F009). For wastewaters in the Reactive Cyanides Subcategory, EPA proposed to transfer treatment performance from treatment of F006–F009 wastewaters using alkaline chlorination, since this is the best treatment data available to the Agency for wastewaters containing high concentrations of cyanides.

With respect to the transfer being valid, several commenters submitted data indicating that D003 wastes in the Reactive Cyanides Subcategory more closely resemble the wastes containing complexed cyanides rather than the wastes containing simple cyanides and that the proposed treatment levels were unachievable for some D003 wastes because of the presence of iron cyanide and other cyanide complexes. One commenter claimed that, in many cases, iron contamination in some D003 cyanide wastes is unavoidable due to normal process operation and that a threshold level of only 50 to 100 mg/kg of iron is required to result in formation of iron cyanide complex.

Based on the high iron contents shown to be present in some D003 cyanide wastes, the Agency believes that some D003 cyanide wastes may contain complexed cyanides and thus may not be treatable to the 110 mg/kg level. One commenter suggested that the Agency develop two treatability groups for nonwastewater forms in the D003 Reactive Cyanides Subcategory based on the concentration of complex cyanide present in the waste: one group for wastes containing mostly simple cyanides (i.e., less than 110 mg/kg complex cyanide) and the other group for wastes containing high concentrations of complexed cyanides (i.e., greater than 110 mg/kg complex cyanide). EPA believes that this concept, while desirable, may not be viable because of the analytical interferences caused by the complicated matrices of untreated wastes. Furthermore, the vast majority of characterization data submitted during the comment period seem to indicate that D003 nonwastewaters more closely resemble the F006–F009 nonwastewaters instead of the F011 and F012 nonwastewaters. Therefore, the Agency is promulgating a treatment standard of 590 mg/kg total cyanide and 30 mg/kg amenable cyanide based on the treatment of wastes containing complex cyanides (i.e., F006–F009 nonwastewaters) for nonwastewaters in the D003 Reactive Cyanide Subcategory.

For the wastewaters in the D003 Reactive Cyanide Subcategory, EPA proposed a treatment standard of 1.9 mg/l total cyanide and 0.1 mg/l amenable cyanide based on alkaline chlorination. Comments and data were received from Sterling Chemicals demonstrating that alkaline chlorination did not achieve those limits for D003. Further examination of categorical wastewater discharge standards, pursuant to the Clean Water Act, supported the inability of alkaline chlorination to achieve the proposed amenable cyanide level. EPA is promulgating an amenable cyanide standard of 0.86 mg/l based on the Metal Finishing categorical wastewater discharge standards. Data submitted by Sterling Chemicals demonstrated compliance with this limit. With regard to total cyanide, the Agency is reserving the standard for further analyses to resolve the substantial variation in total cyanide levels submitted by commenters and standards established for categorical wastewater discharges. In the interim, the amenable cyanide limit will insure that alkaline chlorination of equivalent BDAT technology is utilized to comply with the land disposal restriction for reactive cyanide D003 wastes.

The Agency has chosen a concentration based treatment level for wastes in the D003 Reactive Cyanide Subcategory rather than establish "Deactivation (DEACT) to Remove the Characteristic of Reactivity" for the following reasons: First, unlike the other characteristic wastes, the Agency can identify an indicator compound (i.e., cyanide) that is known to be present in all D003 reactive cyanide wastes and can analyze the indicator compound in wastewater and nonwastewater matrices with EPA-approved SW 846 analytical test methods. (See also section III.A.6.(a) of today's preamble for a further discussion of cyanide treatment standards for other wastes and a clarification of the analytical methodology for compliance with the promulgated standards.) Second, EPA believes most D003 cyanide wastes are generated from the same types of processes that generate the F006–F012 and P030 wastes and thus, are frequently of the same type, and present similar risks when land disposed as the listed wastes. EPA does not believe that Congress precluded the Agency from establishing the same treatment standards for the D003 wastes that have been established for the listed wastes (assuming, of course, that such standards are consistent with the command of section 3004(m) to reduce toxicity or mobility so that risks to health and the environment are minimized). Finally, the Agency suspects that some generators are currently misclassifying F006–F012 and P030 wastes as D003 reactive cyanide wastes. While this is primarily an issue for enforcement, the Agency is concerned that a less stringent standard would discourage proper identification of the F and P cyanide wastes.

The Agency realizes that reactive cyanide wastes treated to meet the promulgated standard may no longer exhibit the characteristic of reactivity (although the determination of reactivity can sometimes be difficult due to the non-quantified standard in § 261.23(a)(5)). The Agency believes this appropriate. As discussed in section III.D., the Agency sees no legal bar in establishing treatment standards that are below the characteristic level. Doing so is appropriate for these wastes because the reactivity characteristic does not evaluate the toxic nature of the wastes, because Congress specifically intended that cyanides be destroyed where possible (see statement of Senator Chafee, 130 Cong. Rec. S 9178–9 (July 25, 1984)), and because the Agency believes the similarity of most D003 wastes and the F006–F009 wastes warrants the same treatment standards for each in order to satisfy the section 3004(m) standard.

(2) *Reactive Sulfides Subcategory.* D003 wastes in the Reactive Sulfides Subcategory are by definition those sulfide-bearing wastes that generate toxic gases (assumed to be H_2S) when exposed to a pH between 2 and 12.5, in a sufficient quantity to present a danger to human health and the environment. Currently the accepted method for quantitatively determining reactive sulfides is outlined in SW–846, Vol. 1C, § 7.3.3.2 and in Method 9030.

The Agency is in the process of developing a quantitative threshold for toxic gas generated from reactive sulfide wastes. The interim value the Agency is considering is 500 mg of H_2S generated per kilogram of waste. Although this number is only an interim guideline for the purpose of BDAT determinations, the Agency proposed to use this number to identify the wastes in this subcategory (given the need for an objective means of determining the subcategory's applicability). The Agency received several comments stating that a test method should be finalized and a rationale published prior to setting this threshold as a numerical standard. EPA agrees with the commenters that for wastes in this subcategory the test method used in determining how much

gas can be released from a waste needs to be standardized before establishing a concentration based treatment standard with the test methods. Accordingly, the Agency's action today should not be viewed as redefining the characteristic for sulfide-bearing wastes.

Reactive sulfides may be treated and chemically converted to relatively inert sulfur, to insoluble metallic sulfide salts, or to soluble sulfates that can be removed or recovered. Some data indicate that these wastes can be treated by alkaline chlorination, specialty incineration, or other chemical deactivation techniques. The Agency believes that some of these wastes may also be contaminated with organic sulfides known as mercaptans. These malodorous chemicals are believed to complicate the treatment of these reactive sulfide wastes. It is believed that these wastes have posed particular treatment problems for the petroleum refining industry and the paper and pulp industry.

The Agency solicited waste characterization and treatment data that could potentially be used to develop treatment standards for these wastes. One commenter sent data demonstrating that treatment with chlorine dioxide is a very effective technology for destroying organic sulfides and mercaptans in petroleum wastes. Another commenter submitted stabilization data indicating that this treatment process can treat D003 reactive sulfide wastes by removing the characteristic. One commenter uses mercaptan-free and organic-free sulfide wastes to precipitate metals from wastewater. Another commenter uses a thermal process that converts sulfides to sulfates instead of sulfur oxides.

The Agency proposed a treatment standard of "Alkaline Chlorination, Chemical Oxidation, or Incineration Followed By Precipitation to Insoluble Sulfates" for the Reactive Sulfide subcategory. (**Note:** While alkaline chlorination is a form of chemical oxidation, the Agency did not want to specifically preclude the use of any particular oxidant.)

Because of the variety of treatment processes currently used to treat reactive sulfide wastes, the Agency is promulgating a treatment standard of "Deactivation (DEACT) to Remove the Characteristic of Reactivity" for nonwastewaters and wastewaters in the D003 Reactive Sulfides Subcategory to allow the treatment facility the flexibility to use the "best" technology for the particular waste stream. See section 268 Appendix VI of today's rule for a list of applicable technologies that used alone or in combination can achieve this standard. (See also § 268.42 Table 1 for a technical description of these technologies. A five letter code (acronym) for each technology has been established in order to simplify the tables.) The treatment standard is expressed as required methods of treatment rather than as a concentration-based standard because the Agency has not approved a standard analytical method for testing either sulfides or "reactive" sulfides in hazardous wastes or in treatment residues (however, as noted above, the Agency is working to develop a quantitative threshold for reactive sulfides). In the future the Agency may establish numerical standards for wastes in this subcategory.

(3) *Explosives Subcategory.* D003 wastes in the Explosives Subcategory are by definition those wastes that are capable of detonation or explosive reaction under various conditions, or are forbidden, Class A, or Class B explosives (according to 49 CFR 173.52, 173.53, and 173.88 respectively). Commenters expressed concern that many types of waste may fall into a potentially explosive classification, and requested a standardized procedure for making a reactivity determination to assist in the classification of explosive hazardous wastes. The Agency chose to rely on the current descriptive definition primarily because the available tests for measuring the various classes embraced by the reactivity definition suffer from some deficiencies.

In 1984, under an interagency agreement with the Bureau of Mines (BOM), OSW sponsored research on two test methods designed to determine whether a substance had explosive properties. However, in June 1985, the Agency issued Memorandum #7 (OSWER Dir. 9445.04(85)) that explained that the BOM test results were inconclusive, and in the interim, OSW supported the use of a battery of tests submitted by the U.S. Army to the Agency. Information on these Army tests can be obtained from the Office of Solid Waste's Methods Section (202–382–4770).

Wastes classified as D003 and belonging to the explosives subcategory, have typically been identified as being generated by the explosives industry and by the U.S. Department of Defense. While these wastes are not generated as frequently as the reactive cyanides, they are generated more often than all other reactive subcategories. Explosives are already subject to special requirements prior to disposal in landfills, surface impoundments, and waste piles under existing regulations. These explosive wastes are not typically placed in most types of land disposal units; rather, commenters have indicated that they can be treated by technologies such as chemical oxidation or incineration. Such treatments permanently remove the explosive characteristic of this D003 waste by thermal or chemical destruction of explosive constituents.

Incineration is an applicable technology for some D003 explosive wastes. Such units are not typically found at commercial incineration facilities. The Agency is aware that incineration units specially designed and fitted with explosion-proof equipment are currently used by the Department of Defense to treat explosive wastes. One commenter suggested that the Agency divide the explosive wastes into incinerable and nonincinerable wastes. EPA, however, could not make a determination of explosive wastes that could always be incinerated 100% of the time as generated.

The Agency proposed a general standard of "Deactivation" for the D003 Explosives Subcategory. By establishing this standard, the Agency is allowing the regulated community to use that treatment technology (e.g., incineration, chemical deactivation) that best fits the type of explosive waste. The Agency took this approach for these wastes since the hazardous characteristic is based on imminent hazard (i.e., explosivity) rather than on other criteria such as levels of hazardous constituents, and because technologies exist that can completely remove this characteristic.

Due to the large number of explosive formulations and the difference in applicable treatments (see Department of the Army Technical Manual TM9–1300–214, Military Explosives), the Agency continues to believe that the proposed standard is applicable for wastes in the D003 Explosive Subcategory and is promulgating a treatment standard of "Deactivation (DEACT) to Remove the Characteristic of Reactivity" for nonwastewaters and wastewaters in the D003 Explosive Subcategory. See section 268 Appendix VI of today's rule for a list of applicable technologies that used alone or in combination can achieve this standard. (See also § 268.42 Table 1 for a technical description of these technologies. A five letter code (acronym) for each technology has been established in order to simplify the tables.) This standard should provide treaters of explosive wastes the ability to use the "best" treatment technology based on the chemical and physical parameters of the explosive waste, and any safety considerations.

Several commenters have indicated that mixing with water or organic liquids (i.e., kerosene) may be necessary in some cases to reduce potential for explosion and thus, ensure safe handling and/or transportation for subsequent incineration or chemical treatment of explosive wastes. EPA is not restricting the use of this practice for any waste in the D003 Explosives Subcategory.

(4) *Water Reactive and Other Reactives Subcategories.* D003 wastes in the Water Reactive or Other Reactives Subcategories can be either organic or inorganic. Water Reactive D003 wastes as defined in 40 CFR 261.23(a)(2), (3), and (4) are either very reactive with water, or can generate toxic or explosive gases with water. These reactions are usually very vigorous and therefore difficult to control. Wastes considered to belong in D003 Other Reactives Subcategory exhibit the property listed in § 261.23(a)(1). Wastes in both of these subcategories are generated on a sporadic basis and generally in low volumes. These wastes are not typically placed in land disposal units nor are they placed in surface impoundments due to their violent reactivity.

The Agency has information suggesting that some water reactives are treated by incineration. During this thermal oxidation process, the reactive organic constituents are destroyed and the reactive inorganic constituents form less hazardous oxides. Other applicable treatment technologies include controlled reactions with water, chemical oxidation and chemical reduction. All the above-mentioned technologies can remove the characteristic of reactivity.

The Agency proposed a general standard of "Deactivation" for the D003 Water Reactives and Other Reactives Subcategories. The Agency chose this approach for these wastes since the hazardous characteristic is based on imminent hazard (i.e., potential violent reactions with water) rather than on other criteria such as levels of hazardous constituents, and that technologies exist that can completely remove these reactive characteristics.

Because of the diversity in physical and chemical forms of the waste in both subcategories, it is not possible to determine a "best" technology for all wastes. The Agency is promulgating a treatment standard of "Deactivation (DEACT) to Remove the Characteristic of Reactivity" for wastes in the D003 Water Reactives Subcategory and D003 Other Reactives Subcategory to allow flexibility in the selection of the "best" technology. See section 268 appendix VI of today's rule for a list of applicable technologies that used alone or in combination can achieve this standard. (See also § 268.42 Table 1 for a technical description of these technologies. A five letter code (acronym) for each technology has been established in order to simplify the tables.) For wastes in the D003 Water Reactives Subcategory, the standard is established only for nonwastewaters since these wastes are very reactive with water and thus cannot exist as wastewaters.

Several commenters have indicated that mixing with certain organic liquids (such as kerosene) may be necessary in some cases to reduce potential for violent reaction with water and thus, ensure safe handling and/or transportation for subsequent incineration or chemical treatment. EPA is not restricting the use of this practice for any waste in these D003 Subcategories.

BDAT TREATMENT STANDARDS FOR D003 REACTIVE CYANIDES—261.23(a)(5)

[Nonwastewaters]

Regulated constitutent	Maximum for any single grab sample, total composition (mg/kg)
Cyanides (total)	590
Cyanides (amenable)	30

BDAT TREATMENT STANDARDS FOR D003 REACTIVE CYANIDES—261.23(a)(5)

[Wastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/l)
Cyanides (total)	Reserved
Cyanides (amenable)	0.86

BDAT TREATMENT STANDARDS FOR D003 REACTIVE SULFIDES—261.23(a)(5)

Deactivation (DEACT) to Remove the Characteristic of Reactivity*

BDAT TREATMENT STANDARDS FOR D003 Explosives—261.23(a)(6), (7), AND (8)

Deactivation (DEACT) to Remove the Characteristic of Reactivity*

BDAT TREATMENT STANDARDS FOR D003 Water Reactives—261.23(a)(2), (3), AND (4)

Deactivation (DEACT) to Remove the Characteristic of Reactivity*

BDAT TREATMENT STANDARDS FOR D003 OTHER REACTIVES—261.23(a)(1)

Deactivation (DEACT) to Remove the Characteristic of Reactivity*

*See 40 CFR part 268 appendix VI for a list of applicable technologies that used alone or in combination can achieve this standard. See also § 268.42 Table 1 for a description of the technologies as referred to by a five letter code.

e. Effect of Treatment Standards on Disposal Provisions in 40 CFR parts 264 and 265 for Ignitable and Reactive Wastes

Management practices have been established for ignitable and reactive wastes in surface impoundments, waste piles, land treatment units, and landfills (see 40 CFR 264.229, 264.256, 264.281, and 264.312, as well as 265.229, 265.256, 265.281, and 265.312). The treatment standards finalized today for ignitable (D001) and reactive (D003) wastes will supercede the above-mentioned provisions and exclusions for permissable land disposal of these waste outlined in parts 264 and 265; therefore, the Agency is amending these sections to reflect the new regulations in part 268. Facilities handling ignitable and reactive wastes will have to comply with the promulgated treatment standards for these wastes in order to land dispose them.

f. EP Toxic Halogenated Pesticide Wastes

D012—EP Toxic for Endrin.
D013—EP Toxic for Lindane.
D014—EP Toxic for Methoxychlor.
D015—EP Toxic for Toxaphene.
D016—EP Toxic for 2,4–D
D017—EP Toxic for 2,4,5–TP (Silvex)

In the November 22, 1989 proposed rule, the Agency proposed two basic options for the treatment standards for EP Toxic halogenated pesticide wastes (D012, D013, D014, D015, D016 and D017) and solicited comments on these. In one option, the Agency proposed concentration-based standards that were based on the total composition of

these pesticides in treatment residuals. As a second option, the Agency proposed concentration-based treatment standards that correspond to their respective characteristic concentrations. As an alternative, the Agency stated that technology-based treatment standards could be established that would achieve treatment to below these characteristic levels.

(1) *Nonwastewaters.* EPA proposed concentration-based standards for the nonwastewater forms of D012, D013, D014, D015, D016 and D017 that were based on the analysis of total composition based on data that clearly indicated that the pesticide constituents of concern (or pesticides with similar physical and chemical characteristics) could be incinerated to detection limits as measured in ash samples. As noted in the proposed rule, the Agency believes that these total constituent concentration-based treatment standards based on incineration, are preferable to those in the second option (i.e., standards that correspond to their respective characteristic concentrations). The Agency contends that the total constituent concentration standards assure the public that these chemicals are being destroyed to the best levels that are achievable. This comports with the statutory policy of reducing the uncertainties inherent in hazardous waste land disposal as well as specific Congressional directives to destroy hazardous organic constituents, see, e.g., 130 Cong. Rec. S 9179 (July 25, 1984) (statement of Sen. Chaffee), and results in minimization of threats to human health and the environment.

The Agency has determined that it is prudent to require that these EP Toxic halogenated pesticide wastes be treated with the best demonstrated technology in view of their toxicity: they are probable carcinogens. Since data clearly indicate that incineration represents BDAT, the Agency gave serious consideration to establishing a technology-based treatment standard of "Incineration as a Method of Treatment" for the nonwastewater forms of these wastes. However, the Agency believes that other technologies besides incineration may be able to achieve an equivalent performance. As such, the Agency is promulgating concentration-based treatment standards for all EP Toxic halogenated pesticide nonwastewaters based on total composition rather than establishing "Incineration as a Method of Treatment".

Commenters offered very little opposition to the proposed nonwastewater standards based on analysis of total constituent concentrations, other than questioning the achievability of the standard due to differences in detection limits. Commenters submitted a limited amount of additional detection limit data for these pesticides in incinerator ash. The Agency has evaluated these additional detection limit data, along with the data used to propose the standards, in promulgating the standards for D012–D017 nonwastewaters in today's rule. The Agency believes that these data indicate that the promulgated standards are achievable, and detectable.

These nonwastewater standards are based on the analysis of total constituent concentrations. Some of the standards on their face appear higher than the characteristic levels. This is not the case, however, since the characteristic levels are based on levels in a leachate rather than total constituent analysis. Given the 20 to 1 dilution factor inherent to the TCLP (and the EP) protocol, it is apparent that none of the final treatment standards in fact exceed characteristic levels because none of them are 20 times higher than the characteristic level.

(2) *Wastewaters.* The Agency proposed one set of concentration-based standards for D012–D017 wastewaters based on detection limits of the pesticides as measured in scrubber waters. Just prior to proposal, the Agency completed its analysis of treatment performance data for wastewaters from various data sources. (See, generally, the discussion of the development of treatment standards for U and P wastewaters using these data in section III.A.5.(a)(1) to today's preamble.) As a result, the Agency proposed alternative concentration-based treatment standards for various wastewaters based on these wastewater treatment data. While the Agency did not specifically propose these as alternatives standards for wastewater forms of D012–D017, the Agency believes that these standards could have been promulgated, if it were not for circumstances discussed below.

Based on the aforementioned wastewater treatment data, the Agency has identified specific treatment technologies that are considered to be demonstrated on D012–D017 pesticide constituents (or pesticides with similar physical and chemical characteristics) and can achieve destruction of the pesticide constituents to below their respective characteristic levels. By adopting treatment methods for these wastewaters rather than concentration-based standards, the dilution prohibition attaches at the point of generation when these wastes are managed in Clean Water Act systems, and destruction of these constituents is assured. (See section III.D. of today's preamble.) As a result, concentrations below the characteristic levels will be achieved through the use of these treatment technologies rather than through the potential use of simple dilution. The Agency is therefore promulgating technology-based treatment standards for the D012–D017 wastewaters.

The Agency has identified incineration, wet air oxidation, chemical oxidation, carbon adsorption, and/or biodegradation as BDAT treatment technologies as BDAT for D012–D017 wastes, as discussed in EPA's Final Best Demonstrated Available Technology (BDAT) Background Document for U and P Wastes and Multi-Source Leachates (F039), Volume A: Wastewater Forms of Organic U and P Wastes and Multi-Source Leachates (F039) For which There Are Concentration-Based Treatment Standards. The technology-based standards are as follows: (1) Incineration and biodegradation have been specified as BDAT for D012 and D015 wastewaters; (2) incineration and carbon adsorption for D013 wastewaters; (3) incineration and wet air oxidation for D014 wastewaters; (4) incineration, chemical oxidation, and biological treatment for D016 wastewaters; and (5) incineration or chemical oxidation for D017 wastewaters.

BDAT TREATMENT STANDARDS FOR D012, D013, D014, D015, D016, AND D017

[Nonwastewaters]

Waste code	Regulated constituent	Maximum for any single grab sample, total composition (mg/kg)
D012	Endrin	0.13
D013	Lindane	0.066
D014	Methoxychlor	0.18
D015	Toxaphene	1.3
D016	2, 4-D	10
D017	2, 4, 5-TP	7.9

BDAT TREATMENT STANDARDS FOR D012 AND D015

(Wastewaters)

Incineration (INCIN) or Biodegradation (BIODG) as a method of treatment

BDAT TREATMENT STANDARDS FOR D013

(Wastewaters)

Incineration (INCIN) or Carbon Adsorption (CARBN) as a method of treatment

BDAT TREATMENT STANDARDS FOR D014

(Wastewaters)

Incineration (INCIN) or wet air oxidation (WETOX) as methods of treatment

BDAT TREATMENT STANDARDS FOR D016

(Wastewaters)

Incineration (INCIN) or chemical oxidation (CHOXD) or biodegradation (BIODG) as a method of treatment

BDAT TREATMENT STANDARDS FOR D017

(Wastewaters)

Incineration (INCIN) or chemical oxidation (CHOXD) as a method of treatment

3. Treatment Standards for Metal Wastes

a. Introduction

Metal wastes are hazardous wastes containing metals or metallic compounds such as inorganic metallic salts or organometallics. Certain F, K, U, and P wastes were listed specifically for the presence of metallic compounds. Additionally, a waste can be identified as a characteristic waste based on the concentration of one of eight different metals as specified in 40 CFR 261.24: arsenic, barium cadmium, chromium, lead, mercury, selenium, or silver (i.e., D004 through D011 respectively) at a concentration equal to or greater than the levels presented in 40 CFR 261.24 Table I—Maximum Concentration of Contaminants for Characteristic of EP Toxicity.

Treatment standards for most U and P metallic compounds are based on a quantitative analysis for the metal constituent only, and not for the specific U or P metallic salt (i.e., compound). The Agency received comments supporting this proposed approach and it agrees that regulation of only the metal constituents for these wastes will address the primary toxic hazard associated with these metallic compounds. (Except those few U and P wastes where the anionic species also poses a toxic hazard, such as for metal-cyanide salts.)

(1) *Development of Treatment Standards for Metals.* In today's rule, the Agency is promulgating treatment standards for several of the U and P wastes expressed as concentrations of specific metals. In general, performance data that are available from the treatment of various F and K wastes containing these metals have been transferred to these U and P wastes. Commenters also provided information and data to support the characterization and treatment of certain metal wastes. These data have been used in some cases to establish metal U and P treatment standards. (These comments and data are discussed in the preamble section pertaining to the specific metal waste, and are discussed in detail in the Response to BDAT-Related Comments Background Document.)

The Agency proposed a similar approach for characteristic metal wastes—i.e., transferring treatment data from F and K listed wastes to these D-coded wastes. Significant comments were received, however, describing potential problems associated with this approach that EPA finds persuasive. Commenters pointed to the fact that characteristic wastes may be generated in many different matrices and thus take any number of forms. A transfer of data from treatment of any one particular matrix would thus be unlikely to be routinely achievable unless the treatment data being transferred represented a waste more difficult to treat than any characteristic waste. The Agency has further determined that the data generally do not support the proposed transfer of concentration-based treatment standards from the specified listed wastes to these relatively non-specific characteristic wastes. The Agency found that the data and information submitted by the commenters further supported that certain matrices from particular industries (or particular waste types) appear to be so unlike the matrix of the listed waste (from which the Agency originally proposed to transfer treatment standards) that the treatment standard could not be achieved. All waste-specific comments are further addressed below in the sections pertaining to each metal, or in the Response to BDAT-Related Comments Background Document.

While there are certain treatability groups that are exceptions, the general approach for regulating metal wastes is as follows. The Agency is establishing treatment standards for arsenic, barium, cadmium, chromium, lead, and silver at a level corresponding to their respective characteristic levels. For most metals the data received by the Agency indicate that concentrations below these characteristic levels can be achieved through the use of either stabilization processes or vitrification; however, the exact concentration achievable by stabilization processes is apparently dependent upon the industry and processes from which the waste was generated. This is most likely due to the wide variability of other constituents (both organic and inorganic) present in the waste which interfere with the performance of stabilization.

The treatment standard for D010 selenium wastes is established at a level slightly greater than the characteristic level, because the Agency had only a limited amount of data on these wastes. In fact, the majority of information suggests that while there are relatively few generators of D010 wastes, most of them are recovering the selenium from them. Treatment standards for D009 mercury wastes with high concentrations of mercury are set as required methods of treatment. See also the discussion in section III.D. of this preamble.

(2) *Treatment of Organic Debris and Inorganic Solids Debris.* Comments were received indicating that many of the D004 through D011 characteristic metal wastes may be generated in organic matrices. Rather than set up specific organic treatability groups under each characteristic metal waste code, the Agency is stating as a matter of treatment policy that prohibited metal wastes that are generated as an organo-metallic or in an organic matrix can be incinerated (in accordance with the technical operating requirements of 40 CFR 264 or 265 Subpart O) to destroy the organo-metallic bond or the organic matrix containing the metal, prior to subsequent treatment of the ash (if necessary), in order to comply with a concentration-based standard or prior to application of the technology-based metal treatment standard. This includes characteristic metal wastes that are identified specifically as "debris". D004 through D011 wastes identified as debris that are comprised primarily of organic materials are referred to as "organic debris" (e.g., rags, paper, cardboard, clothes, gloves, paints, paint chips, wood, grubbing materials, blankets, hoses, bags, resins, plastic liners and PVC piping). (This does not preclude the washing or extraction of metals from "organic debris" that is only a characteristic wastes due to surface contamination (i.e., provided the residual "organic debris" is no longer a characteristic waste for metals). In fact, much of the D004–D011 "organic debris"

may be treatable by washing or extraction rather than incineration. However, incineration may be a preferred pretreatment when the "organic debris" are expected to contain organo-metallics or are otherwise impregnated with inorganic metal dyes or pigments (e.g., paints, paint chips, and/or resins)).

The Agency also received comments requesting that the Agency clarify the appropriate treatment for characteristic metal wastes that are identified as slags, glass, concrete, bricks, and other inorganic solid debris. They stated that these materials would probably have to be crushed or otherwise reduced in size prior to stabilization in order to comply with the D004 through D011 treatment standards. The Agency agrees that these as well as other similar wastes form a different treatability group, and is identifying this group of D004 through D011 wastes as the "inorganic solids debris" treatability group. Wastes in this treatability group are defined in § 268.2(a)(7) of today's rule as follows: "nonfriable inorganic solids that are incapable of passing through a 9.5 mm standard sieve that require cutting, or crushing and grinding in mechanical sizing equipment prior to stabilization, limited to the following inorganic or metal materials: (1) Metal slags (either dross or scoria); (2) glassified slag; (3) glass; (4) concrete (excluding cementitious or pozzolanic stabilized hazardous wastes); (5) masonry and refractory bricks; (6) metal cans, containers, drums, or tanks; (7) metal nuts, bolts, pipes, pumps, valves, appliances, or industrial equipment; and (8) scrap metal as defined in 40 CFR 261.1(c)(6). (**Note:** The 9.5 mm requirement on sieve is based on a similar requirement for pretreatment of samples that are to be analyzed using the TCLP. This size also approximates the size of small pebbles that are often incorporated into some forms of concrete.)

While the Agency is establishing a separate treatability group for these "inorganic solids debris", it is promulgating the same concentration-based treatment standards for these wastes as for other characteristic metal wastes. Thus, there are no separate treatment standards for inorganic solid debris D004 through D011 wastes appearing in today's rule. The Agency has determined, however, that there is a national capacity shortage for treatment of this treatability group. Therefore, the standards for D004 through D011 wastes do not apply to "inorganic solids debris" until May 8, 1992.

Several commenters suggested that treatment standards should not apply at all to these wastes; that no treatment technology is technically applicable to these wastes; and that these wastes should be allowed to land disposed as is. Other commenters pointed out that crushing processes create dust emissions or discharges to surface waters that may result in a significant increase in releases of toxic constituents to the environment. They pointed out that stabilization should not be necessary because of the relatively impermeable nature of these inorganic solids and that stabilization results in a significant increase in volume of waste to be land disposed.

While the Agency finds these comments persuasive, it is somewhat limited by RCRA section 3004(m) into developing treatment standards for these wastes, since absent a treatment standard, the statutory land disposal prohibition applies. However, from a purely common sense standpoint, it may make little sense to pulverize these relatively cement-like materials only to re-cement them again before land disposal. The Agency believes today's actions provide the opportunity to revisit these standards during the two-year national capacity variance and to address these commenters concerns in greater detail. In addition, the Agency points out that many of these same issues will be addressed in a forthcoming proposed rule for soil and debris.

(3) *Reexamination of Proposed of Co-disposal Prohibitions.* EPA requested comments at proposal on whether it should establish requirements under 40 CFR parts 264 and 265 for certain chemical species of arsenic, selenium, and mercury. The proposed requirements called for segregating certain wastes containing these metals in monofills or in separate cells within landfills, and for prohibiting the addition of alkaline materials to these wastes. These proposed requirements were the result of available data showing that the solubility of certain metal species is likely to increase under alkaline leaching conditions as compared to their relative insolubility under acid conditions (see 54 FR 48430, 48441). Several comments were received addressing this issue, most of which stated that specific co-disposal requirements are not needed at this time because operators of landfills must monitor leachate collection systems for the migration of metals. Other commenters pointed out that some operators of landfills already segregate these particular metal-bearing wastes as part of their waste analysis plan, and such requirements should be made on a site- and waste-specific basis. In addition, vendors of specialized stabilization materials submitted data that show some promise in treating low concentration of these alkaline-soluble metal species.

EPA finds these comments persuasive and is therefore not promulgating its proposed co-disposal prohibitions for wastes containing arsenic, selenium and mercury. Additional information is necessary to develop a comprehensive national prohibition standard for these wastes. EPA also concurs with commenters that permit writers can effectively address these co-disposal prohibition requirements on a case-by-case basis under the omnibus authority in RCRA section 3005(c)(3).

b. Arsenic

D004—EP toxic for arsenic
K031—By-product salts generated in the production of MSMA and cacodylic acid.
K084—Wastewater treatment sludges generated during the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.
K101—Distillation tar residues from the distillation of aniline-based compounds in the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.
K102—Residue from the use of activated carbon for decolorization in the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.
P010—Arsenic acid
P011—Arsenic (V) oxide
P012—Arsenic (III) oxide
P036—Dichlorophenylarsine
P038—Diethylarsine
U136—Cacodylic acid

These wastes are grouped together because they all contain arsenic as the primary hazardous constituent. Like other metals arsenic exhibits a positive valence state; however, it shows little tendency to exist as solitary cationic species in aqueous matrices. Arsenic typically exists in aqueous conditions as oxo-anions (e.g., arsenic appears primarily as anionic arsenite (AsO_2) or arsenate (AsO_4^{-3})). This behavior is important, because selection and performance evaluation of treatment technologies for other metals are based primarily on the cationic behavior of the metals in aqueous conditions (i.e., wastewaters and leachates). Thus, treatment technologies for wastewaters and nonwastewaters containing arsenic are often different from technologies for wastes containing only other metal constituents.

(1) *Nonwastewaters.* To identify the technologies that are applicable for

treating metals in nonwastewaters, the Agency evaluates treatment technologies that either reduce the leaching of the metals or recover the metals for reuse. The Agency identified stabilization technologies (e.g., cement, asphalt, vitrification), and recovery as potentially applicable technologies for treatment of arsenic present in nonwastewater matrices.

(a) Inconclusive Stabilization Performance Data. EPA has relatively inconclusive performance data for stabilization of arsenic in three different wastes using nine different binders. Analysis of these data indicates that the effectiveness of any particular stabilization binder appears to be highly dependent upon the waste types. This result is what might be expected giving the chemical nature of arsenic (see preceding discussion of arsenic chemistry) and the relative sensitivity of the effectiveness of stabilization processes with respect to the presence of organics and organo-metallics.

Data on a K031 waste with an untreated leachability of 533 mg/l (based on analysis of an EP extract) indicate that the leachability of arsenic decreases somewhat for all binders. The best results were obtained from asphalt stabilization, which provided reductions to 25.3 mg/l (EP). Data on a D004 waste identified as an arsenic sulfide waste show an increase in leachability when cement, silicate polymer, clay, and polyethylene binders are used. However, data on this waste using an asphalt binder indicated a reduction in leachability of arsenic from 41 mg/l to 1.7 mg/l (EP). Data and information on a smelter dust that leaches aresenic indicate that cement binders can increase the leachability of the arsenic, while silicate polymers and asphalt binders decrease the leachability. However, these data do not contain operating information (e.g., binder to waste ratios) or QA/QC information.

The Agency has also tested cement, lime/fly ash, and kiln dust stabilization on K031 nonwastewaters that when untreated contain more than 130,000 ppm total arsenic and leach 5,930 mg/l (based on analysis of a TCLP extract). Some of the TCLP data on the K031 wastes that were "stabilized" with cement, appear to indicate an increase in arsenic leachability of 10 percent. The best results were achieved when the lime/fly ash binder was used, however, these data show minor reductions of arsenic from 5,930 mg/l to 4,687 mg/l in the TCLP extract.

Chemfix submitted performance data for a proprietary "alkaline stabilization system". These limited data show an acid production byproduct liquid waste (believed to be a D004) with 73,000 ppm total arsenic leaching 2.7 mg/l arsenic in the treatment residue TCLP leachate. No binder-to-waste ratios, binder additives or untreated TCLP concentrations were presented, making it difficult to assess the viability of this treatment process for all D004 nonwastewaters, in particular those arsenic wastes known to contain organics.

Data were submitted by the Hazardous Waste Treatment Council (HWTC) showing stabilization using proprietary reagents of a boiler stack residue designated D004, generated from the demolition of stacks and site closure of an electric utility. The reagents are added to induce cementitious, siliceous, and pozzolanic stabilization reactions. The solid waste was first slurried with tap water to facilitate reaction with the reagents. The data show reductions of arsenic in the TCLP leachate from 409 mg/l to 2.27 mg/l. The volume ratio of waste to binder was 1 to 1; consequently, the volume for disposal increased by 100 percent. The Agency is uncertain that this technology would be applicable for wastes containing organics or organic arsenicals.

Another commenter, Solidiwaste, submitted stabilization data for D004 arsenic sulfide wastes using a proprietary silicate-rich matrix under neutral or slightly alkaline conditions. Under these conditions, the arsenic sulfide may have been converted to an insoluble complex silicoarsenate compound. The data show an untreated waste containing 35,000 ppm total arsenic, which after treatment contains 0.08 mg/l arsenic in the TCLP leachate. The commenter did not submit TCLP data for the untreated waste, information concerning waste to binder ratios, or analytical QA/QC data. The Agency is also uncertain that this technology would be applicable for wastes containing organics or organic arsenicals.

(b) Performance Data Indicating Broader Applicability. The Agency received data from American NuKEM demonstrating that incineration and/or chemical oxidation followed by coprecipitation and subsequent stabilization is effective treatment for a variety of arsenic wastes. The Agency believes that the arsenic compounds treated by this procedure are first oxidized to the arsenate form by either thermal and/or chemical treatment. The arsenate, which ends up in the scrubber water (in the case of incineration) or in the wastewater (in the case of the chemical oxidation), is then coprecipitated with iron salts. (Note: The coprecipitation process is very pH dependent and even under optimum conditions the amount of ferric hydroxide generated is two to eight times the concentration of ferric arsenate precipitated.) The iron precipitate containing the arsenate is then stabilized with dolomitic lime.

Performance data submitted by American NuKem for their chemical oxidation wastewater treatment train described above indicate that a D004 arsenic sulfide waste containing 750,000 ppm total arsenic can be treated to 0.75 mg/l (TCLP). However, these data do not indicate whether the arsenic sulfide waste was significantly diluted prior to treatment. In addition, it is important to note that the stabilization step with dolomitic lime required careful control to avoid making the stabilized mass significantly alkaline, implying that the arsenic may have been quite leachable under alkaline conditions and thus, may not be truly "stabilized".

Performance data were also submitted by American NuKEM using incineration followed by treatment of scrubber water indicate that organo-arsenic wastes designated as a combined P011/D004 waste with concentrations up to 1,200 total arsenic can be effectively treated. The treatment facility states that essentially all of the arsenic compounds in the feed volatilize during incineration and are completely oxidized to arsenic oxides and ultimately to arsenate ions, which are removed by flue gas scrubbing using alkaline solution scrubbers with large liquid-to-gas ratios. As mentioned above, the scrubber water treatment (discussed in a subsequent discussion on treatment of arsenic wastewaters) consists of coprecipitation with iron salts and stabilization of the precipitate. No data on the characterization or treatment of the incinerator ash residual were submitted. Also, the commenter failed to provide untreated TCLP results or waste-to-binder ratios.

(c) Vitrification Performance Data. As an alternative to conventional stabilization processes such as cementitious stabilization for arsenic wastes, the Agency identified vitrification as technology that is applicable to nonwastewaters containing arsenic (54 FR 48431–33). Vitrification is a technology that uses heat generated by electrodes or direct flame to melt a mixture of glass formers and waste materials into a molten slag, which then cools and incorporates the metals and other materials into this glass/slag matrix. This technology can be applied to wastes containing organic as well as inorganic forms of arsenic since it operates at high temperatures

(1200 °C to 1500 °C) that will destroy the organics present in the wastes.

The Agency solicited and received comments on this stabilization technique for arsenic wastes. Several commenters said that vitrification is neither "demonstrated" nor "available" to treat arsenic-containing wastes. The Agency also received comments supporting the argument that vitrification can treat arsenic wastes effectively and that the units are available for sale. One commenter even conducted a study that determined that vitrification would provide a significantly better method of disposal than other stabilization processes for D004 arsenic sulfide wastes generated from phosphoric acid purification containing 2 to 3% total arsenic. This determination was made because the waste volume for disposal is reduced by more than 75%, even though fixation and fluxing agents were added, and the resultant product leaches arsenic levels less than 0.5 mg/l (TCLP). However, the commenter did not submit TCLP results on the untreated waste or analytical QA/QC data.

Other data available to the Agency indicate that vitrification can incorporate arsenic in concentrations up to 23.5% into a glass/slag matrix with a maximum leachability of arsenic at 1.8 mg/l (EP). In all, these data consist of 14 separate data points, with arsenic concentration in the untreated wastes ranging from 0.3% to 23.5%. Data on the treated (i.e., glassified) wastes ranged from 0.007 mg/l to 1.8 mg/l (EP). All of these data clearly indicate that vitrification can consistently achieve stabilization of arsenic to leachate levels below the characteristic level, 5.0 mg/l (based on EP). However, these data did not have any analytical QA/QC or any information about volume increases/reductions on the treatment residues.

Several commenters expressed concern about air emissions associated with the vitrification units. The Agency believes that these concerns are addressed because these devices will typically have to be permitted under 40 CFR part 264 subpart X and will therefore have to meet designated air permit requirements. In addition, one commenter said that to avoid arsenic loss due to vaporization, a special furnace configuration with a recycling vapor scrubbing system is being investigated for use with the facility's vitrification unit. Thus, the Agency anticipates that this technology currently under development will result in an additional safety precaution (with regards to potential air emissions) for this technology in the near future.

(d) Determination of BDAT for Nonwastewaters. For the proposed rule, the Agency determined that vitrification was the "best" technology for treatment of nonwastewaters containing arsenic. EPA made this determination based on the performance data available at the time of proposal. Most data that was then available appeared to indicate that conventional stabilization (e.g., cement) was not an effective technology for arsenic wastes since the stabilized wastes showed little reduction in arsenic leaching or leached more arsenic than the unstabilized wastes. In the proposed rule, the Agency requested that facilities submit data demonstrating treatment of arsenic nonwastewaters.

Several commenters submitted new data that appear to indicate that wastes containing high concentrations of specific inorganic forms of arsenic can be treated by stabilization using cement, silicates, and/or proprietary binder mixtures. Generally, these stabilization data are relatively inconclusive, due to the lack of necessary treatment performance data and to the relatively limited applicability of these stabilization processes to wastes containing organics or organo arsenicals. In addition, while the data do indicate low levels of leachable arsenic are obtained, in some cases the reductions may be attributed to dilution with the binders caused by undesirable high binder-to-waste ratios (resulting in considerable increases in the amount of waste to be land disposed). While the Agency believes that these stabilization technologies have considerable drawbacks, the data do appear to indicate that they may provide adequate treatment for some specific forms of D004 inorganic arsenic wastes. However, the Agency has not based BDAT treatment standards for all D004 wastes on these stabilization technologies. The Agency is not precluding their use, but cautions that their use should be determined on a case-by-case basis. At this time, the Agency cannot determine a separate treatability subcategory for D004 wastes for which these technologies could be used to establish treatment standards.

The technology that appears to have a broader applicability to wastes containing organics or organo arsenicals is the American NuKem process (i.e., the process where the arsenic is first thermally or chemically oxidized, coprecipitated with iron or aluminum salts, and then stabilized in an insoluble form such as ferric arsenate). Unfortunately, this treatment may also increase the amount of waste for land disposal because of the large amounts of ferric hydroxide that may be precipitated with the ferric arsenate. However, because of the broader applicability of this technology, the Agency considered this process to be an alternative technology to vitrification for K031, K084, K101, K102, P036, P038, U136 and D004 wastes containing organics and organo arsenicals.

The Agency still believes that vitrification represents the "best" technology because the data support treatment of arsenic present at percentage concentrations along with volume reductions for land disposal. The Agency also believes that incineration or complex chemical treatment followed by stabilization may work for some forms of arsenic in some wastes, but the increases in volume for disposal make this technology less desirable than vitrification.

(e) Treatment Standards for Nonwastewaters. The Agency used the vitrification data from the study that used EP toxicity testing to evaluate treatment performance. These EP leachate data were used to calculate the treatment standard because one of the fourteen data points represents a waste containing 23.5 percent arsenic whereas the vitrification data that were based on TCLP analyses represent a waste containing only 3 percent arsenic. EPA hence believes that the EP vitrification data demonstrate treatment of a waste matrix that is more difficult to treat.

EPA calculated the treatment standard for arsenic nonwastewaters based on the highest leachate data point of 1.8 mg/l for the matrix containing 23.5 percent arsenic. Analytical recovery data were transferred from the Agency's analysis of K102 incinerator ash (which had the appearance of a slag) were used to adjust the value for analytical accuracy. The adjusted value was multiplied by a variability factor of 2.8, and a concentration-based treatment standard for arsenic of 5.6 mg/l in the leachate (measured by the EP toxicity test) was calculated.

The Agency is transferring the concentration-based treatment standard of 5.6 mg/l in the EP toxicity leachate arsenic to K031, K084, P010, P011, P012, P036, P038, and U136 nonwastewaters, primarily due to similarities in total arsenic concentrations anticipated in these wastes when compared to the 23.5% total arsenic that was vitrified (i.e., the basis of the 5.6 mg/l standard). For example, waste characterization data indicate total arsenic concentrations of 0.1 to 18% for K031 and 10 to 25% for K084, with theoretical

arsenic content in the U and P wastes ranging from approximately 25% total arsenic in P036 to a maximum of 75% in P011. While some of these U and P wastes may contain percentage levels of arsenic greater than the amount in the untreated waste used to develop the treatment standard (i.e., 23.5 percent), the Agency believes that the arsenic content in these wastes are similar enough to transfer this standard. In addition, for such wastes, the Agency believes that more glass-forming reagents can be added to the molten slag/waste mixture during the vitrification process in order to achieve the promulgated treatment standard. Based on EPA's analysis of additional vitrification data, the Agency believes that the performance of the vitrification technology and analytic variability of treatment residues will not change significantly for different arsenic-containing wastes; thus, this transfer is legitimate.

For D004 nonwastewaters, EPA is promulgating the characteristic level of 5.0 mg/l arsenic as the treatment standard. The Agency has taken this approach because available data indicate that treatment below the characteristic level is achievable (albeit the extent is not readily ascertainable for the entire group of D004 wastes) and because of the concern for the potential regulatory disruptions and confusion that could be created by establishing a standard slightly higher than the characteristic level. In addition, given the statutory hard hammer, EPA would not establish a treatment standard at a higher level unless there clearly was a problem treating to the hard hammer level. Although the data are equivocal, the Agency does not believe that treatment to the characteristic level is unachievable. Furthermore, the Agency believes that persons will normally try to ensure that their waste no longer exhibits a characteristic in order to have less expensive subtitle D disposal, and also because these technologies cannot easily be "turned off" at precisely the characteristic level, so that the characteristic level will more readily be achieved.

Since the vitrification performance data that EPA used to develop the nonwastewater treatment standards for arsenic were EP toxicity leachate data, the Agency has based the nonwastewater standards on the arsenic concentration in the EP leachate. However, since the Agency has some information that appears to indicate that the TCLP test is more aggressive than the EP test for determining arsenic leachability, the Agency is establishing that if a waste does not achieve the arsenic nonwastewater standard based on analysis of a TCLP extract but achieves the standard based on analysis of an EP extract the waste is considered to be in compliance with the arsenic nonwastewater standard. Thus, a facility can use the TCLP test to demonstrate compliance for D004, and also K031, K084, K101, K102, P010, P011, P012, P036, P038, and U136 nonwastewaters.

(f) Comments Concerning Recovery. The Agency believes that for some wastes, recovery of arsenic may be feasible with high-temperature metal recovery technologies used by mining operations. Information available to the Agency indicates that arsenic trioxide recovered as a by-product of copper and gold mining operations has been used by the wood preserving industry as a raw material in the formulation of wood preservatives. Currently smelters located in the United States are not accepting hazardous wastes to recover arsenic trioxide; however, the idea is being investigated by a smelter located in Canada who is planning to market copper arsenate as a wood preservative in the Northwest. The plan, still under consideration, is to have the smelter accept back arsenic-bearing residues from the copper arsenate customers. The Agency requested comments and data on the applicability of recovery technologies for wastes containing arsenic. One commenter claimed that while recovery options may be technically viable, the current market does not make recovery of arsenic economical.

(2) *Wastewaters.* The Agency identified chemical precipitation technologies as applicable treatment technologies for arsenic-containing wastewaters. When evaluating precipitation technologies to determine BDAT for arsenic wastewaters, the Agency considered not only the efficiency of removal of these metals from the wastewater, but also the physical and chemical state of the arsenic that ends up in the wastewater treatment residues.

(a) Identification of BDAT. Wastewater treatment for most metals is typically based on precipitation with anionic species such as hydroxide or sulfide. Soluble arsenic species have been removed from wastewaters by using lime (calcium hydroxide) as a precipitant, resulting in arsenic precipitation as a calcium salt (calcium arsenate) rather than as a hydroxide as is typical for most other metals. Sulfide precipitation using sodium sulfide or hydrogen sulfide as reagents has also been reported as being partially effective for wastewaters containing arsenic in the form of arsenates, but relatively ineffective for arsenites. While arsenic sulfide is relatively insoluble in water under acid conditions, information indicates that the leachability (*i.e.*, solubility) of the arsenic sulfide increases under alkaline conditions. Additionally, coprecipitation with iron salts generates a relatively insoluble ferric arsenate precipitate, but the nature of the reaction also generates ferric hydroxide, which causes an increase in sludge volume for disposal.

The Agency solicited comment on whether it should specify the precipitating reagent for all wastewaters containing arsenic as part of the treatment standard. Commenters said that the Agency should not specify which reagents should be used to precipitate arsenic from wastewaters because the chemical matrix of each wastewater is unique and therefore each wastewater should be evaluated individually to determine the appropriate reagent for removing arsenic. Based on the diversity of waste characterization data for the arsenic wastes, the Agency agrees with the commenters and is not specifying precipitating reagents.

(b) Standards for Arsenic-Containing Wastewaters. In the proposed rule, the Agency based a treatment standard of 0.79 mg/l arsenic for all D004 wastewaters on performance data demonstrating the precipitation of arsenic from wastewaters identified as D004 from the veterinary pharmaceutical industry. The treatment system consisted of precipitation using lime followed by manganese sulfate and ferric sulfate in a three-stage alkaline process. The untreated wastewater data were for a waste consisting of a mixture of organo-arsenicals and inorganic arsenic compounds in concentrations up to 1,600 ppm. At the time of the proposed rule, the Agency believed that these data represented a D004 wastewater matrix that would be the most difficult to treat.

Some commenters have indicated that they cannot treat to the proposed levels because some D004 wastewaters require more extensive treatment trains in order to treat other metals, and also contain organics, which interfere with the treatment of the arsenic. One commenter described a treatment process that required a reduction step for hexavalent chromium and an oxidation step with peroxides or permanganates to treat the organo-arsenicals. Reduction of the chromium is required to precipitate chromium

hydroxide at high pH. The addition of oxidizing agents to destroy the organo-arsenical compounds will reoxidize the trivalent chromium to hexavalent chromium, and consequently the chromium will be leachable from the waste. This commenter requested that the Agency reconsider treatment to the characteristic level because experience indicates that a level of 5.0 mg/l can be achieved but not a level of 0.79 mg/l. However, the commenter submitted no data to substantiate this claim. Other commenters also indicated difficulty meeting the proposed level of 0.79 mg/l arsenic when treating scrubber waters containing arsenic and wastewaters containing hexafluoroarsenate compounds.

Based on the information in the comments, the Agency believes that it may not be possible for all generators of D004 wastewaters to meet a level of 0.79 mg/l arsenic. In addition, and more important, EPA has determined not to impose treatment standards below characteristic levels for characteristic wastewaters (i.e., is choosing to apply the prohibition at the point of disposal) in order to properly integrate Clean Water Act (CWA) programs with the RCRA land ban, and due to general protectiveness of class I nonhazardous UIC well disposal for dilute metals. Hence, EPA is promulgating a treatment standard of 5.0 mg/l arsenic for D004 wastewaters. It should be mentioned that EPA still believes precipitation to be BDAT for arsenic wastewaters because even a difficult to treat waste (i.e., the hexafluoroarsenate waste) shows a reduction in total arsenic concentration.

The constituents for which P010, P011, and P012 wastes are listed are all inorganic forms of arsenic. The constituents for which P036, P038, and U136 wastes are listed are all organic forms of arsenic. K031 and K084 are typically generated as process wastes that contain mixtures of both organic and inorganic forms of arsenic. Although all of these wastes are typically generated as nonwastewaters, the Agency expects that wastewater forms of these wastes may be generated from incidental spills or from the treatment process itself and thus require treatment standards. The Agency is transferring the D004 performance data and concentration-based treatment standard of 0.79 mg/l to K031, K084, P010, P011, P012, P036, P038, and U136 wastewaters. The Agency has chosen to transfer treatment performance from the treatment of the D004 veterinary pharmaceutical wastewaters because these wastewaters should contain similar organo-arsenical and inorganic arsenic compounds that can be removed by lime followed by manganese sulfate and ferric precipitation.

(3) *Revisions to K101 and K102 Treatment Standards.* In the First Third Final Rule (53 FR 31170, August 17, 1989), the Agency established two subcategories of K101 and K102 nonwastewaters based on the concentration of arsenic in the waste. A low arsenic subcategory was established for waste containing less than 1 percent arsenic and a high arsenic subcategory for waste containing 1 percent or greater. In today's rule, the Agency is changing the nonwastewater standards for K101 and K102 promulgated in the First Third Final Rule as proposed by eliminating the low and high level arsenic subcategories and by replacing the existing metal standards with a concentration-based treatment standard for arsenic of 5.6 mg/l (measured in the EP extract) based on the performance of vitrification. The organic standards will remain the same as those established in the First Third Final Rule.

The Agency is also promulgating new wastewater treatment standards for K101 and K102 in today's rule. Standards for K101 and K102 wastewaters were promulgated in the First Third rule (53 FR 31170, August 17, 1988) and were applicable to all forms of K101 and K102 wastewaters (i.e., they did not distinguish between high arsenic or low arsenic subcategories). These promulgated standards were based on the same D004 wastewater treatment data used in today's proposal to establish arsenic standards for other K, U, and P wastes. In the process of reevaluating the D004 wastewater treatment data for today's rule, however, EPA discovered an error in the calculation of the promulgated K101 and K102 wastewater standards for the metal constituents. The Agency is correcting this error by amending the wastewater standards for the metal constituents (arsenic, cadmium, lead, and mercury) in K101 and K102 as proposed. Therefore, a new treatment standard of 0.79 mg/l for arsenic, 0.24 mg/l for cadmium, 0.17 mg/l for lead, and 0.82 mg/l for mercury is being promulgated. Since there was no error in the calculation of the promulgated standards for the organic constituents, they are not being changed. The promulgated standards for the organics are being presented for convenience of the reader.

BDAT TREATMENT STANDARDS FOR D004

[Nonwastewaters]

Regulated constituent	Maximum for any single grab sample, EP leachate [1] (mg/l)
Arsenic	5.0

BDAT TREATMENT STANDARDS FOR D004

[Wastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/l)
Arsenic	5.0

BDAT TREATMENT STANDARDS FOR K031, K084, P010, P011, P012, P036, P038, AND U136

[Nonwastewaters]

Regulated constituent	Maximum for any single grab sample, EP leachate [1] (mg/l)
Arsenic	5.6

BDAT TREATMENT STANDARDS FOR K031, K084, P010, P011, P012, P036, P038, AND U136

[Wastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/l)
Arsenic	0.79

BDAT TREATMENT STANDARDS FOR K101

[Nonwastewaters [2]]

Regulated constituent	Maximum for any single grab sample, total composition (mg/l)	Maximum for any single grab sample, EP leachate [1] (mg/l)
Nitroaniline	14	NA
Arsenic	NA	5.6

BDAT TREATMENT STANDARDS FOR K101

[Wastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/l)
Ortho-nitroaniline	0.27
Arsenic	0.79
Cadmium	0.24
Lead	0.17
Mercury	0.082

BDAT TREATMENT STANDARDS FOR K102

[Nonwastewaters [2]]

Regulated constituent	Maximum for any single grab sample, total composition (mg/l)	Maximum for any single grab sample, EP leachate [1] (mg/l)
Ortho-nitrophenol	13	NA
Arsenic	NA	5.6

BDAT TREATMENT STANDARDS FOR K102

[Wastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/l)
Ortho-nitrophenol	0.028
Arsenic	0.79
Cadmium	0.24
Lead	0.17
Mercury	0.082

[1] The TCLP test can also be used to demonstrate compliance for these wastes.
[2] This removes subcategories based on high and low arsenic content.

c. Barium

D005 Characteristic Barium Wastes
P013 Barium Cyanide

The Agency proposed treatment standards for all D005 wastes (wastes containing 100 mg/l barium as measured in the EP leachate) as well as for all barium cyanide wastes listed as P013 (54 FR 48434). The proposed wastewater treatment standard for D005 and P013 was 1.15 mg/l, based on a limited amount of data from the EPA Office of Water's Effluent Guidelines program. The proposed nonwastewater treatment standard for D005 and P013 was expressed as a method of treatment, "Acid or Water Leaching Followed by Chemical Precipitation as Sulfate or Carbonate; or Stabilization". An alternative for all characteristic wastes was also presented, that of establishing the characteristic level as the treatment standard.

Because the proposed treatment standards were based on very limited data, the Agency solicited comments and data on waste characterization and treatment. Several data sets were received pertaining to D005 nonwastewaters. These data have been used in today's rule to support that D005 nonwastewaters can be treated to levels below the characteristic level of 100 mg/l. In most cases, however, the data were not adequate to support a specific treatment standard for D005 and P013 because they lacked QA/QC information, influent/effluent levels, or did not provide enough data points to be representative of these wastes. One data set was used, however, to establish today's final treatment standard for P013 nonwastewaters, as is further discussed in section (2) below.

Several comments were received on the proposed approach for regulating D005. No comments were received pertaining specifically to P013. Additional comments other than those addressed in this preamble were received on the proposed approach for regulating barium wastes. All comments and the Agency's responses are found in the Response to BDAT-Related Comments Document, in the RCRA Docket.

(1) *D005—Characteristic Barium Wastes.* Today's rule promulgates concentration-based treatment standards for all D005 wastes expressed as the characteristic level for barium, 100 mg/l. The Agency is adopting this approach because of the data deficiencies discussed above, and issues that were raised in the public comments that are discussed in the following paragraphs.

Several commenters requested that the treatment standard be set at the characteristic level. As mentioned above, the Agency received data for D005, all of which demonstrates treatment to below the characteristic level of 100 mg/l. Because D005 wastes are so diverse (in fact, an organobarium waste stream was identified by two commenters when the Agency primarily characterized this waste as an inorganic waste stream) and the data received during the comment period so inconclusive as to establishing a concentration-based treatment standard for all D005 wastes, the Agency is promulgating the characteristic level as the treatment standard. The Agency is confident, however, based on the data received, that treatment to achieve the 100 mg/l level is possible for both wastewater and nonwastewater forms of D005.

Many commenters requested that a concentration-based standard be established for D005 nonwastewaters rather than the proposed method of treatment. As explained above, this is the approach that is being promulgated in today's rule. The Agency prefers to set a concentration-based treatment standard rather than specifying a method of treatment because it allows the treater of any of the various forms of D005 maximum flexibility in the choice of treatment technology most appropriate for the waste. Additionally, some commenters disagreed with the proposed specification of precipitating reagents (i.e., precipitation as sulfate or carbonate). The Agency agrees that specifying precipitating reagents may cause unnecessary problems for the treatment industry in that treatment of barium often takes place in a waste stream containing other metals for which the specified reagent is inappropriate.

Commenters opposed the proposed D005 wastewater treatment standard as being unattainable, stating further that the 1.15 mg/l standard is overly restrictive because it is very close to the Agency's drinking water standard. Only one data point was received during the comment period for treatment of D005 wastewaters, not enough data to support a concentration-based standard for the diverse forms of D005 wastewaters. Additionally, some commenters disagreed with EPA's discussion of typical precipitation reagents suitable for D005 (and P013). The Agency has data indicating that barium is usually precipitated as a sulfate salt. Commenters expressed concern that the Agency should neither set precipitation as a required method of treatment for these wastewaters nor specify required precipitation reagents. The Agency is not promulgating a treatment standard expressed as a required method, and agrees that specifying precipitating reagents may cause unnecessary problems for the treatment industry.

(2) *P013—Barium Cyanide.* Today's rule promulgates barium treatment standards for P013, barium cyanide wastes. Treatment standards for cyanide in P013 were promulgated in the June 23, 1989 final rule for Second Third wastes (54 FR 26614).

Data was provided during the comment period on stabilization of D005 nonwastewaters that is being used as the basis of a treatment standard for barium in P013 nonwastewaters. Based on these data, a treatment standard of

52 mg/l has been calculated. Use of this data for P013 is justified even though it was not used for D005 nonwastewaters. As one of the "P" listings, P013 is a specific waste, while D005, a characteristic waste, may take diverse forms. Generally, the more specific P013 is expected to be characterized consistently. The data is appropriate for establishing a waste-specific treatment standard for P013 because the waste's properties are not likely to change. Therefore, the standard should be achievable for all P013 nonwastewaters.

No data were received during the comment period to set a treatment standard for P013 wastewaters. Commenters objected to the proposed 1.15 mg/l D005 wastewater standard as being unattainable, and the Agency is considering these comments applicable to P013 as well. Commenters also objected to the specification of precipitation reagents for D005 wastewaters. The Agency is therefore disinclined to establish a method of treatment (i.e., chemical precipitation with specified reagents) for P013 wastewaters. In the absence of any data on treatment of P013 wastewaters, therefore, the Agency is not promulgating a barium wastewater treatment standard. The cyanide in P013 wastewaters is regulated under the land disposal restrictions (54 FR 26614); therefore, P013 wastewaters will not be subject to the "hard hammer" (i.e., banned from land disposal on May 8, 1990).

BDAT TREATMENT STANDARDS FOR D005

(Nonwastewaters)

Regulated constituent	Maximum for any single grab sample TCLP leachate (mg/l)
Barium	100

BDAT TREATMENT STANDARDS FOR D005

(Wastewaters)

Regulated constituent	Maximum for any single grab sample (mg/l)
Barium	100

BDAT TREATMENT STANDARDS FOR P013

(Nonwastewaters)

Regulated constituent	Maximum for any single grab sample TCLP leachate (mg/l)
Barium	52

d. Cadmium

D006—Characteristics cadmium wastes.

Today's rule promulgates wastewater and nonwastewater treatment standards for D006 wastes. Comments and data were received asserting that it was not possible to meet the proposed treatment standards for D006 cadmium, which data EPA finds persuasive. Data are also insufficient to reliably establish a standard below the characteristic level that is generally achievable. Data were submitted during the comment period, however, indicating that the wastes can be treated to meet the characteristic level. Therefore, the Agency is promulgating the characteristic level of 1.0 mg/l cadmium (as measured by the TCLP) as the treatment standard for D006 nonwastewaters and wastewaters. EPA is also establishing an additional treatability group for cadmium batteries that are characteristic hazardous wastes. The standard for cadmium batteries is thermal recovery.

In the proposed rule, EPA proposed regulation of cadmium in D006 wastes at treatment levels below the characteristic level. Two commenters submitted performance data showing various wastes treated by different stabilization technologies (e.g., different chemical reagents) and data supporting that the proposed standards were unachievable. The data, however, showed that D006 wastes can be treated to meet treatment levels at or about the characteristic level of 1.0 mg/l for cadmium (as measured by TCLP for nonwastewaters) once the proper chemical reagents and waste to binder ratios are used. Based on these data, EPA is not finalizing the proposed treatment standards for D006 and instead, is promulgating treatment standards at 1.0 mg/l cadmium for both wastewater and nonwastewater (as measured by TCLP) forms of D006.

Some facilities submitted comments asserting that their wastes were unique or simply unable to meet concentration based treatment standards developed by the Agency and requested that EPA promulgate a method of treatment for their D006 wastes. These facilities failed to identify a method of treatment that may meet BDAT criteria or to provide adequate data that may enable EPA to assess the validity of their claims. As a result, these facilities' claims of not even being able to treat to the characteristic levels must be addressed (if at all) by requesting a treatability variance, as provided in 40 CFR 268.4.

EPA proposed that cadmium-containing batteries be a separate subcategory of D006 wastes. See 54 FR 48436, listing several examples of industries, manufacturing processes, or commercial users that generate cadmium batteries. The proposed rule called for batteries containing leachable cadmium above 1.0 mg/l (as measured by EP Toxicity) to be treated for cadmium recovery in thermal recovery units as a prerequisite for land disposal.

Commenters fully supported the Agency's determination that thermal recovery of cadmium represents BDAT for D006 wastes in the cadmium-containing battery subcategory. Their comments pointed out that these wastes are routinely treated in industrial furnaces such as smelters for the recovery of cadmium and other valuable metals.

Commenters asked the Agency to clarify in its final rule the status of residues from cadmium battery recycling operations. Cadmium is typically recovered in pyrometallic operations or by smelting (typically as a byproduct in zinc smelting operations). Batteries can also be broken to extract recoverable cadmium, which cadmium is then sent to thermal recovery. Residues from these various operations, including air pollution control sludges, thermal recovery furnace residues, and residues from battery breaking, are no longer in the cadmium-containing battery subcategory. If they continue to exhibit the characteristic for cadmium, however, they would still be prohibited wastes in the D006 treatability group and would have to be treated to meet the standard for that treatability group (i.e., treated so that they no longer exhibit the characteristic). Residues most likely to exhibit the characteristic for cadmium are the residues from battery breaking, and air pollution control residues from thermal recovery.

Commenters also questioned whether small consumer-type nickel cadmium rechargeable dry cell batteries were covered by the prohibition. EPA is making no determination in this rule whether such batteries are hazardous wastes. This is a question of fact based upon whether such batteries exhibit the EP characteristic when a representative sample of the battery is tested. In

addition, many of these batteries, even if hazardous, would be household hazardous wastes and thus are excluded from all subtitle C regulation (40 CFR 261.4(b)(1) and 268.1(b)).

BDAT TREATMENT STANDARDS FOR D006

[Nonwastewaters]

Regulated constituent	Maximum for any single grab sample TCLP leachate (mg/l)
Cadmium	1.0

BDAT TREATMENT STANDARDS FOR D006

[Wastewaters]

Regulated constituent	Maximum for any single grab sample (mg/l)
Cadmium	1.0

BDAT TREATMENT STANDARDS FOR D006

[Cadmium-Containing Batteries]

Thermal Recovery of Metals or Inorganics (RTHRM) as a Method of Treatment

e. Chromium

D007—EP Tox for Chromium
U032—Chromic acid (H_2CrO_4, calcium salt)

EPA is promulgating a treatment standard of 0.094 mg/l chromium (total), as measured in the leachate generated by use of the TCLP for nonwastewater forms of U032. The wastewater treatment standard for U032 is 0.32 mg/l chromium (total). For nonwastewater and wastewater forms of D007, EPA is promulgating a treatment standards of 5.0 mg/l chromium (total) (as measured by TCLP for nonwastewaters). A technical description of U032 and D007 can be found in the listing documents for each waste.

Several commenters objected to the proposal to regulate total chromium rather than hexavalent chromium in D007 and U032. They believe that EPA should only regulate hexavalent chromium since "EPA has recognized that only the hexavalent chromium presents a threat to humans and the environment * * *" The Agency is not persuaded by these arguments, maintaining that treatment of total chromium will provide the most effective regulation of hexavalent forms. These comments moreover improperly characterize the Agency's position, which is long-established, and is not being reopened for consideration in this rule. Under Subtitle C, EPA regulates on a total chromium basis unless it is demonstrated that chromium is exclusively (or nearly exclusively) trivalent, the chromium is generated from a process that uses only trivalent chromium, and that the waste is managed in non-oxidizing environments. See § 261.4(b)(6)(i) (1980). To date, EPA is unaware of any generator submitting a demonstration to EPA for processing. EPA repeats that it is not reopening this long-settled issue in this proceeding.

Detailed discussions of the development of treatment standards for D007 and U032 can be found in the final BDAT Background Document for these wastes in the RCRA docket.

(1) *D007.* EPA proposed concentration-based treatment standards for D007 wastewaters and nonwastewaters based on a transfer of treatment standards for K062. (K062 wastes are spent pickle liquors generated by the iron and steel industry.) This was because the chromium standards that were promulgated for K062 wastes were based on treatment of a mixture of K062 and other EP Toxicity wastewaters (including D007 wastes). The treatment process included hexavalent chromium reduction (to the trivalent state) followed by chemical precipitation, settling, filtering, and dewatering of solids. As an alternative, the Agency also proposed treatment standards for D007 wastes based on a transfer of chromium standards promulgated for F006 wastes (wastewater treatment sludges from the treatment of wastewaters from the electroplating industry). Treatment data for F006 wastes were based on the performance of conventional cementitious or pozzolanic stabilization.

(i) Wastewaters. Commenters indicated that the proposed levels for D007 wastewaters based on the transfer from K062 wastes (i.e., 0.32 mg/l) could not be achieved for the majority of their D007 wastes. In support of their position, they submitted ten specific sets of data on the treatment of various D007 wastes. However, these data primarily included treatment information with an emphasis on the nonwastewater residues and did not include very much data on the wastewater residuals. Data from one commenter supported their claim, but indicated that the characteristic level for chromium (i.e., 5.0 mg/l could generally be achieved. While these wastewater data were mostly above the proposed 0.32 mg/l standard for chromium, none of these data submitted could be used to support an alternative wastewater treatment standard that is below the characteristic level. Based on these data and for reasons outlined in section III.D. of today's preamble, the Agency is not promulgating the proposed treatment standard of 0.32 mg/l and, instead, is establishing the characteristic level (i.e., 5.0 mg/l) as the treatment standard for D007 wastewaters.

(ii) Nonwastewaters. Except for D007 refractory bricks (see discussion below), the majority of the commenters believed that the 0.094 mg/l TCLP standard based on a transfer from K062 wastes could not be achieved. However, the alternative standards proposed for D007 nonwastewaters (i.e., 5.2 mg/l TCLP based on the transfer from F006 and capping the standard at the 5.0 mg/l characteristic level) could be achieved on a routine basis. In support of their position, they submitted ten specific sets of data on the treatment of various D007 wastes. The Agency examined the quality and completeness of these data for the nonwastewater residues.

The Agency determined that eight of the ten data sets could not support the development treatment standards due to a significant lack of information on: influent concentrations, waste source descriptions, binder/waste ratios, treatment operating/design information, the existence of a pretreatment step (hexavalent chromium reduction), and/or quality assurance and quality control information. The Agency also determined that the other two data sets also have some deficiencies in the above criteria, but do represent similar treatment trains used to establish the chromium standards for K062 and F006. The Agency emphasizes that none of these ten data sets are as complete as the data for either F006 or K062.

In considering the usefulness of the two data sets that are more complete than the others, the Agency examined what treatment standards would have been if they were derived from these data. One data set (from Cyanokem) would have resulted in a standard of 0.86 mg/l and another data set (using only 10 of the more complete data points from the HWTC) would have resulted in a standard of 0.74 mg/l. (Note: Both are based on TCLP analysis.)

However, the HWTC data contained an additional 32 incomplete treatment data points (no untreated TCLP analyses), many of which could not meet the 0.86 mg/l or the 0.74 mg/l treatment standards. Assuming that these previously rejected 32 data points represent valid treatment, the Agency decided that both the 0.86 mg/l and the 0.74 mg/l standards calculated on just 20

data points were not achievable on a routine basis. The Agency found that it was difficult to ascertain (per treatment facility) the mixing ratios of waste volumes that were received from each of the different industries. While the data indicated that some wastes contained very high concentrations of chromium, the lack of information on mixing ratios and feed rates made it difficult to assess the true effectiveness of treatment (i.e., the Agency could not determine the chromium concentration of the mixed D007 wastes just prior to treatment.)

The Agency points out that the data from Cyanokem represented primarily treatment of liquid wastes (some with very high concentrations of chromium). Some of the sludges generated from this process did not require further treatment (i.e., stabilization). This same situation occurred with the process used to establish the promulgated treatment standards for K062 wastes, in that the wastewater treatment process employed for treating the combined K062/D007 wastes was effective enough that the treatment sludges were not characteristic for chromium and did not require any further stabilization. (Thus, the derivation of the 0.094 mg/l proposed standard for D007 wastes.) While Cyanokem's data clearly indicated that the proposed 0.094 mg/l could not be achieved and thus implying that their combined D007 wastes were more difficult to treat, their data did not represent wastes similar to those represented by the HWTC data which was comprised primarily of sludge stabilization data.

The Agency then decided to examine what the treatment standard would be based on all of the data from Cyanokem and the HWTC (i.e., using all 52 data points, except for one from the HWTC data that the Agency believes to be an outlier). In doing so, it significantly increased the number of data points and also represented a greater variety of wastes from a greater cross-section of industries. Despite all of this, the Agency took a conservative approach and assumed that proper and effective treatment had occurred for all of the data.

The resultant standard using these combined data was 4.3 mg/l based on TCLP. While the combined data are technically "weak" due to various deficiencies in BDAT information, the combined two data sets do reflect the treatment of a greater variety of wastes. The Agency comtemplated promulgating the 4.3 mg/l standard as an alternative to the 5.2 mg/l from F006; however, this level is so close to the 5.0 mg/l characteristic level that the Agency does not believe the significant regulatory disruptions and uncertainties inherent in applying direct part 268 regulation to subtitle D facilities is warranted.

The Agency notes that the 5.2 mg/l F006 standard was also generated by the commercial treatment industry and that further combination of the F006 data with the commenters' data would probably result in a standard even closer to the characteristic level of 5.0 mg/l. As it is, a measurement of 4.3 mg/l by the TCLP test is approximately 86% of the 5.0 mg/l characteristic level and within the analytical error that may be expected for such an analysis.

As a result of these comments and data, EPA is withdrawing both of the proposed treatment standards for D007 wastes (i.e., the transfer from F006 and from K062). While the Agency contemplated promulgating the 5.2 mg/l F006 standard, it is even closer to the characteristic level than the 4.3 mg/l calculated using the commenters' data. The treatment standard promulgated today, therefore, is set at 5.0 mg/l chromium (total) (as measured by TCLP). While the majority of commenters supported this approach from a policy standpoint, the Agency is convinced that the available data submitted by them clearly indicate the validity of the achievability of this standard.

(iii) D007 Refractory Bricks. Some D007 nonwastewaters are generated in the form of refractory bricks containing percent levels of hexavalent chromium. The Agency has identified one facility that is recovering chromium using a high temperature thermal recovery process. The bricks are crushed and recycled as feedstock along with other raw materials in the manufacture of refractory bricks or metal alloys. This recovery technology is currently used for bricks that contain up to 20% chromium but the facility believes the technology can treat bricks containing up to 40% chromium. However, the facility also indicated that there are upper limits on the amount of phosphorus present in the bricks that would lower the quality of the product.

EPA has determined that this thermal recovery process is an alternative treatment for some forms of these D007 refractory bricks. However, the Agency is currently uncertain to what extent this thermal recovery technology is demonstrated for all of the various types of refractory bricks currently being land disposed. Thus, the Agency is not establishing high temperature thermal recovery as a treatment standard for these D007 wastes, but is not precluded from doing so in the future. At the same time, facilities are not precluded from using this technology for these types of wastes.

Some commenters submitted data on the stabilization of these spent refractory bricks. These data are one of the seven data sets rejected by the Agency for reasons outlined in section III.A.2.(e)(1) above. These data consist of analysis on two TCLP extracts of crushed refractory brick that were subjected to two different stabilization technologies. One technology utilized cement as a stabilization reagent and achieved a treated TCLP level for chromium of 70 mg/l. The other technology was a glassification process that achieved a treated TCLP level for chromium of 110 mg/l. While these performance data are incomplete, they appear to indicate that chromium bricks could be more difficult to treat than the other chromium containing wastes tested by EPA (K062 or F006) or, more likely, that stabilization of chromium bricks may need to be preceded by a hexavalent chromium reduction step. Congress in fact contemplated that hexavalent chromium would be reduced to the maximum extent possible before prohibited wastes are land disposed. Statement of Senator Chaffee, 130 Cong. Rec. S 9178 (July 25, 1984). EPA thus does not view these data as representing BDAT, nor as minimizing threats to human health and the environment.

See also preceding section III.A.3.(a)(2) discussing treatment standards for inorganic solids debris (including refractory bricks) and the two year national capacity variance granted for these wastes.

(2) *U032.* The treatment standards promulgated today for U032 are transferred from the treatment of K062 wastewaters and nonwastewaters. EPA believes that K062 wastes are more difficult to treat than U032 wastes, in that U032 wastes should contain lower concentrations of potentially interfering metals than K062 wastes and should primarily contain only one specific chromium compound (i.e., the calcium salt of chromic acid). Because of this, EPA sees no technical bar to transferring data to establish treatment standards for U032 wastewaters and nonwastewaters.

BDAT TREATMENT STANDARDS FOR D007

[Nonwastewaters]

Regulated constituent	Maximum for any single grab sample, TCLP (mg/l)
Chromium (Total)	5.0

BDAT TREATMENT STANDARDS FOR D007

[Wastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/l)
Chromium (Total)	5.0

BDAT TREATMENT STANDARDS FOR U032

[Nonwastewaters]

Regulated constituent	Maximum for any single grab sample, TCLP (mg/l)
Chromium (Total)	0.094

BDAT TREATMENT STANDARDS FOR U032

[Wastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/l)
Chromium (Total)	0.32

f. Lead

D008—EP toxic for lead.
P110—Tetraethyl lead.
U144—Lead acetate.
U145—Lead phosphate.
U146—Lead subacetate.
K069—Emission control dust/sludge from secondary lead smelting.
K100—Waste leaching solution from acid leaching of emission control dust/sludge from secondary lead smelting.

(1) *D008 Wastes.* The Agency, as one alternative, proposed treatment standards below the characteristic levels for nonwastewaters and wastewaters as 0.51 mg/l TCLP and 0.04 mg/l, respectively. The Agency also proposed an option of capping the treatment standards for D008 at the characteristic level. Additional data and comments were received that indicated that the proposed levels of 0.51 mg/l TCLP and 0.04 mg/l were unachievable for many D008 wastes on a routine basis. After detailed analysis of the available data, EPA concludes that treatment to 5.0 mg/l EP best represents the achievable treatment standard for the entire spectrum of D008 nonwastewaters. In addition, EPA is establishing the treatment standard for wastewaters at the characteristc level for the reasons stated in section III.D of the preamble.

(a) Nonwastewaters. The Agency proposed a cut-off concentration of 2.5% total lead as a means of distinguishing between those essentially inorganic nonwastewaters containing recyclable levels of lead and those which can be effectively stabilized. Consequently, the Agency proposed two treatability groups for lead based on the 2.5% cutoff as the Low and High Lead Subcategory. The Agency solicited comments on the use of the cutoff level and whether the 2.5% total lead gives an accurate description of lead that can be recycled from D008 nonwastewaters. Many commenters requested that the Agency not promulgate the cutoff level. In fact, many commenters suggested that it is not economically feasible to recycle lead from wastes with less than 25% lead. Many commenters (inlcuding those from secondary lead industry itself) also stated that lead concentrations are not the sole measure of recyclability. The commenters presented data that indicates that D008 nonwastewaters with greater than 2.5% total lead can often be stabilized. Therefore, the Agency has decided not to promulgate the cutoff levels and has decided not to adopt proposed high and low lead treatability groups for D008 nonwastewaters and instead to promulgate generically applicable treatment standards.

In addition, the Agency proposed and solicited comments on three options for the development of treatment standards for D008 nonwastewaters. The first option was to develop a numerical treatment standard for those D008 nonwastewaters that can be stabilized. Consequently, the Agency proposed a numerical treatment standard of 0.51 mg/l for leachable lead based on a transfer of the performance of stabilization for F006 wastes. The second option was to specify Thermal Recovery as a method of treatment as the treatment standard for D008 nonwastewaters where the lead could be recovered. The third option was to limit the treatment standard for D008 nonwastewaters to the characteristic level.

During the comment period, the Agency received D008 nonwastewater data from various sources. Most of the data came from stabilizing specific D008 nonwastewaters. Some of the data were from the foundry industry, secondary lead smelters, the glass industry, and commercial treaters of D008 nonwastewaters. The majority of the data received by the Agency did not have the proper QA/QC, corresponding influent and effluent data, and design and operating parameters, so the Agency is hesitant to use the data in developing treatment standards. The Agency, nevertheless, evaluated all of the data to assess the range of waste variability and what standard could typically be achieved.

Stabilization data was submitted by the foundry industries by Wheland Foundry and the American Foundrymen. The untreated lead concentration ranged up to 88 mg/l leachable using the EP toxicity test. An analysis of the data indicates that the performance of the treatment system could achieve leachable levels of lead lower than the characteristic level. In fact, the highest leachable concentration of lead is 1.4 mg/l. Although these data showed that the leachable concentration of lead was below the characteristic level, the leachable level for cadmium was higher than the characteristic level. These data clearly show that the other metals in the wastes could affect the performance of stabilization for this waste. Put another way, this means (assuming proper treatment performance) that the performance of the treatment system could achieve concentration levels below the characteristic level for lead but levels higher than the characteristic level for cadmium.

Data was submitted by two glass manufactures, Vision Ease and Ciby-Geigy Corporation. Vision Ease submitted treatment data for stabilization of ground glass particles, wastewater treatment sludges, and polishing and grinding dust. The type of binder used was hydrated lime and sodium monophosphate. The commenter indicated that these untreated wastes contained total lead concentrations greater than 2.5% and leached higher than the characteristic level; however, no actual influent concentrations were submitted. The commenter also did not submit QA/QC data. If the Agency calculated a treatment standard using the stabilized data, the standard would be the characteristic level of 5.0 mg/l measured by the EP test.

Ciby-Geigy submitted treatment data for waste produced in the manufacture of glass enamels. These wastes were produced from equipment and container washing during the manufacturing

process. These washing were treated by a wastewater treatment system that generated a sludge that exhibited the characteristic of toxicity for lead. The commenter submitted two sets of data. The first set of data was treatment of a 25.6% lead oxide sludge by stabilizing with clays, flints, and calcium chloride and then heating the waste to a maximum temperature of 1850 degrees Fahrenheit to produce a ceramic material. This ceramic material leached lead concentration ranging from 0.2 to 0.4 ppm as measured by the EP test. If the Agency calculated a treatment standard for this waste, the treatment standard would be 0.89 mg/l measured by the EP test. For this data set, there was no untreated leachable concentrations of lead, therefore the Agency cannot determine whether the waste was hazardous before treatment. The second data set contained lead oxide concentration ranging from 13% to 75%. The waste was mixed with borax and then heated to a maximum temperature of 1950 degrees Fahrenheit. This ceramic material leached lead at levels ranging from 0.2–40 ppm measued by the EP test. Of the 11 data points that were collected by the commenter, 4 of the 11 would fail the EP test. The Agency did not use these data to calculate a treatment standard, however, because each used different binder ratios. These two data sets from glass manufacturers clearly show the diversity of the waste and a difference in treatable levels. In some cases stabilization can reduce leachability of lead at, or somewhat below, the characteristic level.

The Agency received data from the Secondary Lead Smelters Association (SLSA) on the treatment of slag by stabilization. The wastes contained total concentrations of up to 10 percent lead. The types of binders that were used were portland cement, polymers, and silicates. The commenter submitted approximately 110 data points from two different plants. The binder to waste ratios ranged from 1 to 2, to 1 to 15. In the data submission, there was no QA/QC data and no corresponding influent leachable lead concentration. One data set was based on use of portland cement as a stabilizing agent with a binder to waste ratio ranging from 1 to 5, to 1 to 10. The Agency calculated a treatment standard of 2.47 mg/l was measured by the TCLP from these data. The other data set was based on the use of polymers and silicates as stabilizing agents with binder to waste ratio ranging from 1 to 5, to 4 to 10. There were approximately 94 data points, and of these data points, one was above the characteristic level for lead. The Agency used these data to calculate a treatment standard of 4.82 mg/l as measured by the TCLP.

The Hazardous Waste Treatment Council (HWTC) submitted eight data sets for the treatment of D008 nonwastewaters. There was no QA/QC and influent leachable concentration of lead. The data set with the highest concentration of total lead was a zinc ammonium chloride solid from the manufacture of containers. This waste had a total lead concentration of 49,000 ppm. This waste was stabilized to a leachable level of lead ranging from 6.47 to 8.7 ppm as measured by the TCLP. This stabilized waste represented a volume increase ratio ranging from 1.8 to 2.5.

The data set with the next highest total lead concentration was generated from an incinerator fly ash from the aerospace industry that contained 810 ppm of total lead. Based on the data provided in the comments, this waste would not be considered characteristically hazardous due to the fact that the untreated leachable level for lead is 0.0749 ppm. This waste was treated by stabilizing with a binder to waste ratio ranging from 0.89 to 2.8. The treated leachable levels ranged from 0.1 to .27 ppm as measured by the TCLP.

The third highest data set represented data from three soils contaminated with lead and petroleum, with concentrations ranging from 29 to 561 ppm total lead. This waste contained total lead concentration of 29 ppm, and had a corresponding untreated leachable level of 6.01 ppm as measured by the TCLP, which is above the characteristic level. These soils resulted in the best treatment, with levels ranging from .066 to 0.257 ppm as measured by the TCLP. This represented a volume increase ranging from 1.6 to 3.4.

The HWTC provided three other data sets representing waste generated as water filtrate and sludge from the manufacture of conduit, as ammonium hydroxide sludge from electroplating, and as sump sludge from the reconditioning of metal drums. These wastes had total lead concentrations ranging from 234 to 460 ppm. There was no untreated TCLP data corresponding to the total lead levels. The stabilized wastes ranged in concentration from .06 to .10 ppm as measured by the TCLP. The binder to waste ratio ranged from 1.6 to 3.5.

Of these data, the waste with the highest total lead concentration shows treatment levels barely above the characteristic level of 5 ppm. These data show that a high concentration of lead (approximately 5%) could barely be stabilized to the characteristic level (although the data are so sparse that no hard conclusions are possible). These data also show that most of the untreated wastes discussed in the HWTC comments did not exhibit a characteristic before stabilization. Also, these data highlight the diversity of D008 nonwastewaters that can be treated.

The HWTC commented on data submitted to EPA from the Secondary Lead Smelters Association (SLSA). The HWTC concluded that the treatment data support concentrations of lead below the characteristic level. The HWTC also stated that these data support the proposed BDAT treatment standard of 0.51 mg/l, or at least achieving levels below the characteristic level. The HWTC points out that agents such as fly ash, lime, and sulfide would provide for a higher degree of stabilization than just adding portland cement.

The Agency does not agree with the HWTC that these data support treatment levels significantly below the characteristic level. The data provided by SLSA clearly show that two treated data points of 87 were above the characteristic level. The Agency used the data to calculate a treatment standard of 4.82 mg/l, very close to the 5.0 mg/l characteristic level. In addition, the Agency does not agree with HWTC that other stabilizing agents may provide a higher degree of stabilization. At the least, the proposition is not self-evident. The data provided by SLSA show treatment by three types of binders and a significant range of binder to waste ratios. Using the highest binder to waste ratio for these wastes, the treated level is higher than the characteristic level. (In addition, there are issues of whether stabilization of slag is appropriate treatment. See discussion of inorganic debris in preamble section III.A.1.a.(2).)

The Agency does not believe that the data it received in response to the proposed rule represent the entire spectrum of characteristic lead nonwastewaters. Also, these data do not support the assumption that characteristic lead nonwastewaters can typically be treated to levels significantly less than the EP characteristic level. The limited amount of data does not reflect the full measure of waste variability inherent in a characteristic waste, particularly variability of matrices and lead concentrations. In addition, the commenters do not address how treatability of other metals could be affected by optimized lead treatment,

nor has EPA had the time to address this issue. With the treatment of the Vision Ease waste to 5.0 mg/l as measured by the EP and the SLSA data demonstrating treatment to 4.82 mg/l as measured by the TCLP, and data points above the characteristic level submitted by the waste treatment industry, the Agency is adopting for nonwastewater forms of D008 wastes, the treatment standard equal to 5.0 mg/l as measured by the EP procedure. The Agency is adopting this approach to address the range of variability inherent in the D008 wastes.

Because a facility may generate a waste containing lead and other metals, the TCLP (which is required for most other metals) may be used to measure compliance with this standard. EPA is not basing the standard for D008 on the TCLP; however, because that protocol is more aggressive for lead than the EP. The Agency is not sure that levels of 5.0 mg/l as measured by the TCLP are typically achievable. The TCLP can be used to demonstrate compliance. However, if the analysis shows that the waste leaches below 5.0 mg/l for lead as measured by the TCLP, then the facility has complied with the standard. If the waste leaches above 5.0 mg/l for lead, then the facility may analyze the sample using the EP procedure. (It should be noted, however, that if a waste exhibits the amended toxicity characteristic, it must still be managed in a Subtitle C facility even if it is not prohibited from land disposal).

(b) Wastewaters. In the November 22, 1989, proposed rule, the Agency proposed a treatment standard for D008 wastewaters of 0.04 mg/l based on a transfer of the performance of precipitation with lime and sulfide, filtration, and settling for K062 wastewaters. In addition, the Agency solicited comments on the approach of specifying a precipitant as a method of treatment for D008 wastewaters. Comments were solicited on whether the Agency should develop treatment standards based on data provided from the primary and secondary lead smelters industries as part of the Agency's effluent limitation guidelines program.

Many commenters questioned the Agency's technical capabilities of the transfer of the performance of the treatment system for K062 wastes as compared to D008 wastewaters. In particular, the commenters pointed out that the untreated K062 wastewaters had low concentration of lead compared to the D008 wastes as actually generated. However, commenters submitted additional data indicating that although the 0.04 mg/l for lead was unachievable, precipitation and filtration treatment could achieve concentrations of lead in the effluent lower than the characteristic level.

In particular, the Agency received treatment data for D008 wastewaters from three sources. One set of data submitted to the Agency was from the Battery Council, Inc (BCI). These data represented a small portion of the data that was collected in the effluent limitations guidelines program for the battery and nonferrous metals point source category. BCI's contention was that if the Agency decides to develop treatment standards lower than the characteristic level for D008 wastewaters, then the Agency should base the levels on the effluent guidelines for the battery and nonferrous metals categories. The Battery Council submitted treatment data using the following treatment technologies: lime settling, lime settling and filtration, and carbonate precipitation, settling, and filtration. This data showed influent concentration levels ranging up to 300 ppm. The data showed a substantial reduction of lead and other metals from the treatment system. BCI submitted corresponding quality assurance/quality control (QA/QC) information for the data. If the Agency uses the data from the treatment system, the calculated treatment standard would be roughly 0.6 mg/l, an order of magnitude lower than the characteristic level.

In addition, the Agency received D008 wastewater data from Tricil Environmental Services, a treater of D008 and other characteristically hazardous wastewaters. However, this waste was commingled with other waste before treatment, thereby blending down such that the concentration of lead would be lower than what was actually reported. Data was submitted on the treatment of lead by precipitation with phosphate, followed by settling, and filtration. The concentration of lead in the influent before blending down ranged up to 50,000 ppm. If the Agency used all of the treatment data in order to calculate a treatment standard, the performance of the treatment system indicates that a calculated treatment standard is 0.2 mg/l, which is more than an order of magnitude lower than the characteristic level. The Agency would hesitate to use the data in developing treatment standards for D008 wastewaters due to the lack of QA/QC data and corresponding influent and effluent data. Because of the initial concentration of lead and concentrations of other dissolved metal, the Agency believes that these wastes represent the variability associated with the characteristic wastes.

Also, the Agency received treatment data from a foundry facility treating D008 wastewater. This data represents treated wastewaters by precipitation with high magnesium lime and filtration. The lead concentration in the untreated wastewater ranged up to 276 mg/l. If the Agency used all of the treatment data, the calculated treatment standard is 0.4 mg/l, which is an order of magnitude lower than the characteristic level. For this data, the Agency evaluated the QA/QC data, the design and operating parameters, and corresponding influent concentrations.

Based on the evaluation of all of the wastewaters data received from comments, as well as the various Clean Water Act, effluent limitation guidelines and pretreatment standards regulating lead (for example, the Combined Metals Data Base and regulations for primary lead, secondary lead and battery manufacturing), the Agency concludes that well designed and well operated treatment systems can achieve total concentrations of lead lower than the characteristic level. As explained in Section III.D, however, EPA has determined not to require hazardous wastewaters to be treated to levels less than the characteristic level in order to avoid significant and potentially environmentally counterproductive disruptions to the NPDES/pretreatment and UIC programs.

In addition, many commenters suggested that the Agency not specify a precipitant as a method of treatment for D008 wastewaters. Many commenters suggest that particular precipitants may perform better depending on the characteristics of the waste. For example, Tricil Environmental points out that phosphate is a superior precipitant than carbonate or sulfate because of the low solubility of lead phosphate. The Agency agrees with the commenters and is not promulgating a precipitant as a method of treatment. In fact, the Agency is promulgating the treatment standard at the characteristic level, thereby treaters and generators of D008 wastewaters may select any precipitant in order to meet the characteristic level.

(c) Lead Acid Batteries. For lead acid batteries, the Agency is promulgating a standard of "Thermal recovery of lead in secondary lead smelters (RELEAD)". (See § 268.42 Table 1 in today's rule for a detailed description of the technology standard referred to by the five letter technology code in the parentheses.) The Agency believes that virtually all of

the treaters of lead acid batteries are using a recovery process.

Incidentally, the Agency notes that lead acid batteries themselves, when stored, are not considered to be land disposed because the battery is considered to be a container (see 40 CFR 264.314(d)(3)). Battery storage, however, typically is subject to the subpart J storage standards (relating to secure storage, secondary containment in some instances, and other requirements). See subpart G of part 266.

Other commenters questioned whether the slag or matte from recovery processes would need further treatment and whether these wastes should be placed in monofills. The residuals from the recovery process are a new treatability group (i.e. the residues are not lead acid batteries) and therefore their status as prohibited or nonprohibited is determined at the point the residues are generated. Such residues would thus only be prohibited and therefore require further treatment if they exhibit a characteristic. See discussion of inorganic debris in section III.A.3.a of today's rule.

(2) *P110, U144, U145, and U146 Wastes.* The Agency proposed wastewater treatment standards for lead for P110, U144, U145, U146 based on a transfer of the performance of precipitation with lime and sulfide, filtration, and settling for K062 wastewaters. While these U and P codes represent primarily organo-lead compounds and one may consider that the transfer from an inorganic lead to an organic lead is not feasible, no comments were received indicating the lack of achievability. The Agency's judgment is that the standard is technically feasible. Therefore, the Agency is promulgating a standards for lead in P110, U144, U145, U146 wastewaters of 0.04 mg/l as proposed.

The Agency has determined that some nonwastewater forms of lead wastes including P110, U144, U146, and some D008 wastes, would need to be incinerated prior to stabilization due to the presence of high concentrations of organics in order to achieve a treatment standard based on stabilization. This is primarily because the organics typically interfere with conventional stabilization processes (particularly at concentrations exceeding 1% TOC). The Agency has data on the incineration on organic wastes containing up to 1,000 mg/kg lead (such as K087 wastes) followed by stabilization of the ash. These data indicate that the proposed standard (i.e. 0.51 mg/l leachable lead) can be achieved for wastes that also contain significant concentrations of organics, provided the organics are destroyed by pretreatment. Lead acetate (U144) and lead subacetate (U146) are anticipated to be less difficult (or at least of similar difficulty) to treat than tetraethyl lead. The Agency is therefore promulgating the 0.04 mg/l standard for organo-lead compounds, P110, U144, and U146.

Additionally, the Agency received no comments on the feasibility of the transfer of lead in K062 wastewaters to lead phosphate U145. Therefore, the Agency will promulgate as proposed.

(3) *K069.* In today's rule, the Agency is promulgating treatment standards for K069 nonwastewaters in the Calcium Sulfate Subcategory, and for wastewater forms of K069. In addition, the Agency is revoking the no land disposal based on recycling as a treatment standard for the Non Calcium Sulfate Subcategory for K069 nonwastewaters and is promulgating "Thermal Recovery of Lead in Secondary Lead Smelters (RLEAD)". See § 268.42 Table 1 in today's rule for a detailed description of the technology standard referred to by the five letter technology code in the parentheses.

For K069 wastewaters, the Agency is promulgating treatment standards for cadmium and lead. For cadmium, the treatment standard is based on the performance of chemical precipitation with lime and sulfide and sludge dewatering for K062 wastes. For lead, the treatment standard is based on the performance of chemical precipitation with magnesium hydroxide followed by clarification and sludge dewatering for D008 wastewaters. This treatment data was submitted as part of the public comment period. The Agency believes that these wastewaters better represent a K069 wastewater due to the concentration of lead (i.e. up to 300 ppm). The Agency believes that the performance of both technologies can achieve the regulated concentration due to the fact that both precipitating agents are hydroxides.

BDAT for K069 nonwastewaters in the Calcium Sulfate Subcategory is stabilization. The Agency believes that there is only one generator of this waste and that this waste cannot be directly recycled to recover lead. The waste characterization data from the one generator indicated that this waste contains metal constituents such as cadmium and lead. The metal concentrations range up to 3300 ppm.

For the K069 nonwastewaters in the Calcium Sulfate Subcategory, the Agency is transferring the performance of stabilization of K061 to K069 nonwastewaters. This is a technically feasible transfer because the K061 waste is a more difficult waste to treat. In fact, the lead concentrations in K061 waste ranges up to 20,300 ppm thus, the performance of the treatment system can be legitimately transferred.

(4) *K100.* In today's rule, the Agency is promulgating treatment standards for wastewaters and nonwastewater forms of K100 wastes as proposed. For cadmium and total chromium in K100 wastewaters, treatment standards are based on a transfer of the performance of chromium reduction followed by lime and sulfide precipitation, and dewatering for K062 wastes. For lead in K100 wastewaters, treatment standard is based on the performance of chemical precipitation with magnesium hydroxide followed by clarification and sludge dewatering for D008 wastewaters. The Agency believes that both technologies can achieve the concentration of the regulated constituents due to the fact that both precipitating agents are hydroxides. For K100 nonwastewaters treatment standards are based on the transfer of the performance of stabilization for F006 wastes.

Treatment standards for K100 wastes were originally scheduled to be promulgated as part of the Third Third rulemaking. However, a treatment standard of "No Land Disposal Based on No Generation" for K100 nonwastewaters was promulgated on August 8, 1988 and subsequently revised on May 2, 1989 (54 FR 18836) to be applicable only to "Nonwastewater forms of these wastes generated by the process described in the listing description and disposed after August 17, 1988, and not generated in the course of treating wastewater forms of these wastes (Based on No Generation)." The Agency received no comments on the treatment standards for K100 wastes; therefore, the Agency is promulgating as proposed.

BDAT TREATMENT STANDARDS FOR D008

[Nonwastewaters]

Regulated constituent	Maximum for any single grab sample, EP (mg/l)
Lead	5.0

BDAT TREATMENT STANDARDS FOR D008

[Wastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/l)
Lead	5.0

BDAT TREATMENT STANDARDS FOR D008

[Lead Acid Batteries]

Thermal recovery (RLEAD) of lead in secondary lead smelters

BDAT TREATMENT STANDARDS FOR P110, U144, U145, AND U146

[Wastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/l)
Lead	0.040

BDAT TREATMENT STANDARDS FOR P110, U144, U145, AND U146

[Nonwastewaters]

Regulated constituent	Maximum for any single grab sample, TCLP (mg/l)
Lead	0.51

BDAT TREATMENT STANDARDS FOR K069

[Wastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/l)
Cadmium	1.6
Lead	0.51

BDAT TREATMENT STANDARDS FOR K069 CALCIUM SULFATE SUBCATEGORY

[Nonwastewaters]

Regulated constituent	Maximum for any single grab sample, TCLP (mg/l)
Cadmium	0.14
Lead	0.24

BDAT TREATMENT STANDARDS FOR K069 NON-CALCIUM SULFATE SUBCATEGORY

[Nonwastewaters; Revised From No Land Disposal]

Thermal recovery of lead in secondary lead smelters (RLEAD)

BDAT TREATMENT STANDARDS FOR K100

[Wastewaters; Revised From No Land Disposal]

Regulated constituent	Maximum for any single grab sample, total composition (mg/l)
Cadmium	1.6
Chromium (Total)	0.32
Lead	0.51

BDAT TREATMENT STANDARDS FOR K100

[Nonwastewaters; Revised From No Land Disposal]

Regulated constituent	Maximum for any single grab sample, TCLP (mg/l)
Cadmium	0.066
Chromium (Total)	5.2
Lead	0.51

* See § 268.42 Table 1 in today's rule for a detailed description of the technology standard referred to by the five letter technology code in parentheses.

g. Mercury

D009—EP toxic for mercury.
K071—Brine purification muds from the mercury cell process in chlorine production, where separately prepurified brine is not used.
K106—Wastewater treatment sludges from the mercury cell process in chlorine production.
P065—Mercury fulminate.
P092—Phenylmercury acetate.
U151—Mercury.

EPA is today promulgating treatment standards for D009, K106, P065, P092, and U151. EPA has revised the proposed regulatory approach for some of these wastes in response to comment. EPA is also withdrawing the proposed revisions for K071 nonwastewaters. These wastes are described fully in the respective Listing Background Documents.

(1) *Review of BDAT for Nonwastewaters.* EPA identified thermal recovery processes, acid leaching, stabilization, and incineration as BDAT for mercury wastes. Commenters questioned whether thermal processing of mercury should be the basis (or the exclusive basis) for the treatment standard. Use of thermal processing raises issues of cross-media transfer of mercury, as well as the environmental benefit of thermal processing over stabilization or land disposal. Other comments questioned the amenability of mercury sulfide wastes to stabilization as well as EPA's proposed restrictions on co-disposal of mercury wastes with alkaline wastes. The stabilization comments and the co-disposal issues are addressed in section III.A.3.a.

Multimedia issues raised by thermal processing of mercury materials involve the potential transfer of mercury and sulfur dioxide from the retorting/roasting chambers to downstream air pollution control devices (APCD) and potentially to environmental media (e.g., air to water). Specifically, commenters felt that EPA had not properly addressed the issue of mercury air emissions from retorting and urged EPA to quantify mercury emissions prior to determining whether roasting or retorting represents BDAT for mercury and sulfide wastes (i.e., K106).

The Agency acknowledges the legitimacy of the commenters' concerns, which the Agency shares. The Agency discussed the issue of air controls for mercury retorting at 54 FR 48501. In addition, the Agency provided calculations in the administrative record for the proposed rule of the potential amounts of sulfur dioxide emissions to the air that could result from the retorting or roasting of mercury sulfide wastes such as K106, based on available performance data from a facility thermally processing cinnabar ores. EPA also included the document entitled, "Review of National Emission Standards (NESHAPs) for Mercury" (EPA 450/3-84-014, 1984) in the proposed administrative record. In this 1984 document, EPA provided quantitative analysis for the potential of mercury air emissions from several industrial operations that include the thermal processing of cinnabar ores as well as the retorting of mercury containing wastes.

The available air emission information shows that both mercury and sulfur dioxide emissions can be effectively controlled by well designed and well operated air pollution control devices that allow for the recovery of valuable mercury. Based on available air emission information, performance data from the thermal processing of cinnabar ores, and performance data from the retorting/roasting of mercury wastes, EPA determined that retorting/roasting represent BDAT for mercury wastes. EPA reaffirms this determination in today's rule. In order to assure that air emissions from mercury

are controlled adequately, the Agency is specifying as part of BDAT that the retorting unit either (a) be subject to the mercury NESHAP; (b) be subject to a BACT or LAER standard for mercury imposed pursuant to a PSD permit; or (c) that it be subject to a state permit that establishes emission limitations (within the meaning of section 302 of the Clean Air Act) for mercury. The Agency believes that with such air emission controls retorting is a treatment technology that minimizes threats to human health and the environment and so satisfies the requirements of section 3004(m). (Pending amendments to the Clean Air Act may also result in imposition of standards for these units.) (The Agency's authority to impose these conditions on performance of a mercury retorting device comes directly from its authority under section 3004(m) to establish methods of treatment. EPA is indicating here that part of the designated method includes operating pursuant to standards that prevent cross-media contamination. Such standards are enforceable under RCRA pursuant to the authority in section 3008(a).) In addition, as discussed more fully below, the Agency believes that this technology is preferable to stabilization.

Several commenters believe that the treatment standards of roasting and retorting are not needed for K106 wastes that are generated as mercury sulfides. According to the commenters, these K106 wastes contain mercury in one of its less soluble forms. As a result, the commenters argued that sulfide stabilization—including the sulfide precipitation treatment that generates the K106—should be considered a mode of treatment under RCRA section 3004(m). The commenters also believe the migratory potential of mercury from sulfide sludges to the air or water is less than what could result from retorting/roasting.

EPA has evaluated these comments carefully but determined that treatment standards for those mercury wastes amenable to recovery should be based on recovery technologies. There is a strong preference in the land disposal restrictions legislation for treatment standards to be based on recovery where possible (e.g., S. Rep. No. 284 at 17). This preference is reinforced by the overall goals of RCRA to encourage waste minimization and resource recovery (e.g., RCRA section 1003(a)(6)). The Agency further concludes that compliance with the mercury NESHAP, PSD BACT/LAER controls, or state permitting requirements will ensure that air emissions of mercury are controlled so as to be protective of human health and the environment. Commenters also raised the potential for fugitive air emissions from mercury waste handling operations preceding retorting. Since retorters would normally require RCRA storage permits, however, permit writers are able to craft controls to adequately control fugitive emissions using the omnibus authority in RCRA section 3005(c)(3). (The Agency intends to issue guidance to permit writers on this matter.)

EPA has also considered the argument that wastes from retorting will contain a more leachable form of mercury than at least the mercury sulfide wastes (such as K106) being smelted in the unit. Although this will be true in some cases, as demonstrated in the record leachable mercury in retorting wastes will still be at low levels, and well below the characteristic level. More important, there will be less mercury to leach because most mercury will be recovered as product. The Agency estimates, based on data from the thermal processing of cinnabar ores and the retorting/roasting of a mixture of K071 and K106 wastes, that mercury retorting can recover 98–99% of mercury contained in the feed material. The overall potential of disposed mercury to be released to the environment will thus be significantly reduced. Retorting/roasting also achieves volumetric waste minimization compared to stabilization, because it reduces the overall volume of waste to be disposed, unlike stabilization which increases overall volume. The Agency thus concludes that retorting/roasting is the appropriate method of treatment for recoverable mercury wastes. As explained below, however, the Agency has modified its proposed approach with respect to which mercury wastes are recoverable.

(2) *Revisions to the Cut-Off Level for Mercury Subcategories.* EPA proposed a cut-off level of 16 mg/kg of total mercury in a hazardous waste to delineate two subcategories of mercury wastes (54 FR 48441–42), high and low, with high mercury wastes being required to meet a standard based on recovery. The 16 mg/kg cut-off level was calculated from two sets of retorting/roasting data collected by EPA. One data set represents the retorting/roasting of mercury chloride/mercury sulfide wastes (mixture of K071 and K106). The other data set represents the thermal processing of cinnabar ores which the Agency believes can simulate the retorting/roasting of mercury sulfide sludges (i.e., K106 wastes) because wastewater treatment sludges (including sulfide sludges) are routinely burned in multiple hearth furnaces, the same (or similar) type of furnace that processes cinnabar ores. EPA relied on the K071/K106 treatment residual data, on the analytical data of cinnabar ore thermal recovery, and on the performance data from the thermal processing of cinnabar ores for the purpose of calculating the 16 mg/kg cut-off level. The level reflected the Agency's view of mercury levels remaining after properly conducted recovery, and assumed that any higher level is recoverable. The majority of the commenters have submitted comments and data urging EPA to reconsider the proposed cut off level of 16 mg/kg in the retorting residual use at proposal to define the two subcategories of mercury wastes.

The Chlorine Institute (CI) and OxyChem have submitted performance data based on the retorting/roasting of mercury wastes. The Chlorine Institute's performance data consists of bench- and pilot-scale test studies for the roasting of K106 having mercury sulfide species. OxyChem performance data consist of full-scale retorting tests of K106 and D009 wastes. None of OxyChem's K106 and D009 wastes had mercury sulfide species.

The Chlorine Institute's data show that mercury sulfide sludges (K106 wastes) differ from cinnabar ores with regard to the concentration of chloride salts. The Chlorine Institute believes that the high concentrations of chloride salts in K106 are likely to interfere with the overall performance of retorting/roasting operations. As explained in detail in the BDAT and Response to Comments Background Documents, however, EPA believes these chloride salts can be effectively controlled by a pretreatment step prior to retorting/roasting along with the optimized operation of the retorting/roasting process.

The Chlorine Institute also believes that their roasting data show that higher concentrations of residual mercury, in the order of 160 mg/kg mercury, may be left behind in the residues from retorting/roasting operations. OxyChem likewise believes that their performance data show that lower concentrations of residual mercury cannot routinely be achieved and thus should not be required for mercury wastes below 260 mg/kg.

Another commenter pointed out more fundamentally that EPA should base the cut-off level for "Mercury Subcategories" not on treated residuals from the retorting/roasting operations but rather on mercury concentrations in the waste before retorting. In other words, the determination of what is recoverable should not be determined

solely by levels reflecting mercury treatment. The commenter also believes that basing the cut-off level of "High Mercury Subcategory" on untreated mercury concentrations will better reflect similar BDAT determinations EPA had made for other recoverable wastes such as K061. EPA's data for untreated mercury wastes being retorted/roasted domestically show minimum concentrations of mercury up to 255 mg/kg (for a mixture of K106 and K071 wastes).

Based on these comments, EPA is revising the proposed cut-off level from the proposed 16 mg/kg to 260 mg/kg (rounded to two significant figures). Although the new cut-off level is based on the available data for low mercury concentrations of untreated mercury wastes being retorted/roasted, EPA points out that this new cut-off level of 260 mg/kg shuld not be deemed as a relaxation of the standard or treatability group. Instead, the new cut-off level takes into account consistency in identifying treatability groups and the variability inherent to mercury sulfide wastes, as documented by EPA's thermal processing data of cinnabar ores and the fact that available data on these low levels of recoverable mercury fully support that well-designed and operated thermal recovery processes allow routine recovery of valuable mercury.

For the purpose of this rule, mercury nonwastewaters with mercury concentrations equal to or above 260mg/kg mercury belong to the High Mercury Subcategory. Mercury nonwastewater with mercury concentrations below the 260 mg/kg mercury belong to the Low Mercury Subcategory.

(3) *Standards for All Wastewaters.* EPA is promulgating a treatment standard of 0.030 mg/l mercury for K106, P065, and P092. This treatment standard is based on the precipitation of mercury from wastewaters identified as K071 from the chlor-alkali industry using sulfide as the precipitant.

EPA acknowledges that there may be certain wastewaters that may require combinations of other wastewater treatment technologies which may include either additional treatment (for the destruction or removal of organics) or additional treatment by sulfide precipitation and filtration for the purpose of meeting today's treatment standards. The use of other wastewater treatment technologies are not precluded by this rule. This determination seems to be supported by the concurrence of other commenters either with the proposed standards or with EPA's determination of BDAT for mercury wastewaters.

Some commenters objected to EPA's rationale to transfer the K071 performance data to K106, P065, P092, U151, and D009 wastewaters. Among these commenters, one believes the proposed treatment standards are based on performance data that may not take into account other forms of mercury constituents which can be less amenable to sulfide treatment. However, this commenter submitted no specific data and thus failed to demonstrate that combinations of other wastewater technologies are unable to meet the standards.

Other commenters concurring with EPA's identification of BDAT believe EPA should base the treatment standards on the Office of Water (OW) performance data supporting the treatment standards for multi-source leachate. These commenters believe the OW-performance data represent the treatment of a more diverse universe of K071 wastewater than the one tested by EPA. These alternative performance data result in a treatment standard of 0.11 mg/l mercury.

The multi-source leachate treatment performance data represent the treatment provided by sulfide chemical precipitation to different characteristic wastewaters that may include K071 wastewaters. EPA believes that the data developed from treating the specific mercury wastes is preferable to a transfer of performance data. Moreover, the commenters advocating the transfer submitted no data and so failed to demonstrate unachievability of the standards or whether their wastes are significantly different from the treated wastewaters supporting the proposed standards. The Agency is not convinced by these comments and thus, is promulgating treatment standards for K106, P065, P092, and U151 as proposed.

For D009 wastewaters, EPA proposed two regulatory options. One option was to transfer K071's performance treatment data and require a level of treatment below the D009 characteristic level. The other option was to set a treatment level at the characteristic level. For reasons discussed in preamble section III.D., EPA is promulgating treatment standards at the characteristic level of 0.20 mg/l mercury for D009 wastewaters as measured by TCLP.

(4) *Standards for K106 and U151 Nonwastewaters.* EPA is promulgating treatment standards for these two wastes as proposed (54 FR 48441). The threshold for the High and Low Mercury Subcategories is revised, however, as explained in section (2) above.

High Mercury Subcategory K106 and U151 wastes are required to be treated by retorting/roasting as a prerequisite for land disposal. Residues from retorting/roasting operations are not prohibited from land disposal unless they leach mercury above 0.2 mg/l, as measured by the TCLP (see § 268.9 of the final rule indicating that normally any disposal of a waste exhibiting a characteristic is prohibited). Data indicate, however, that residues from retorting these wastes do not leach mercury at this level. Residues unacceptable for land disposal (i.e., above 0.2 mg/l) are required to comply with the appropriate standards for K106 or U151 wastes (i.e., High or Low Mercury Subcategory) presented below. It is impermissible to dilute a High Mercury Subcategory waste to reduce the mercury concentration to less than 260 mg/kg.

For K106 and U151 nonwastewaters in the "Low Mercury Subcategory" (i.e., less than 260 mg/kg) the Agency is promulgating a treatment standard of 0.025 mg/l mercury as measured by the TCLP leachate. This level is transferred from acid leaching data for K071 nonwastewaters. Residues from this acid leaching process must be evaluated for mercury content to determine whether they should undergo roasting/retorting. K106 and U151 nonwastewaters that contain less than 260 mg/kg and that also leach less than 0.025 mg/l mercury (as measured in the TCLP extract) are considered to have met the BDAT and can be land disposed.

(5) *Withdrawal of Proposed Revisions to K071 Nonwastewaters.* EPA proposed that certain K071 nonwastewaters be retorted or roasted (54 FR 48442). The Chlorine Institute and generators of K071 submitted comments to EPA emphasizing that existing treatment standards should not be revised. These commenters pointed out that their K071 wastes currently being land disposed already have low concentrations of mercury (10 to 120 mg/kg mercury, average) which EPA had deemed to meet the requirement of 3004(m) of HSWA. They believe these low mercury concentrations are unattractive for retorting/roasting operations. In addition, they believe that retorting/roasting may have not been demonstrated for these K071 wastes since the available data to EPA for the retorting/roasting of K071 wastes describe the treatment of untreated K071 wastes having low mercury concentrations of up to 255 mg/kg.

Although EPA believes these treated forms of K071 can be treated by retorting/roasting, EPA is not adopting the proposed revisions to K071 wastes because their recyclability is

questionable. The existing standard for these wastes thus will stay in place (53 FR 31166, August 17, 1988 and § 268.41 (treatment standard for K071 nonwastewaters)). However, today's decision does not preclude the Agency from revising the K071 treatment standards if new data become available.

(6) *Standards for P065 and P092 Nonwastewaters.* EPA is promulgating incineration as the treatment standard for P065 and P092 nonwastewaters followed by recovery or treatment of mercury from the incineration treatment residues if those residues are in the high mercury subcategory. (As noted at proposal, these organo-mercury wastes are not directly amenable for recovery, but must be pretreated to destroy carbon-metal bonds (54 FR 48442).) Incineration nonwastewater residues from these wastes that are above or equal to 260 mg/kg are considered to belong to the High Mercury Subcategory and thus must be recovered by retorting or roasting. Incineration wastewater residues must meet the treatment level of 0.030 mg/l mercury as a prerequisite for land disposal. Nonwastewater residues from retorting/roasting operations are not prohibited from land disposal unless they leach mercury above 0.2 mg/l, as measured by the TCLP. Retorting/roasting residues unacceptable for disposal (i.e., above 0.2 mg/l) are required to comply with the appropriate standards for the High or Low Mercury Subcategory, depending on whether their total mercury concentration exceeds 260 mg/kg. Incineration residues below 260 mg/kg are considered to belong to the Low Mercury Subcategory which are not prohibited from land disposal unless they leach mercury above 0.025 mg/l (as measured in the TCLP extract). See section (4) above for a discussion of this mercury leach level.

(7) *Standards for D009 Nonwastewaters.* The treatment standards for D009 nonwastewaters in the High Mercury Subcategory are promulgated as "Roasting or Retorting as a Method of Treatment, or Incineration followed by Roasting or Retorting of Incinerator nonwastewater residues (e.g., calcinates, soot, ash, or wastewater treatment sludges from the treatment of incineration scrubber waters) provided such residues exceed 260 mg/kg total mercury. Residues from retorting/roasting operations are not prohibited from land disposal unless they leach mercury above 0.20 mg/l, as measured by the TCLP. Retorting/roasting residues unacceptable for disposal (i.e., above 0.20 mg/l) are required to comply with the appropriate standards for the High or Low Mercury Subcategory. The applicable standards for wastes in the Low Mercury Subcategory are discussed at the end of this section. As a result, if the initial organic content is too high for the retorting or roasting, incineration can be used as a pretreatment step to the retorting/roasting.

At least one facility submitted data showing that wastes with concentrations of semivolatile organics up to 30 percent are currently being retorted outside the United States. The facility described its waste as a mercury spent catalyst contaminated with an intermediate chemical used in the manufacture of polymers. The facility sends this D009 waste overseas for the purpose of direct retorting of mercury. Based on this information, EPA believes the proposed standards can be promulgated as proposed.

Several commenters have identified a list of D009 wastes which they believe meet EPA's criteria of contaminated soils and debris. The commenters believe this list of D009 debris are not amenable to retorting/roasting. However, they have proposed alternative treatment standards based on the use of a chemical decontamination technology. The chemical decontamination standards require the use of three steps: (1) Decontamination of debris wastes based on polysulfide or hydrochloride solutions; (2) triple water rinses of the chemically decontaminated wastes; and (3) (sulfide) chemical precipitation of mercury from contaminated solutions and water washes. The chemically decontaminated and triple water rinsed debris would not be prohibited from land disposal.

EPA has been unable to determine whether the alternative chemical decontamination technology specifically represents BDAT for these wastes. EPA currently lacks performance data from the use of this technology on D009 debris wastes. If performance data become available, the Agency may be publishing revisions to today's standards as it continues the general effort to develop separate standards for soil and debris wastes. See also section III.A.3.(a)(2) for a further discussion of treatment for inorganic solids debris.

Another reason that the Agency is not adopting these procedures as the treatment standard for mercury debris is the possibility that mercury could ultimately be recovered. One commenter provided information indicating that their facility routinely recovers chromium from debris such as waste refractory bricks containing chromium. The bricks are crushed and recycled as feedstock along with other raw materials in the manufacture of refractory brick. EPA believes that this recycling technology (following pretreatment) may be generally applicable and can be used to treat at least some D009 debris.

For D009 wastes in the Low Mercury Subcategory, EPA is promulgating a treatment standard of 0.20 mg/l, as measured by the TCLP. Achievability of these standards are supported by K071 treatment data and other stabilization data submitted to the Agency. The Final BDAT Background Document for Mercury contains a detailed technical discussion for the development of all the treatment standards promulgated today.

BDAT TREATMENT STANDARDS FOR K106 AND U151

[All nonwastewaters in the High Mercury Subcategory (i.e., greater than or equal to 260 mg/kg total mercury)]

Roasting or Retorting (RMERC)

BDAT TREATMENT STANDARDS FOR K106 AND U151

[Nonwastewaters that are residues from RMERC and are in the Low Mercury Subcategory (i.e., less than 260 mg/kg total mercury)]

Regulated constituent	Maximum for any single grab sample, TCLP (mg/l)
Mercury	0.20

BDAT TREATMENT STANDARDS FOR K106 AND U151

[Nonwastewaters that are not residues from RMERC and are in the Low Mercury Subcategory (i.e., less than 260 mg/kg total mercury)]

Regulated constituent	Maximum for any single grab sample, TCLP (mg/l)
Mercury	0.025

BDAT TREATMENT STANDARDS FOR K106 AND U151

[Wastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/l)
Mercury	0.030

BDAT TREATMENT STANDARDS FOR D009

[All nonwastewaters that contain mercury and organics (and are not incinerator residues) and are also in the High Mercury Subcategory (i.e., greater than or equal to 260 mg/kg total mercury)]

Incineration of wastes with organics and mercury (IMERC) or roasting/retorting (RMERC)

BDAT TREATMENT STANDARDS FOR D009

[Nonwastewaters that are inorganics (including incinerator residues and residues from RMERC) and are in the High Mercury Subcategory (i.e., greater than or equal to 260 mg/kg total mercury)]

Roasting or retorting (RMERC)

BDAT TREATMENT STANDARDS FOR D009

[All nonwastewaters in the Low Mercury Subcategory (i.e., less than 260 mg/kg total mercury)]

Regulated constituent	Maximum for any single grab sample, TCLP (mg/l)
Mercury	0.20

BDAT TREATMENT STANDARDS FOR D009

[Wastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/l)
Mercury	0.20

BDAT TREATMENT STANDARDS FOR P065

[All nonwastewaters that are not incinerator residues and are not residues from RMERC; regardless of Mercury Content]

Incineration of wastes with organics and mercury (IMERC)

BDAT TREATMENT STANDARDS FOR P092

[All nonwastewaters that are not incinerator residues and are not residues from RMERC; regardless of Mercury Content]

Incineration of wastes with organics and mercury (IMERC) or roasting/retorting (RMERC)

BDAT TREATMENT STANDARDS FOR P065 AND P092

[Nonwastewaters that are either incinerator residues or residues from RMERC, and are in the High Mercury Subcategory (i.e., greater than or equal to 260 mg/kg total mercury)]

Roasting or retorting (RMERC)

BDAT TREATMENT STANDARDS FOR P065 AND P092

[Nonwastewaters that are incinerator residues (and are not residues from RMERC) that are also in the Low Mercury Subcategory (i.e., less than 260 mg/kg total mercury)]

Regulated constituent	Maximum for any single grab sample, TCLP (mg/l)
Mercury	0.025

BDAT TREATMENT STANDARDS FOR P065 AND P092

[Nonwastewaters that are residues from RMERC and are in the Low Mercury Subcategory (i.e., less than 260 mg/kg total mercury)]

Regulated constituent	Maximum for any single grab sample, TCLP (mg/l)
Mercury	0.20

BDAT TREATMENT STANDARDS FOR P065 AND P092

[Wastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/l)
Mercury	0.030

h. Selenium

D010—EP toxic for selenium
P103—Selenourea
P114—Thallium selenite
U204—Selenious acid
U205—Selenium disulfide

For the proposed rule the Agency had no specific treatment data on RCRA hazardous wastewaters or nonwastewaters containing significant quantities of selenium (54 FR 48433). However, based on the similarities in chemical behavior of arsenic and selenium, the Agency extrapolated the treatment performance data for arsenic-containing wastewaters and nonwastewaters to the selenium-containing wastewaters and nonwastewaters, respectively.

(1) *Standards for Selenium-Containing Nonwastewaters.* The Agency believes that for most wastes containing high concentrations of selenium, recovery of selenium is feasible using recovery technologies used by copper smelters and copper refining operations. The Agency does not have any performance data for selenium recovery, but information available to the Agency indicates that recovery of elemental selenium out of certain types of scrap material and other types of waste is currently practiced in the United States. The Agency requested comments and data on the applicability of these, and any other, recovery technologies for wastes containing selenium; however, the Agency received no responses to these issues.

The Hazardous Waste Treatment Council (HWTC) submitted treatment performance data for stabilization of selenium wastes using proprietary reagents to induce cementitious, siliceous, and pozzolanic stabilization reactions. One data set shows a D010 waste containing selenium concentrations of 5 ppm total selenium and 2.97 mg/l in the TCLP extract reduced to concentrations of 0.282 mg/l in the TCLP extract. The binder-to-waste ratio was 1 to 1. Another data set shows results for treatment of a mineral processing waste believed to be a D010 waste because of the high selenium concentrations in the TCLP leachate. The waste contains up to 700 ppm total selenium and 3.74 mg/l selenium in the TCLP leachate. The treated residuals leach between 1.80 and 0.154 mg/l selenium based on TCLP methodology. This waste also contains high concentrations of arsenic, cadmium, and lead. The binder to waste ratios varied from 1.3 to 2.8.

Data were also submitted by the HWTC for the stabilization of wastes containing selenium dioxide (U204) an selenium sulfide (U205). Data for stabilization of the discarded pure product show values of 30 and 6.05 mg/l in the TCLP leachate for U204 and U205, respectively. The binder-to-waste ratios were 1.8 for each study. Data for stabilization of spiked soil samples containing 1000 ppm of the U204 compounds show values of 45.6 mg/l in the unstabilized TCLP leachate and 2.88 mg/l in the stabilized TCLP leachate. Data for stabilization of spiked soil samples containing 1000 ppm of the U205 compounds show values of 0.207 mg/l in the unstabilized TCLP leachate and 0.154 mg/l in the TCLP leachate.

For the proposed rule, the Agency had no stabilization data for selenium and could not investigate the potential problems in stabilization for high concentrations of selenium. The Agency believed, based on selenium's chemical similarities to arsenic, that the same complications would occur (e.g., increased leaching when using alkaline binders). Therefore, the Agency determined that vitrification was the "best" technology for selenium wastes

and extrapolated the performance data for vitrification of arsenic to D010 nonwastewaters and proposed the same concentration-based standard, 5.6 mg/l selenium as measured in the leachate generated by the EP toxicity test (54 FR 48432). In a similar manner, the Agency proposed to transfer this concentration-based treatment standard of 5.6 mg/l selenium to P103, P114, U204, and U205 nonwastewaters. The Agency has received a comment indicating that selenium parallels the melting behavior of arsenic and that the transfer of performance data was valid; however, no performance data for the vitrification of selenium were submitted during the comment period.

EPA still believes that vitrification is an applicable technology for treatment of selenium wastes based on the history of the commercial glass industry using the metal as an additive and the melting behavior of selenium, which is similar to that of arsenic. However, unlike arsenic, no known generators of selenium wastes are investigating vitrification as a treatment technology. The Agency continues to believe that most wastes containing high levels of selenium are being recovered because of the high market value of selenium (approximately $10.00/pound).

The Agency has developed performance standards based on stabilization as BDAT since the only treatment data submitted by commenters, and available to the Agency, were for the stabilization of selenium. Because EPA has information indicating that wastes containing high concentrations of selenium are rarely generated and land disposed, the Agency does not believe that the pure product and simulated wastes are representative of wastes that would require stabilization treatment but are more representative of wastes that should be recovered for the selenium content. Consequently, the Agency is not using any performance data for treatment of these wastes, but is using the performance data for the D010 waste containing up to 700 ppm selenium since this waste contains more selenium than the other wastes and is believed to be the most difficult to treat waste. Based on these data, the Agency has used an analytical recovery of 85 percent to calculate a corrected average concentration of 0.80 mg/l. Next, multiplying the corrected value by a variability factor of 7.15 (calculated from the same selenium treatability data) gives a treatment standard of 5.7 mg/l selenium in the TCLP leachate. The Agency is transferring the stabilization performance from D010 to P103, P114, U204, and U205 because EPA believes this waste to be most representative of wastes requiring stabilization and not recovery.

Because this treatment standard (5.7 mg/l) is above the level of leachable selenium that defines the waste as D010 (1.0 mg/l), D010 wastes that are generated at a level between 5.7 mg/l and 1.0 mg/l meet the treatment standard but are still considered to be hazardous wastes (assuming the TCLP value exceeds 1.0 mg/l) and, therefore, must be land disposed in a subtitle C facility.

(2) *Standards for Selenium-Containing Wastewaters.* Based on the lime, manganese sulfate, and ferric precipitation wastewater treatment data used to calculate the proposed standards for the arsenic wastewaters, the Agency proposed a treatment standard of 0.79 mg/l selenium for the selenium in D010, P103, P114, U204, and U205 wastewaters (54 FR 48431). The Agency also proposed a second option of limiting the treatment standard for D010 wastewaters to the characteristic level of 1.0 mg/l.

The Agency solicited comments regarding the transfer of the arsenic performance data to selenium wastewaters and specifically solicited additional treatment data for wastewaters containing treatable levels of selenium that would classify the wastewaters as D010 prior to treatment. Although several commenters support EPA's determination that arsenic and selenium typically exist in aqueous conditions as oxo-anions and do not exhibit the cationic behavior of other metals, they do not agree that all selenium and arsenic species can be removed by the use of the same treatment technology (i.e., chemical precipitation).

One commenter sent treatment data indicating that precipitation of selenium using ferric chloride at pH 7.0, calcium hydroxide at pH 12.1, aluminum at pH 7.0, ferrous iron at pH 7.0, or sodium sulfide at pH 6.5 could not achieve the level of 0.79 mg/l selenium. Another commenter said that selenium cannot be removed from wastewaters using lime, but can be removed by sulfide treatment. The commenter stated that for the treatment to be effective a pH of less than 2.0 is required.

The Agency received information about the treatment performance of selenium removal using sulfide treatment. This information indicates that selenium can be reduced in wastewaters to the characteristic level (i.e., 1.0 mg/l selenium). Additionally, the precipitate contains elemental selenium, which can be recovered and sold for reuse. Based on the new performance data the Agency is promulgating a treatment standard of 1.0 mg/l selenium for the selenium in D010, P103, P114, U204, and U205 wastewaters.

BDAT TREATMENT STANDARDS FOR 103, P114, U204, and U205

[Nonwastewaters]

Regulated constituent	Maximum for any single grab sample, TCLP leachate (mg/l)
Selenium	5.7

BDAT TREATMENT STANDARDS FOR D010, P103, P114, U204, and U205

[Wastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/l)
Selenium	1.0

i. Silver

D011—Characteristic for Silver
P099—Potassium silver cyanide
P104—Silver cyanide

(1) *D011.* In the proposed rule for nonwastewaters and wastewater forms of D011, the Agency proposed treatment standards and methods of treatment below the characteristic level (0.072 mg/l measured by TCLP and 0.29 mg/l). Commenters indicated that these levels were unachievable for many D011 wastes, such as silver thiosulfate complex waste generated from the photoprocessing industry. This waste is very stable and is not always amenable to recovery or stabilization. The Agency also proposed an option of capping the treatment standards for D011 at the characteristic level. Based on the comments received, the Agency has determined that this second option better represents the overall achievability of treatment for D011 wastes.

(a) Wastewaters. In the proposed rule, the Agency proposed a treatment standard for D011 wastewaters of 0.29 mg/l based on data from the EPA Office of Water's Effluent Guidelines program. In addition, the Agency solicited comments on whether it should specify the use of chloride as the precipitating reagent for all wastewaters containing silver. Commenters opposed specifying

precipitating reagents stating that most wastewater streams contain more than one metal and the use of a required precipitating agent for one metal could interfere with the precipitation of any other metals in the waste stream. The Agency agrees with the commenter's position and is therefore not specifying precipitating agents for silver.

The Agency also solicited comments on the applicable technologies to treat silver wastewaters to the proposed concentration based standard. Based on a review of the comments, the Agency received information that indicated that ion exchange is an applicable technology for silver wastewaters, but will not be able to achieve the proposed standards. Therefore, because of the lack of treatment data and because of the diversity of D011 wastewaters, the Agency is promulgating the treatment standard for D011 wastewaters at the characteristic level of 5.0 mg/l as measured by the EP toxicity.

(b) Nonwastewaters. The Agency proposed three options for treatment standards for D011 nonwastewaters. One option was based on the inherent economic value of silver and the general lack of treatment data for wastes containing various levels of silver. This option proposed "Recovery as a Method of Treatment". Another option proposed was to transfer the performance of stabilization for F006 wastes to silver non-wastewater (i.e. a numerical treatment standard of 0.072 mg/l as measured by the TCLP). The third alternative for the characteristic wastes was to establish the treatment level at the characteristic level of 5.0 mg/l as measured by the EP toxicity. The Agency solicited data on the treatment of D011 nonwastewaters. No data was received but many comments pointed out that the proposed treatment standard is unachievable. The commenters claimed that silver in many D011 nonwastewaters can not be recovered because these wastes contain silver sulfate complexes. In addition, many commenters stated that the treatment standard of 0.072 mg/l is not achievable due to the diversity of the D011 wastes. The Agency agrees with the commenters that some of the D011 wastes can not be recovered or be treated to the treatment level. The commenters did not provide any treatment data for D011 nonwastewaters but did provide substantial technical arguments (based on the chemical nature of wastes classified as D011 nonwastewaters) that recovery is not an applicable technology for all D011 nonwastewaters and that the performance of stabilization for D011 nonwastewaters may not achieve similar treated concentrations of silver. Therefore, the Agency is promulgating the treatment standards for D011 nonwastewaters at the characteristic level of 5.0 mg/l measured by the EP toxicity.

(2) P099 and P104. The Agency is promulgating the wastewater treatment standard for silver as proposed. The Agency received no comments disputing the technical feasibility of the transfer of the Effluent Guidelines data to P099 and P104 wastewaters. As a point of clarification, the Agency is promulgating a numerical treatment standard as opposed to a method of treatment for silver. Treatment standards for cyanides contained in P099 and P104 wastewaters, and cyanides as well as silver in P099 and P104 nonwastewaters, were promulgated in the Second Third final rule on June 23, 1989 (54 FR 26614).

BDAT TREATMENT STANDARDS FOR D011

[Wastewaters]

Regulated constituent	Maximum for any single grab sample total composition (mg/l)
Silver	5.0

BDAT TREATMENT STANDARDS FOR D011

[Nonwastewaters]

Regulated constituent	Maximum for any single grab sample total leachate by TCLP (mg/l)
Silver	5.0

BDAT TREATMENT STANDARDS FOR P099 AND P104

[Wastewaters]

Regulated constituent	Maximum for any 24 hour composite sample total composition (mg/l)
Silver	0.29

See also the promulgated standards for cyanides in the Second Third Final Rule.

j. Thallium

P113—Thallic oxide
P114—Thallium (I) selenite
P115—Thallium (I) sulfate
U214—Thallium (I) acetate
U215—Thallium (I) carbonate
U216—Thallium (I) chloride
U217—Thallium (I) nitrate

In today's rule, the Agency is promulgating nonwastewater and wastewater treatment standards for P113, P115, U214, U215, U216, and U217 thallium wastes as proposed. No comments were received addressing the proposed approach for regulating these wastes.

The Agency proposed to establish a thallium nonwastewater treatment standard for P114, thallium selenite, expressed as recovery or stabilization as a required method of treatment. A thallium wastewater treatment standard was also proposed, 0.14 mg/l. These thallium treatment standards are not being promulgated today. The Agency is promulgating, however, P114 treatment standards for selenium nonwastewaters and wastewaters (see preamble section III.A.3.h.). The Agency is taking this action because it believes that the treatment of selenium in P114 will also provide substantial treatment of thallium.

The Generator Survey indicates that most thallium nonwastewaters are characterized as inorganic salts used as research chemicals, or off-specification or out-dated materials. The Agency believes that due to the relatively high economic value of thallium, generators have an economic incentive to investigate recovery options and source reduction techniques. There may be cases, however, at very low concentrations and low waste volumes when recovery may not be a viable alternative for thallium wastes. No comments were received on the proposed nonwastewater standard, therefore, the Agency promulgating the nonwastewater treatment standard expressed as required methods: "Recovery or Stabilization". (See § 268.42 Table 1 in today's rule for a detailed description of the technology standard referred to by the five letter technology code in the parentheses.)

Most thallium wastewaters are characterized as metallic acidic liquids. Thallic hydroxide is very insoluble, therefore, thallium wastes can be treated by chemical oxidation followed by chemical precipitation with hydroxide reagents, settling and filtration, in order that most of the thallic compounds will precipitate out into the sludge. The Agency proposed a treatment standard for thallium wastewaters based on data from the EPA Office of Water's Effluent Guidelines program of 0.14 mg/l. No comments were received on this proposed treatment standard, therefore, the Agency is promulgating as proposed.

BDAT TREATMENT STANDARDS FOR P113, P115, U214, U215, U216, AND U217

(Nonwastewaters)

Thermal recovery (RTHRM) or stabilization (STABL) as a method of treatment

BDAT TREATMENT STANDARDS FOR P113, P115, U214, U215, U216, AND U217

(Wastewaters)

Regulated constituent	Maximum for any single grab sample, total composition (mg/l)
Thallium	0.14

k. Vanadium

P119—Ammonium vanadate
P120—Vanadium pentoxide

At proposal, the Agency had no data from the treatment of P119 and P120 nonwastewaters upon which to establish concentration-based treatment standards. The Agency had data, however, on the recovery of vanadium from spent catalysts that typically contain about 5% vanadium. The Agency also anticipated that wastes containing vanadium could also be stabilized. This recovery and stabilization information were the basis of the proposed nonwastewater treatment standard for P119 and P120 expressed as required methods of treatment: thermal recovery or stabilization. Commenters generally supported the proposed nonwastewater treatment standard.

One commenter, however, suggested that the thermal recovery treatment standard should be revised to include recovery by dissolution, chemical precipitation, followed by thermal treatment. The Agency agrees that pretreatment practices such as dissolution, chemical precipitation, cation exchange, or resin adsorption that are performed in tanks or containers are not precluded by today's final treatment standard. However, since these recovery processes are not precluded by any treatment standard (as long as the recovery is not performed in land disposal units) and since the Agency currently lacks information to clarify a description of a specific thermal recovery process for vanadium wastes in § 268.42 Table 1 (i.e., it is uncertain that the thermal recovery process for vanadium matches the description for thermal recovery listed under the five letter technology code identified as RTHERM), the Agency is promulgating a standard for P119 and P120 that only specifies stabilization as a method of treatment.

A treatment standard was proposed for vanadium wastewaters of 0.042 mg/l based on data from the EPA Office of Water's Effluent Guidelines program. Commenters asserted that this wastewater treatment standard and was unattainable and was probably due to the effects of dilution. Upon reexamination of these data, the Agency tends to agree that this low level was due to dilution and is, therefore, not promulgating this treatment standard in today's rule. The Agency received data that were classified as Confidential Business Information during the comment period from a proprietary wastewater treatment technology. Since these data reflect the actual treatment of P119 and P120 wastewaters (and the Agency has no other treatment data for these wastes) the Agency has decided to use them to calculate today's final wastewater treatment standard of 28 mg/l.

The proposed rule included a statement that P119 and P120 nonwastewaters can be generated as spent catalysts from chemical production or as fly ash from the iron and steel industry. Commenters pointed to this statement as a mistake, and requested clarification on the definition of P119 and P120 wastes. The Agency regrets the confusion that was caused by this statement and agrees that it was a mistake. The statement would actually apply to vanadium-containing compounds that do not meet the definition of listed P119 and P120 wastes (i.e., they are not unused commercial chemical products). Spent catalysts and iron and steel industry fly ash are not classified as P119 and P120.

Commenters requested that the Agency establish another treatability group for P119 and P120 nonwastewaters because containers or container liners from the shipment of ammonium metavanadate or vanadium pentoxide as commerical chemical products may become P119 or P120 hazardous waste. The Agency disagrees that another treatability group is needed. In the event that a non-empty container from the shipment of P119 or P120 is generated and today's treatment standard cannot be met, the generator may petition the Agency for a variance from the treatment standard.

BDAT TREATMENT STANDARDS FOR P119 AND P120

(Nonwastewaters)

Stabilization (STABL) as a method of treatment

BDAT TREATMENT STANDARDS FOR P119 AND P120

(Wastewaters)

Regulated constituent	24 hour composite sample, total composition (mg/l)
Vanadium	28

4. Treatment Standards for Remaining F and K Wastes

a. F002 and F005

F002—The following spent halogenated solvents: Tetrachloroethylene, methylene chloride, trichloroethylene, 1,1,1-trichloroethane, chlorobenzene, 1,1,2-trichloro-1,2,2-trifluoroethane, ortho-dichlorobenzene, trichloro-fluoromethane, and 1,1,2-trichloroethane; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above halogenated solvents or those listed in F001, F004, or F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.

F005—The following spent non-halogenated solvents: Toluene, methyl ethyl ketone, carbon disulfide, isobutanol, pyridine, benzene, 2-ethoxyethanol, and 2-nitropropane; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above non-halogenated solvents or those solvents listed in F001, F002, or F004; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.

EPA is promulgating treatment standards for 1,1,2-trichloroethane, benzene, 2-ethoxyethanol, and 2-nitropropane. EPA has revised its proposed approach for wastewaters in response to comments. These four organic compounds were added as hazardous constituents to the F002 and F005 spent solvents in 1986 (see 51 FR 6737, February 25, 1986). Today's treatment standards only apply to these four new solvents. Treatment standards for other solvents in F002 and F005 remain as promulgated in the 51 FR 40572, November 7, 1986, Solvents and Dioxins Rule. A technical description of these four new spent solvents can be found in the Listing Document for F002 and F005, as amended in 1986, and in 40 CFR 261.31.

The Agency received comments addressing various issues related to these wastes. One commenter pointed out that there were discrepancies between the proposed treatment standards for 1,1,2-trichloroethane in both wastewater and nonwastewater forms of F002. The discrepancies occurred in the concentration-based standards presented in the preamble, and the regulation (see 54 FR 48461, November 22, 1989). A similar discrepancy occurred in the wastewater treatment standard for 2-nitropropane in F005. EPA thanks the commenter for pointing out these typographical errors. The proposed BDAT Background Document Amendment for F002 and F005 confirms that the concentration-based standard for 2-nitropropane in wastewater forms of F005 in the preamble discussion was in error. The concentration-based standards printed in the regulatory tables for 1,1,2-trichloroethane wastewaters and nonwastewaters likewise were in error. The preamble and the proposed Background Document Amendment presented the correct treatment standards. The correct treatment standards are being finalized in today's rule.

(1) *Revisions to the Proposed Rule for Wastewaters.* Other commenters urged the Agency to develop treatment standards for wastewater forms of F002 and F005 based on residues from wastewater treatment technologies rather than incineration scrubber waters. Commenters felt that EPA has several performance data from wastewater treatment technologies treating wastewaters containing the same or similar constituents to F002 and F005 which EPA can use in order to develop treatment standards. Commenters emphasize that these performance data better represent the treatment of organic-containing wastewaters rather than incineration scrubber waters alone.

As stated in the Final Rule for Land Disposal Restrictions for Second Third Wastes (54 FR 26629) and reiterated in the proposed rule for Third Third Wastes (54 FR 48390), when the Agency has appropriate wastewater treatment data from well-designed and well-operated wastewater treatment units, it prefers to use these data rather than scrubber water concentrations to develop wastewater treatment standards.

Commenters to the proposed First Third, Second Third, and Third Third rules almost unanimously supported that EPA should promulgate wastewater standards based on the performance of specific wastewater treatment rather than incinerator scrubber water constituent levels. After reviewing all available data and comments, the Agency agrees with these comments, and is promulgating concentration-based treatment standards for 1,1,2-trichloroethane and benzene based on wastewater treatment data rather than scrubber water for all wastes that were proposed in the Third Third rule. While the Agency did not specifically identify the standards based on wastewater treatment data as alternatives for F and K wastewaters, the Agency believes that this is a logical outgrowth of the notice and comment process. As such, the Agency is today modifying the wastewater treatment standards for F002 and F005.

(2) *Treatment Standards for 1,1,2-Trichloroethane (F002) and Benzene (F005).* The treatment standards promulgated today for organics in wastewater forms of F002 and F005 are based on performance data generated from one, or a combination of two or more of the following BDAT technologies: Biological treatment, steam stripping, carbon adsorption, liquid extraction, and others. (See Section III.A.6.(3) of today's preamble for a discussion of these performance data.) Those treatment standards are expressed as concentration levels for 1,1,2-trichloroethane (F002) and benzene (F005).

The treatment standards promulgated for organics in nonwastewater forms of F002 and F005 are based on incineration. These treatment standards are expressed as concentration based standards for 1,1,2-trichloroethane (F002) and benzene (F005).

Each treatment standard is based on the treatment of another waste containing the same or similar constituents to the one of concern. EPA believes that none of the constituents in F002 and F005 are likely to interfere with the treatment of organics in F002 and F005. As a result, EPA is transferring the available performance data to these two wastes.

(3) *Treatment Standards Expressed as Methods of Treatment for 2-ethoxyethanol and 2-nitropropane.* Comments were received indicating drastic detection limits discrepancies in nonwastewater forms that contain 2-nitropropane. The proposed treatment standards relied on pilot scale data from the stripping of synthetic wastewaters along with incineration performance data for a waste containing a constituent as difficult to treat as 2-nitropropane. Based on the available data, EPA believes that 2-nitropropane may not be amenable to analytical quantification and thus, a concentration-based treatment standard is not be a viable regulatory option at this time. (See section III.A.5.b)

Another problematic constituent is 2-ethoxyethanol. As with 2-nitropropane, the proposed treatment standards relied on in-house treatment studies and performance data from similar wastes. For 2-ethoxyethanol, EPA specifically conducted bench-scale studies for the biological treatment of synthetic wastewaters spiked with 2-ethoxyethanol. Modifications to existing analytical test methods were needed in order to enable EPA to analyze these two organic constituents in wastewaters and nonwastewaters. EPA has determined that the available information is insufficient to promulgate concentration-based treatment standards for wastewater and nonwastewater forms of F005 at this time. As a result, EPA is withdrawing the proposed concentration based treatment standards for F005 wastes that contain 2-nitropropane and 2-ethoxyethanol respectively (i.e., F005 wastes that are listed due to the presence of these constituents). EPA is instead promulgating required methods as the treatment standard.

EPA proposed incineration or steam stripping followed by carbon adsorption as methods of treatment for F005 wastewaters containing 2-nitropropane. This proposal relied on in-house pilot scale steam stripping studies of 2-nitropropane as well as a transfer of steam stripping data for wastewaters containing nitrobenzene. EPA's in-house treatment study indicated that 2-nitropropane is likely to form an azeotrope with water. Therefore, any technology-based treatment standard that specifies steam stripping for these wastes must also specify (or at least emphasize) operating conditions capable of treating this type of azeotrope (or prevent its generation). At this time, EPA lacks sufficient information to develop such detailed standards. EPA is thus withdrawing steam stripping as part of an alternative technology-based treatment standard.

The Agency has determined that chemical oxidation followed by carbon adsorption as well as wet air oxidation followed by carbon adsorption represent BDAT for F005 wastes listed for 2-nitropropane. This determination is based on available performance data for wastewaters containing organic constituents that are as difficult to treat as 2-nitropropane. EPA does not expect any of the other constituents in F005 wastewaters to interfere with the

treatment of 2-nitropropane when treated by these technologies. As a result, EPA is promulgating these two treatment trains along with incineration as technology-based treatment standards for F005 wastewaters listed for 2-nitropropane.

Based on the revisions to the proposed treatment standards for F005 wastewaters containing 2-nitropropane, EPA is also withdrawing its proposed criteria for defining wastewaters in this category of F005 wastewaters (i.e., less than 4% TOC and less than 1% TSS.) The definition of wastewaters and nonwastewaters is thus consistent with those established for all hazardous wastes (i.e., as defined in section 268.2(a)(6) of today's rule but not including the wastewater definitions excluded in § 268.2(a)(6) (i) through (iv).)

EPA is promulgating the proposed technology-based treatment standards for F005 wastes listed for 2-ethoxyethanol as incineration or biodegradation. EPA believes that these technologies are BDAT based on a transfer of information on the treatment of n-butyl alcohol using activated sludge. EPA believes that n-butyl alcohol is as difficult to treat as 2-ethoxyethanol.

For nonwastewater forms of F005 containing these two constituents, EPA is promulgating a treatment standard of "Incineration" as a method of treatment. EPA is specifying further that incinerators operate in accordance with the technical requirements of part 264 subpart O or part 265 subpart O. Residues from incineration are not precluded from land disposal. However, nonwastewater forms of F005 resulting from the required wastewater treatment processes must comply with the incineration treatment standards as a pre-requisite for land disposal.

BDAT TREATMENT STANDARDS FOR F002, LISTED FOR 1,1,2-TRICHLOROETHANE

[Nonwastewaters]

Regulated constituent	Maximum for any single, grab sample, total composition (mg/kg)
1,1,2-Trichloroethane	7.6

BDAT TREATMENT STANDARDS FOR F002, LISTED FOR 1,1,2-TRICHLOROETHANE

[Wastewaters]

Regulated constituent	Maximum for any composite sample, total composition (mg/l)
1,1,2-Trichloroethane	0.030

BDAT TREATMENT STANDARDS FOR F005, LISTED FOR BENZENE

[Nonwastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/kg)
Benzene	3.7

BDAT TREATMENT STANDARDS FOR F005, LISTED FOR BENZENE

[Wastewaters]

Regulated constituent	Maximum for any composite sample, total composition (mg/l)
Benzene	0.070

BDAT TREATMENT STANDARDS FOR F005, LISTED FOR 2-NITROPROPANE OR 2-ETHOXYETHANOL

[Nonwastewaters]

Incineration (INCIN) as a method of treatment

BDAT TREATMENT STANDARDS FOR F005, LISTED FOR 2-ETHOXYETHANOL

[Wastewaters]

Incineration (INCIN); or biodegradation (BIODG) as methods of treatment

BDAT TREATMENT STANDARDS FOR F005, LISTED FOR 2-NITROPROPANE

[Wastewaters]

Incineration (INCIN); chemical oxidation (CHOXD) followed by carbon adsorption (CARBN); or wet air oxidation (WETOX) followed by carbon adsorption (CARBN) as methods of treatment

b. F006 and F019

In today's final rule, the Agency is promulgating an amendment to Method 9012, used for analyzing wastes for cyanides. In this amendment, the Agency is specifying that in order to determine compliance with the promulgated treatment standards for nonwastewaters in cyanides, a facility must use a 10 gram sample size and a distillation time of 1 hour and fifteen minutes.

In the June 23, 1989 Second Third final rule, the Agency promulgated treatment standards for amenable and total cyanide constituents for the electroplating, heat treating, and acrylonitrile F and K wastes (54 FR 26610–26615). The Agency transferred certain of these treatment standards to the cyanide wastes listed as P waste codes. The analytical method used to measure cyanide concentrations in treatment residues (thereby determining compliance with the treatment standard) was SW–846 Method 9012.

Commenters suggested that the Agency not amend the analytical method and that the Agency conduct a study that investigates improvements for the analytical method for cyanides and treatment of F006 wastes. The Agency appreciates the commenters' concerns about the analytical method. The Agency is aware that analytical problems exist for measuring total and amenable cyanides in nonwastewaters. The Agency believes that these problems exist because there is no specific sample size and distillation time specified in Method 9012. Because a generator or treater may use any sample size or distillation time, the Agency has decided to amend the analytical method 9012 by promulgating constraints on sample size and distillation time of 10 grams and one hour and fifteen minutes, respectively. In fact, the sample size and the distillation time used to develop the treatment standards for F006, F007, F008, and F009 nonwastewaters were 10 grams and one hour and fifteen minutes, respectively (see RCRA Docket LD10–L0032, letter dated May 1, 1989).

By promulgating these specifications on sample size and distillation time, the Agency believes that compliance with the BDAT treatment standard will occur as a result of actual treatment. EPA does not believe that this promulgated clarification to the analytical method affects the achievability of the cyanide standards already promulgated. After the close of the Second Third rulemaking, a potential loophole in the cyanide analytic method was brought to EPA's attention. The Agency solicited

information from generators and treaters as to the sample size and distillation time used as standard operating procedures. These facilities indicated that they were achieving the F006 nonwastewater cyanide standard by using a sample size of less than 5 grams and a distillation time of 1 hour (see administrative record for cyanide wastes in today's notice. Also, see 54 FR 48447 noting this information for public comment in this rulemaking). Therefore, the Agency believes that the data in the Second Third rule documenting achievability of the cyanide treatment standard reflects the analytic procedure being promulgated today.

(1) *F006 Wastewaters.* Today's rule promulgates wastewater treatment standards for amenable and total cyanides and metal constituents for F006 wastewaters as proposed. (Nonwastewater standards for F006 metal constituents were promulgated in the First Third final rule, and nonwastewater standards for F006 cyanides were promulgated in the Second Third final rule.) Wastewater treatment standards are based on the performance of alkaline chlorination for the amenable and total cyanides, and chromium reduction followed by chemical precipitation using lime and sulfides and sludge dewatering for the metals. Detailed information on F006 waste characterization and the technical feasibility of the transfer of the performance of the treatment systems can be found in the Final Addendum to the Best Demonstrated Available Technology (BDAT) Background Document for F006.

In addition, commenters believe that the transfer of the treatment for K062 wastewaters to F006 wastewaters is inappropriate. The Agency disagrees with the commenters and believes that the transfer is technically feasible because of the high concentration of metals in K062 as compared to F006 wastewaters, making these wastes more difficult to treat. Furthermore, in determining today's promulgated standards, the Agency also evaluated performance data that were developed by EPA's Office of Water for hydroxide precipitation, sedimentation, and filtration for wastes from the metal finishing industry. However, the Agency did not use these data to develop today's promulgated F006 metal standards because the metal finishing waste characterization data indicated that the untreated concentrations of these metals in these wastewaters were low compared to those in F006 wastewaters. The Agency believes, therefore, that these treatment data for the metal finishing wastewater streams do not represent treatment of F006 wastewaters and may result in wastewater treatment standards that would be unachievable for actual F006 wastewaters. Thus, the Agency is not promulgating F006 wastewater treatment standards based on these data.

BDAT TREATMENT STANDARDS FOR F006

[Wastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/l)
Cyanides (Total)	1.2
Cyanides (Amenable)	.86
Cadmium	1.6
Chromium	.32
Lead	.040
Nickel	.44

(2) *F019.* Today's rule promulgates treatment standards for amenable and total cyanides and total chromium in F019 wastewaters and nonwastewaters. The treatment standards for the amenable and total cyanides in the F019 wastewater and nonwastewaters are based on the performance of alkaline chlorination. The treatment standard for the chromium in the F019 wastewater is based on chromium reduction followed by precipitation with lime and sulfide and sludge dewatering. Treatment standard for the chromium in the F019 nonwastewater is based on stabilization.

In the proposed rule, the Agency solicited comments on two options. The first option proposed concentration-based treatment standards for cyanides based on the performance data for wet air oxidation (that is the 390 mg/kg and 20 mg/kg for total and amenable cyanides, respectively). The second option proposed was to transfer the concentration-based treatment standards for cyanides based on the performance of alkaline chlorination for F006–F009 (electroplating wastes) to F019 wastes (that is the 590 mg/kg and the 30 mg/kg for total and amenable cyanides, respectively).

Based on a review of the comments, the majority of the commenters suggested that the Agency promulgate a standard based on the 590 mg/kg limit. The commenters suggest that the electroplating wastes are similar to the F019 waste because of the iron concentration in the untreated wastes. Therefore, the Agency is promulgating cyanide standards based on a transfer of the performance of the treatment system for electroplating wastes. The Agency believes that the transfer is technically feasible because of the following reasons. First, the Agency believes, as stated in the Final Second Third Rule, that these wastes contain high concentration of iron complex cyanides. The waste characterization data for F006 through F009 indicate that the influent iron concentrations, in some cases, are similar to the F019 wastes based on available waste characterization data. Second, at the time of the proposed rule, the only relevant treatment data available to the Agency to establish treatment standards for these wastes were the performance of wet air oxidation of F019 wastes and from the transferred performance of alkaline chlorination for F006 through F009 wastes. The Agency was reluctant to use the wet air oxidation data to develop treatment standards for F019 because of the analytical discrepancies in the influent concentration of cyanides of typical F019 wastes, suggesting strongly that the wastes treated were unrepresentative. Therefore, the Agency solicited comments on the use of wet air oxidation or any other technology used to develop treatment standards for F019 wastes. During the comment period, the Agency received no treatment data and many comments questioned whether wet air oxidation is applicable technology for these wastes or is demonstrated on a full scale basis. Therefore, the Agency's only alternative in developing cyanide treatment standards for the waste—given the lack of any other data and absence of comment—is to transfer the performance of alkaline chlorination of the electroplating wastes to the F019 wastes.

In addition, the Agency is promulgating a treatment standard for amenable cyanides in F019 nonwastewaters based on the reproducibility of the analytical method for total cyanides. Details of the calculation of the amenable cyanide standards can be found in the background document. The Agency used a similar procedure for developing treatment standards for amenable cyanides in F006–F012 wastes in the Second Third Final Rule (see 54 FR 26611).

The Agency is promulgating treatment standards for total chromium in F019 wastewaters based on the performance of chromium reduction, lime and sulfide precipitation, and sludge dewatering for K062 wastewaters. The Agency believes that this is a technically feasible transfer due to the influent total chromium concentration of 7000 ppm for

K062 is similar to the concentration of chromium in F019 wastewaters.

The Agency is also promulgating treatment standards for total chromium in F019 nonwastewaters based on a transfer of performance data from the stabilization of F006 wastes. The Agency believes that the transfer of the performance of stabilization data from F006 to F019 is technically feasible due to the higher concentration of metals within F006 wastes (i.e. up to 3000 ppm).

BDAT TREATMENT STANDARDS FOR F019

[Wastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/l)
Cyanides (total)	1.2
Cyanides (amenable)	0.86
Chromium (total)	0.32

BDAT TREATMENT STANDARDS FOR F019

[Nonwastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/kg)
Cyanides (total)	590
Cyanides (amenable)	30
	Maximum for any single grab sample, TCLP (mg/l)
Chromium (total)	5.2

c. F024

F024—Process wastes, including but not limited to, distillation residues, heavy ends, tars, and reactor clean-out wastes, from the production of certain chlorinated aliphatic hydrocarbons by free radical catalyzed processes. These chlorinated aliphatic hydrocarbons are those having carbon chain lengths ranging from one to and including five, with varying amounts and positions of chlorine substitution. (This listing does not include wastewaters, wastewater treatment sludges, spent catalysts, and wastes listed in 261.31 or 261.32.)

Wastes identified as F024 are generated primarily by facilities in the organic chemicals manufacturing industry, specifically those engaged in the production of chlorinated aliphatic hydrocarbons. Detailed technical descriptions of the production processes generating these wastes can be found in the listing background document prepared by EPA for this waste code.

Today's rule amends the treatment standards promulgated on June 23, 1989, for F024 (54 FR 26615) by revising the treatment standards to take account of the presence of chlorinated dibenzodioxins and furans in some nonwastewater and wastewater forms of F024, and still allow for proper treatment of these wastes. Today's rule also promulgates the treatment standards proposed on November 22, 1989, for metal constituents in nonwastewater forms of F024. BDAT treatment standards for nonwastewater metals are based on stabilization of F024 incinerator ash using a cement binder. Other treatment technologies that can achieve these concentration-based treatment standards are not precluded from use by this rule. EPA is promulgating treatment standards for three metal constituents, chromium, lead, and nickel, in nonwastewater forms of F024. The complete list of regulated constituents and treatment standards for this waste are presented in the tables at the end of this section. Treatment standards for volatile and semivolatile organic constituents in F024 nonwastewaters and volatile and semivolatile organic and metal constituents in F024 wastewaters were promulgated on June 23, 1989 (54 FR 26615) and are not being amended by this rulemaking unless specifically stated.

Several commenters confirmed EPA's inquiry in the Third Thirds proposed rule (54 FR 48450) that some treatment facilities that previously treated F024 are now refusing to do so because the treatment standards for F024 include standards for various chlorinate dibenzo-dioxins and furans. Commenters agreed that this is the case and documented the current refusal of commercial treatment facilities to accept this waste, whether or not the waste actually contained any chlorinated dibenzo-dioxins and/or furans. All of the commenters agreed that the existence of a dioxin standard is the basis for the refusal to treat. This has resulted in a capacity shortage for treatment of F024 wastes. Commenters further stated that if the treatment standards for other organic constituents in F024 were met, they believed that the treatment standards for the chlorinated dibenzo-dioxins and furans would also be met. Two commenters suggested specific constituents that may be used as surrogates for the chlorinated dibenzo-dioxins' and furans' treatment standards.

The Agency may elect not to regulate every BDAT List constituent that is present or suspected to be present in a listed waste. Frequently, EPA elects an appropriate subset of constituents for regulation in order to facilitate compliance and enforcement. In selecting constituents for regulation, the Agency considers, among other factors, the relative difficulty involved in treating each constituent by the treatment technology identified as BDAT. The subset of constituents selected should ensure that other constituents of concern are adequately treated when the treatment standards for the regulated constituents are met. Waste characteristics affecting the performance of the treatment technology (WCAPs) are used to identify the hardest to treat constituents present in a waste. These constituents may then be selected for regulation and used as surrogates for other non-regulated constituents of concern to ensure that they are adequately treated. For incineration technologies, WCAPs include a constituent's boiling point for nonwastewater residuals and a constituent's bond dissociation (BDE) for wastewater residuals. Constituents with higher boiling points and BDEs are considered to be more difficult to treat than those with lower boiling points and BDEs for nonwastewater and wastewater residuals, respectively.

The Agency did not feel the surrogates suggested for the chlorinated dibenzo-dioxins and furans in F024 wastes by the two commenters were appropriate because they were not more difficult to treat than these constituents (with boiling points ranging from 400 to 500 degrees Celsius and BDEs ranging from 960 to 2,490 kcal/mole), and therefore would not ensure adequate treatment of the chlorinated dibenzo-dioxins and furans. Also, the Agency attempted on its own to develop surrogates, but was unable to identify an appropriate surrogate that was present at treatable levels in all of the wastes containing the chlorinated dibenzo-dioxin and furan constituents. At best, achieving all of the non-dioxin/furan standards' serves as a generalized indication that treatment for dioxins and furans was probably also effective.

The concentration-based treatment standards that were promulgated for the chlorinated dibenzo-dioxins and furans in F024 (54 FR 26615) may hinder effective treatment because of the refusal of treatment facilities to accept these wastes due to the perceived stigma of managing wastes containing chlorinated dioxins and furans. Also, as noted, the Agency is unable to select an

appropriate particular surrogate which would ensure adequate treatment of these constituents. Finally, the Agency believes that incineration technologies can effectively treat chlorinated dibenzo-dioxins and furans based on the results obtained from the Agency-sponsored incineration treatment test of F024 wastes containing these constituents.

Therefore, based on the above considerations, the Agency is revising the treatment standards promulgated on June 23, 1989 to specify incineration as a method of treatment for F024 wastes (organic constituents only). If these wastes are incinerated, the record indicates that dioxins and furans, as well as all of the other hazardous constituents in the waste will be substantially destroyed. To ensure that incineration is fully effective, the Agency will also retain in the rule the existing standards for organics promulgated in the Second Third rule. Thus, there will be no specific standard for dioxins and furans in the rule, which should alleviate the treatment industry's reluctance to accept these waste. The § 268.7 certification would refer to the designated method for treating this waste, and certify that the standards for organic hazardous constituents (which do not include dioxins and furans) have been satisfied. Standards for metals would remain as numerical limits, however. These standards are discussed below. (Ordinarily the Agency would not alter a regulatory standard due to industry recalcitrance. In this case, however, the clear existence of a problem, the Agency's desire to have industry resume treatment of these wastes (there was no capacity shortfall until EPA promulgated the Second Third treatment standard), and the statutory prohibitions on disposal and storage (which foreclose all legitimate waste management options) have led EPA to revise the treatment standard.)

Two commenters stated that the proposed treatment standards for metal constituents may preclude F024 from being accepted at commercial incineration facilities. The Agency feels that the treatment standards calculated from stabilization testing of F024 incinerator ash appropriately reflect the level of performance achievable via stabilization for chromium, lead, and nickel in F024. In addition, EPA has not received treatment performance data from the regulated community indicating that the proposed treatment standards cannot be met. Therefore, the Agency has no reason to believe that the treatment standards proposed for chromium, lead, and nickel in nonwastewater forms of F024 cannot be reliably met on a routine basis and is not revising the proposed treatment standards in today's rule.

One commenter expressed concern that other forms of incineration (i.e., liquid and gas phase incineration) are precluded from use in meeting the treatment standards for organic constituents in F024 if rotary kiln incineration is specified as BDAT. Liquid injection incineration and fluidized bed incineration may provide equivalent levels of treatment to rotary kiln incineration and, therefore, may be considered equivalent BDAT technologies for organic constituents in liquid and solid forms of F024, respectively. As is the case for all concentration-based treatment standards promulgated in the land disposal restrictions program, the use of other treatment technologies that can achieve the promulgated concentration-based treatment standards in F024 is not precluded by the second third rule (54 FR 26615). Nor is the incineration standard specified as an alternative treatment standard in today's rule based on any particular type of incineration.

One commenter stated that the treatment standards promulgated for the nine volatile and semivolatile organic constituents in nonwastewater forms of F024 (54 FR 26615) were set below practical quantitation limits (PQLs) and should be revised. The commenter is incorrect. The treatment standards for these nine organic constituents in nonwastewater forms of F024 were based on the detection limits of these constituents achieved on F024 residuals analyzed following the Agency-sponsored incineration treatment test. The PQLs the commenter refers to were obtained from analyzing a non-F024 incinerator ash.

One commenter expressed concern that the definition of F024 had been revised to include watewaters. The wastewater treatment standards adopted for F024 are applicable to wastewater residuals derived from the treatment or leaching of nonwastewater forms of F024 as defined in 40 CFR 261.31. This does not include process wastewaters from the production of chlorinated aliphatic hydrocarbons.

BDAT TREATMENT STANDARDS FOR F024

[Nonwastewaters]

Incineration (INCIN) as a method and meet the following standards

Regulated constituent	Maximum for any single grab sample, total composition (mg/kg)
2-Chloro-1,3-butadiene	0.28
3-Chloropropene	0.28
1,1-Dichloroethane	0.014
1,2-Dichloroethane	0.014
1,2-Dichloropropane	0.014
cis-1,3-Dichloropropene	0.014
trans-1,3-Dichloropropene	0.014
Bis(2-ethylhexyl)phthalate	1.8
Hexachloroethane	1.8

Regulated constituent	Maximum for any single grab sample TCLP (mg/l)
Chromium (total)	0.073
Lead	0.021
Nickel	0.088

BDAT TREATMENT STANDARDS FOR F024

[Wastewaters]

Regulated constituent	Maximum for any single grab sample total composition (mg/kg)
2-Chloro-1,3-butadiene	0.28
3-Chloropropene	0.28
1,1-Dichloroethane	0.014
1,2-Dichloroethane	0.014
1,2-Dichloropropane	0.014
cis-1,3-Dichloropropene	0.014
trans-1,3-Dichloropropene	0.014
Bis(2-ethylhexyl)phthalate	0.036
Hexachloroethane	0.036
Chromium (total)	0.35
Nickel	0.47

d. F025 Waste

F025—Condensed light ends, spent filters and filter aids and spent desiccant wastes from the production of certain chlorinated aliphatic hydrocarbons by free radical catalyzed processes. These chlorinated aliphatic hydrocarbons are those having carbon chain lengths ranging from one to and including five with varying amounts and positions of chlorine substitution.

On December 11, 1989, (54 FR 50968) EPA amended its regulations under RCRA by listing as hazardous one generic category of waste generated during the manufacture of chlorinated aliphatic hydrocarbons by free radical catalyzed processes having carbon

chain lengths ranging from one to five (EPA Hazardous Waste No. F025). The listing of EPA Hazardous Waste No. F025 becomes effective on June 11, 1990. In anticipation of this listing, the Agency proposed concentration-based treatment standards for F025 wastes in the November 22, 1989 land disposal restrictions proposal (54 FR 48450) for third third wastes. The Hazardous and Solid Waste Amendments of 1984 (HSWA) require the Agency to determine specific treatment standards which the waste must achieve prior to land disposal within six months of the listing of the waste as hazardous. Therefore, today's rule promulgates final treatment standards for wastewater and nonwastewater forms of F025 waste as proposed.

F025 wastes are characterized as condensed light ends, spent filters and filter aids, and spent desiccant wastes from the production of certain chlorinated aliphatic hydrocarbons. For the purposes of establishing treatment standards, the wastes have been grouped into two subcategories: condensed light ends and filters/aids and desiccants. Available characterization data suggest that different constituents may be contained in each of these subcategories. As such, the Agency is promulgating concentration-based treatment standards to reflect these differences in physical and chemical composition. Concentration-based treatment standards for all wastewater and nonwastewater forms of F025 are promulgated today based on the transfer of performance data used in the development of treatment standards for specific U and P wastes that are constituents in the various F025 subcategories. (See sections III.A.2.c. and III.A.2.d. for additional information). Because no comments were received on the proposed regulation for any of the specific constituents of F025 wastewaters or nonwastewaters, the Agency assumes that generators and treaters of F025 agree with EPA's assessment of the treatment of this waste. Further information on the development of treatment standards can be found in the Background Document for F025 Wastes in the RCRA docket.

BDAT TREATMENT STANDARDS FOR F025

[Nonwastewaters]

[Light Ends Subcategory]

Regulated constituent	Maximum for any single grab sample, total composition (mg/kg)
Chloroform	6.2
1,2-Dichloroethane	6.2
1,1-Dichloroethylene	6.2
Methylene chloride	31
Carbon tetrachloride	6.2
1,1,2-Trichloroethane	6.2
Trichloroethylene	5.6
Vinyl chloride	33

BDAT TREATMENT STANDARDS FOR F025

[Wastewaters]

[Light Ends Subcategory]

Regulated constituent	Maximum for any 24-hour composite sample, total composition (mg/l)
Chloroform	0.046
1,2-Dichloroethane	0.21
1,1-Dichloroethylene	0.025
Methylene chloride	0.089
Carbon tetrachloride	0.057
1,1,2-Trichloroethane	0.054
Trichloroethylene	0.054
Vinyl chloride	0.27

BDAT TREATMENT STANDARDS FOR F025

[Nonwastewaters]

[Spent Filters/Aids and Desiccants Subcategory]

Regulated constituent	Maximum for any single grab sample, total composition (mg/kg)
Chloroform	6.2
Methylene chloride	31
Carbon tetrachloride	6.2
1,1,2-Trichloroethane	6.2
Trichloroethylene	5.6
Vinyl chloride	33
Hexachlorobenzene	37
Hexachlorobutadiene	28
Hexachloroethane	30

BDAT TREATMENT STANDARDS FOR F025

[Wastewaters]

[Spent Filters/Aids and Desiccants Subcategory]

Regulated constituent	Maximum for any 24-hour composite sample, total composition (mg/l)
Chloroform	0.046
Methylene chloride	0.089
Carbon tetrachloride	0.057

BDAT TREATMENT STANDARDS FOR F025—Continued

[Wastewaters]

[Spent Filters/Aids and Desiccants Subcategory]

Regulated constituent	Maximum for any 24-hour composite sample, total composition (mg/l)
1,1,2-Trichloroethane	0.054
Trichloroethylene	0.054
Vinyl chloride	0.27
Hexachlorobenzene	0.055
Hexachlorobutadiene	0.055
Hexachloroethane	0 055

e. K001 and U051

K001—Bottom sediment sludge from the treatment of wastewaters from wood preserving processes that use creosote and/or pentachlorophenol.

U051—Creosote

As noted in the November 22, 1989 proposal (54 FR 48410), U051 wastes differ from other U wastes in that the waste is not defined by one chemical or constituent, but by a group of chemicals defined by the generic term of "creosote". Creosote is a derivative of coal that contains a wide range of constituents including cresols, phenols, naphthalene, benz(a)anthracene, benzo(a)pyrene, fluoranthene, chrysene, indeno(1,2,3-cd)pyrene and acenaphthalene. Today's rule promulgates final treatment standards for U051 (creosote) wastewaters and nonwastewaters as proposed. The regulated constituents are naphthalene, pentachlorophenol, phenanthrene, pyrene, toluene, xylenes and lead. The treatment standards for the organic constituents were established based on the performance of incineration of K001 waste. Treatment standards for lead were based on the transfer of performance standards from the stabilization of lead in K001 nonwastewaters and chemical precipitation of lead in K001 wastewaters. Treatment standards for K001 wastewaters and nonwastewaters were promulgated in the First Third final rule on August 8, 1988. Because no comments were received on the proposed regulation for any of the specific constituents of U051, EPA assumes that generators and treaters of this waste agree with EPA's assessment of the treatment of U051 wastes.

The Agency is also promulgating, as proposed, revisions to the concentration-based treatment standards for K001 organics due to a mathematical error that was made in the

calculation of the original standards. These revisions have been reflected in the U051 standards. Additional information on the revised standards can be found in the Addendum to the K001 and U051 Background Document.

As EPA noted in the November 22, 1989 proposal (54 FR 48410), if U051 is simply discarded before it is used (for example because it is off-specification) then it would be unlikely to have all of the same contaminants as K001 wastes. On the other hand, when U051 is spilled at a wood preserving site, then it could contain the same contaminants, in particular pentachlorophenol and lead, as K001 wastes due to the high potential for cross-contamination due to prior use of pentachlorophenol at the site. Since the Agency anticipates that most of the U051 wastes come from spill residues at wood preserving sites, EPA is conservatively promulgating standards that include those constituents that are likely to be present in this form of the waste. In situations where a facility never used pentachlorophenol or where the U051 is only anticipated to be generated as an off-spec product (and pentachlorophenol was never used in the production equipment), EPA anticipates that the facility's waste analysis plan could be revised so that only the constituents that are likely to be present in that form of the waste are monitored.

BDAT TREATMENT STANDARDS FOR K001 AND U051

[Nonwastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/kg)
Naphthalene	1.5
Pentachlorophenol	7.4
Phenanthrene	1.5
Pyrene	1.5
Toluene	28
Xylene(s)	33
	Maximum for any single grab sample, TCLP (mg/l)
Lead	0.51

BDAT TREATMENT STANDARDS FOR K001 AND U051

[Wastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/l)
Naphthalene	0.031
Pentachlorophenol	0.18
Phenanthrene	0.031
Pyrene	0.028
Toluene	0.028
Xylene(s)	0.032
Lead	0.037

f. K002, K003, K004, K005, K006, K007, K008

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.

In today's rule, the Agency is promulgating nonwastewater and wastewater treatment standards for waste codes K002 through K008. BDAT for metal constituents in K002, K003, K004, K005, K006 (anhydrous), K007, and K008 nonwastewaters are based on the performance of chemical precipitation, sludge dewatering, and filtration. BDAT for chromium in K006 (hydrated) is based on the performance of stabilization for F006 wastes. BDAT for cyanides in K005 and K007 wastewaters is based on the performance of alkaline chlorination. BDAT for metal constituents in K002, K003, K004, K005, K006, K007, and K008 are based on chromium reduction, chemical precipitation, and sludge dewatering. For K005 and K007 nonwastewaters, the Agency is reserving the treatment standard for amenable and total cyanides. The Agency believes that these wastes contain treatable concentrations of cyanides. Because the Agency did not propose treatment standard for cyanides in these wastes, in this rule the Agency is providing notice that standards will be proposed for restrictions in a future rulemaking. Detailed technical descriptions of the specific production processes generating these wastes can be found in the Background Document for Inorganic Pigment Wastes.

(1) *Nonwastewaters.* In the Second Third Final Rule (53 FR 26594, June 23, 1989), EPA promulgated treatment standards of "No Land Disposal Based on No Generation" for K005 and K007 wastes. In today's final rule, the Agency is revoking these standards and is promulgating numerical treatment standards because a source wishing to manufacture these pigments in the future would be forced to apply for a variance from the treatment standard (40 CFR 268.44).

In the First Third Final Rule, EPA also promulgated a standard of "No Land Disposal Based on No Generation" for K004 and K008. EPA modified this standard to apply only to certain newly generated waste as part of the May 2, 1989, Final Rule (54 FR 18836). On January 11, 1989, EPA also proposed to modify this designation to "No Land Disposal Based on Recycling". During the comment period for the Second Third Proposed Rule, EPA received information that the recycling operation under consideration for these wastes may involve a limited captive market for the waste by-product; therefore, not all generators would be able to sell their processed K004 and K008. As a result, EPA revoked the "No Land Disposal Based on No Generation" standard in the Second Third Final Rule (54 FR 26617) and is promulgating numerical treatment standards for these wastes in today's rule.

For the K002, K003, K004, K005, K006 (anhydrous), K007, and K008 nonwastewaters, EPA is transferring the performance of the treatment of precipitation, sludge dewatering, and filtration for K062 nonwastewaters to these wastes. The Agency believes that these wastes are similar to K062 because the wastewaters from which K062 sludge are derived are similar in nature to the inorganic pigment wastewaters (i.e., consisting of inorganic constituents).

In the case of hydrated K006 nonwastewaters, EPA is promulgating treatment standards for this waste based on a performance of stabilization of F006. The Agency believes that this is a technically feasible transfer because of the chromium content and other dissolved metals which are in higher concentrations in F006 than K006. The Agency received supportive comments on the transfer feasibility of F006 to K006.

(2) *Wastewaters.* EPA is promulgating treatment standards based on the chrome pigment effluent guidelines for

discharges from this industrial category regulated under the National Pollutant Discharge Elimination System (NPDES) (40 CFR 415.340). The final standards are taken directly from the concentrations as stated in the "Development Document for Effluent Limitations Guidelines, New Source Performance Standards, and Pretreatment Standards for the Inorganic Chemicals Manufacturing Point Source Category, June, 1982. These standards are based on chromium conversion and lime precipitation to remove metals.

For K005 and K007 wastes, the Agency is promulgating treatment standards for total cyanides. These treatment standards are based on the performance of alkaline chlorination for pigment wastes. The Agency received no comments disputing the technical feasibility of the transfer from Effluent Limitations Guidelines data to pigment wastewaters. Although the effluent limitations guidelines and standards contain both 30 day and one day numbers, the RCRA treatment standard specifies only the one day standards.

Land disposal restrictions and corresponding implementation and enforcement procedures have been based on either a grab or a composite standard. Consistent with other BDAT treatment standards, the Agency is therefore promulgating only the one day standards which were proposed. These standards will provide appropriate control of the waste prior to land disposal without the need for a 30 day monitoring.

BDAT TREATMENT STANDARDS FOR K002, K003, K004, K005, K006 (ANHYDROUS), K007 AND K008

[Nonwastewaters]

Regulated constituent	Maximum for any single grab sample, TCLP (mg/l)
Chromium (Total)	0.094
Lead	0.37

BDAT TREATMENT STANDARDS FOR K005 AND K007

[Nonwastewaters]

Regulated constituent	Maximum for any single grab sample, TCLP (mg/l)
Chromium (Total)	0.094
Lead	0.37
Cyanides (Total)	Reserved.

BDAT TREATMENT STANDARDS FOR K006 (HYDRATED)

[Nonwastewaters]

Regulated constituent	Maximum for any single grab sample, TCLP (mg/l)
Chromium (Total)	5.2

BDAT TREATMENT STANDARDS FOR K002, K003, K004, K006 (ANHYDROUS AND HYDRATED), AND K008

[Wastewaters]

Regulated constituent	Maximum for any composite sample, total composition (mg/l)
Chromium (Total)	2.9
Lead	3.4

BDAT TREATMENT STANDARDS FOR K005, AND K007

[Wastewaters]

Regulated constituent	Maximum for any composite sample, total composition (mg/l)
Chromium (Total)	2.9
Lead	3.4
Cyanides (Total)	0.74

g. K011, K013 and K014

K011—Bottom stream from the wastewater stripper in the production of acrylonitrile.
K013—Bottom stream from acetonitrile column in the production of acrylonitrile.
K014—Bottoms from the acetonitrile purification column in the production of acrylonitrile.

In the Second Third Final Rule, the Agency promulgated treatment standards for the K011, K013, and K014 nonwastewaters (54 FR 26614, June 23, 1989). Treatment standards for the nonwastewaters were based on the performance of incineration. In addition, the Agency proposed treatment standards for K011, K013, and K014 wastewaters in the Second Third proposed rule on January 11, 1989 (54 FR 1056). Commenters on the proposed wastewater standards indicated that they were in the process of developing wet air oxidation data for these wastewaters.

Since the Agency concurred that wet air oxidation was an applicable technology for these wastes and since the other data available to the Agency for treatment of these wastewaters were relatively incomplete, the Agency chose not to promulgate the proposed wastewater treatment standards at that time. After the close of the comment period, commenters submitted their performance data for treatment of K011, K013, and K014 wastewaters using wet air oxidation, which demonstrated substantial reduction of waste toxicity and mobility. As a result, the Agency is promulgating treatment standards for organics and total cyanides in K011, K013, and K014 wastewaters. Treatment standards are based on the performance of wet air oxidation for the organics and cyanides.

Many commenters had questions on the TOC cutoff level for K011, K013, and K014 wastewaters. These commenters suggested that because the TOC levels in wastewaters fluctuate, the Agency should develop a higher cutoff level. The Agency agrees that the TOC levels in wastewaters may fluctuate above the level proposed and is accordingly redefining the cutoff level for wastewaters. Therefore, the Agency is defining K011, K013, and K014 wastewaters (as generated) as containing less than 5 percent (%) Total Organic Content (TOC) and less than 1% Total Suspended Solids (TSS). The Agency believes that the 5% cutoff level is applicable based on the available waste characterization data for K011, K013, and K014 wastes. As generated, all of these wastes are liquid and contain primarily water, yet they sporadically contain over 1% TOC (but not more than 5%) and would have been classified as nonwastewaters based on the Agency's standard cut-off of 1% TOC.

In addition, the technology of choice for K011, K013, and K014 liquids with less than 5% TOC is wet air oxidation. Since wet air oxidation is typically designed to handle slightly higher than 5% TOC levels (10% TOC is cited in guidance as a typical maximum level for wet air oxidation, but wet air oxidation systems are usually designed for lower levels) the Agency determined that it is an appropriate technology for these wastes and that the TOC cut-off level for K011, K013, and K014 wastewaters should be adjusted accordingly.

In addition, the Agency has received comments indicating that the standard for acrylonitrile is too low for these wastes. Commenters requested that the Agency reevaluate the calculation of the treatment standard (i.e., the variability factor) for this constituent. The Agency does not agree with the commenters that the acrylonitrile standard is unachieveable. Based on the analysis of the data, the concentration of

acrylonitrile in the treated waste was below the detection limit. The BDAT methodology states that when all of the treated data for one constituent are at the level of detection, then the Agency believes that the data are normally distributed. Therefore, the variability factor is 2.8. The Agency calculates a treatment standard by multiplying the variability factor times the mean of the treated wastes. Therefore, this analysis is within the BDAT methodology. Furthermore, the Agency received no additional treatment data during the comment period for the proposed rule, demonstrating that the standard for acrylonitrile (based on actual treatment performance data for these wastes) is too low.

BDAT TREATMENT STANDARDS FOR K011, K013, K014

[Wastewaters <5% TOC and <1% TSS]

Regulated constituent	Maximum for any single grab sample, total composition (mg/l)
Acetonitrile	38
Acrylamide	19.
Acrylonitrile	0.06
Benzene	0.02
Cyanides (total)	21.

h. K015

K015—Still bottoms from the distillation of benzyl chloride.

The Agency is today promulgating final treatment standards for nonwastewater forms of K015 as proposed. The Agency is promulgating treatment standards for five organic and two metal constituents. Treatment standards for the organic constituents are based on a transfer of performance data from the incineration of K019 and K087 wastes.

The Agency is also promulgating concentration-based treatment standards for the metal constituents nickel and chromium based on the transfer of performance data from K048–K052 waste. The Agency received several comments regarding the nickel standard for K015. The commenters stated that the numerical standard for nickel was extremely low and urged the Agency to reconsider the proposed standard. The treatment standard for nickel was proposed based on a transfer from K048–K052 wastes which were also proposed as part of the November 22, 1989 notice. The Agency received as part of the K048–K052 proposal, additional data and information from commenters that altered the proposed treatment standard for nickel. See section III.A.4.o. of today's preamble for a complete discussion of the comments. As a result of the change made to the K048–K052 treatment standard for nickel, the Agency has determined that a modification to the nickel treatment standard for K015 is appropriate and is therefore revising and promulgating the modified standard in today's rule. Further information on the development of treatment standards can be found in the Addendum to the Background Document for K015 Wastes in the RCRA docket.

BDAT TREATMENT STANDARDS FOR K015

[Nonwastewaters]

[Revised From No Land Disposal]

Regulated constituent	Maximum for any single grab sample, total composition (mg/kg)
Anthracene	3.4
Benzal chloride	6.2
Benzo (b/k) fluoranthene	3.4
Phenanthrene	3.4
Toluene	6.0

	Maximum for any single grab sample, TCLP (mg/l)
Chromium (Total)	1.7
Nickel	0.2

i. K017 and K073

K017—Heavy ends (still bottoms) from the purification column in the production of epichlorohydrin.

K073—Chlorinated hydrocarbon waste from the purification step of the diaphragm cell process using graphite anodes in chlorine production.

Today's rule promulgates final treatment standards for K017 and K073 wastewaters and nonwastewaters. The Agency noted in the November 22, 1989 proposal (54 FR 48393) that treatment standards for K017 and K073 wastes were originally scheduled to be promulgated as part of the First Third rulemaking (i.e., they were to be promulgated by August 8, 1988). The Agency did not however promulgate standards for K017 or K073 by August 8, 1988, and as a result, land disposal of these wastes were subject to the "soft hammer" provisions of 40 CFR 268.8, until May 8, 1990.

Concentration-based treatment standards for nonwastewater forms of K017 are being promulgated based on the transfer of performance data from incineration of nonwastewater forms of F024 (wastes from the production of chlorinated aliphatics such as distillation residues, heavy ends, tars, and reactor clean-out wastes) waste. Concentration-based treatment standards are also being promulgated today for nonwastewater forms of K073 based on the transfer of performance data from incineration of nonwastewater forms of K019 (heavy ends from the distillation of ethylene dichloride in ethylene dichloride production) waste. No comments were specifically received on the proposed regulation for K017 and K073 wastes, however, the Agency did receive one comment on the difficulties of analyzing for specific BDAT list constituents in incinerator ash. The reader is referred to section III.A.5.(a.)(5.)(b.) of today's preamble for a complete discussion of this comment. As a result of this comment, the Agency is revising the nonwastewater standards for the regulated constituents in K017 to reflect these analytical concerns.

In the November 22, 1989 notice, the Agency proposed concentration-based treatment standards for wastewater forms of K017 and K073 based on incinerator scrubber water (F024 and K019 scrubber water respectively). At this time, the Agency also proposed two sets of treatment standards for the majority of U and P wastewaters for which concentration-based standards could be established. One set of standards was based on incinerator scrubber water while the alternate set of standards was based on a transfer of treatment performance data for wastewaters containing these constituents from various data sources. The reader is referred to the discussion in section III.A.5.(a.)(1.) of today's preamble for additional information.

Commenters to the proposed rule for First Third, Second Third and Third Third wastes however, almost unanimously supported the option of promulgating wastewater treatment standards based on the performance of specific wastewater treatment rather than incinerator scrubber water constituent levels. Upon review of all available data and comments, the Agency agrees with this comment and is today promulgating concentration-based treatment standards based on wastewater treatment data rather than scrubber water for wastes that were proposed in the Third Third rule.

While the Agency did not specifically identify the standards based on wastewater treatment data as alternatives for F and K wastewaters,

the Agency believes that this is a logical outgrowth of the notice and comment process. As such, the Agency is today modifying and promulgating the wastewater standards for both K017 and K073 wastewaters based on the performance of wastewater treatment. Information on the technical development of the constituent specific treatment standards for these wastes can be found in the K017 and K073 background documents. Detailed information on the development of the wastewater treatment standards by constituent can be found in the background document entitled, Final Best Demonstrated Available Technology (BDAT) Background Document for U and P Wastes and Multi-Source Leachate (F039) Volume A: Wastewater Forms of Organic U and P Wastes and Multi-Source Leachates (F039) For Which There Are Concentration-Based Treatment Standards.

BDAT TREATMENT STANDARDS FOR K017

[Nonwastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/kg)
1,2-Dichloropropane	18
1,2,3-Trichloropropane	28
Bis(2-chloroethyl) ether	7.2

BDAT TREATMENT STANDARDS FOR K017

[Wastewaters]

Regulated constituent	Maximum for any 24-hour composite sample, total composition (mg/l)
1,2-Dichloropropane	0.85
1,2,3-Trichloropropane	0.85
Bis(2-chloroethyl) ether	0.033

BDAT TREATMENT STANDARDS FOR K073

[Nonwastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/kg)
Carbon tetrachloride	6.2
Chloroform	6.2
Hexachloroethane	30
Tetrachloroethene	6.2
1,1,1-Trichloroethane	6.2

BDAT TREATMENT STANDARDS FOR K073

[Wastewaters]

Regulated constituent	Maximum for any 24-hour composite sample, total composition (mg/l)
Carbon tetrachloride	0.057
Chloroform	0.046
Hexachloroethane	0.055
Tetrachloroethene	0.056
1,1,1-Trichloroethane	0.054

j. K021

K021—Aqueous spent antimony catalyst from fluoromethane production.

Final treatment standards are being promulgated today for nonwastewater forms of K021 wastes as proposed. The treatment standards for organics are based on the transfer of performance data from incineration of nonwastewater forms of K019 (heavy ends from the distillation of ethylene dichloride in ethylene dichloride production) waste. No comments were received on the proposed standards. Concentration-based treatment standards for antimony in nonwastewater forms of K021 are being promulgated today based on the transfer of performance data from the stabilization of ash from the incineration of nonwastewater forms of K048 (dissolved air flotation (DAF) float from the petroleum refining industry) and K051 (API separator sludge from the petroleum refining industry) wastes.

In the November 22, 1989, proposal (54 FR 48394), the Agency simultaneously proposed alternative concentration-based treatment standards for antimony nonwastewater based on the performance of vitrification of arsenic wastes (see section III.A.5.(a.) of the November 22, 1989, notice describing the development of this arsenic standard for D004 wastes) and antimony wastewaters based on the performance of lime precipitation, sedimentation and filtration (see the November 22, 1989, notice (54 FR 48393) describing the development of wastewater treatment standards for U and P wastes). At that time, the Agency solicited comment from the public on the appropriateness of these alternative transfers. However, because no comments or data were received for either set of standards for antimony, EPA assumes that generators and treaters of K021 wastes agree with EPA's initial assessment of the treatment of antimony based on the transfer of performance data from K048 and K051 wastes. Therefore, the Agency is promulgating the proposed concentration-based treatment standards for antimony based on the transfer of performance data from these wastes. Details on this transfer and the other nonwastewater standards for K021 wastes can be found in the Background Document for K021 wastes in the RCRA docket.

In the November 22, 1989, notice, the Agency also proposed concentration-based treatment standards for wastewater forms of K021 based on incinerator scrubber water from K019 waste. The Agency also proposed two sets of wastewater treatment standards for the majority of U and P wastewaters for which concentration-based standards could be established. One set of standards was based on incinerator scrubber waste while the alternate set of standards was based on a transfer of treatment performance data from wastewaters containing these constituents from various data sources. The reader is referred to the discussion in section III.A.5.(a.)(1.) of today's preamble for additional information.

As stated in the Final Rule for Land Disposal Restrictions for Second Third Wastes (54 FR 26629) and reiterated in the proposed rule for Third Third Wastes (54 FR 48390), when the Agency has appropriate wastewater treatment data from well-designed and well-operated wastewater treatment units, it prefers to use these data rather than scrubber water concentrations to develop wastewater treatment standards.

Commenters to the proposed rules for the First Third, Second Third and Third Third wastes however, almost unanimously supported the option of promulgating wastewater treatment standards based on the performance of specific wastewater treatment rather than incinerator scrubber water constituent levels. Upon review of all available data and comments, the Agency agrees with the commenters, and is today promulgating concentration-based treatment standards based on wastewater treatment data rather than scrubber water for wastes that were proposed in the Third Third rule.

While the Agency did not specifically identify the standards based on wastewater treatment data as alternatives for F and K wastewaters, the Agency believes that this is a logical outgrowth of the notice and comment process. As such, the Agency is today modifying and promulgating the wastewater standards for K021 wastewaters based on the performance of wastewater treatment. Detailed information on the development of the

wastewater treatment standards by constituent can be found in the background document entitled, Final Best Demonstrated Available Technology (BDAT) Background Document For U and P Wastes and Multi-Source Leachates (F039) Volume A: Wastewater Forms of Organic U and P Wastes and Multi-Source Leachates (F039) For Which There Are Concentration-Based Treatment Standards.

BDAT TREATMENT STANDARDS FOR K021

[Nonwastewaters]

[Revised from no land disposal]

	Maximum for any single grab sample, total composition (mg/kg)
Carbon tetrachloride	6.2
Chloroform	6.2
	Maximum for any single grab sample, TCLP (mg/l)
Antimony	0.23

BDAT TREATMENT STANDARDS FOR K021

[Wastewaters]

Regulated constituent	Maximum for any 24-hour composite sample, total composition (mg/l)
Chloroform	0.046
Carbon tetrachloride	0.057
Antimony	0.60

k. K022, K025, K026, K035, and K083

K022—Distillation bottom tars from the production of phenol/acetone from cumene.

K025—Distillation bottoms from the production of nitrobenzene by the nitration of benzene.

K026—Stripping still tails from the production of methyl ethyl pyridines.

K035—Wastewater treatment sludges generated in the production of creosote.

K083—Distillation bottoms from aniline production.

EPA is promulgating treatment standards for K022 (wastewaters only), and all forms of K025, K026, K035, and K083. Treatment standards promulgated today for K025 and K083, revoke the "No Land Disposal Based on No Generation" treatment standards promulgated on August 8, 1988 and modified on May 2, 1989. (See 53 FR 31167 and 31174 (August 17, 1988) and 54 FR 18836 (May 2, 1989).) A technical description of these five wastes can be found in the Listing Background Documents for each waste.

(1) *Revisions to the Standards for Wastewaters.* EPA developed the proposed treatment standards based on the transfer of performance data from wastes believed to be as difficult to treat as K022, K025, K026, K035, and K083. The proposed treatment standards for both wastewater and nonwastewater forms of these five wastes, if applicable, were based on residues from incineration. Several commenters urged EPA to develop treatment standards for the organics regulated in wastewaters based on performance data resulting from wastewater treatment technologies. Specifically, commenters urged EPA to adopt the same performance data used by EPA in developing treatment standards for multi-source leachate. Other commenters urged the Agency to use performance data from the Office of Water.

As stated in the Final Rule for Land Disposal Restrictions for Second Third Wastes (54 FR 26629) and reiterated in the proposed rule for Third Third wastes (54 FR 48390), when the Agency has appropriate wastewater treatment data from well-designed and well-operated wastewater treatment units, it prefers to use these data rather then scrubber water concentrations to develop wastewater treatment standards. Commenters to the proposed rule for First Third, Second Third and Third Third wastes almost unanimously supported the option of promulgating wastewater treatment standards based on the performance of specific wastewater treatment rather than incinerator scrubber water constituent levels. Upon review of all available data and comments, the Agency agrees with the commenters and is today promulgating concentration-based treatment standards based on wastewater treatment data rather than scrubber water for wastes that are proposed in the Third Third rule.

While the Agency did not specifically identify the standards based on wastewater treatment data as alternatives for F and K wastewaters, the Agency believes that this is a logical outgrowth of the notice and comment process. As such, the Agency is today modifying the concentration-based treatment standards for K022, K035, and K083 wastewaters. However, EPA is withdrawing the proposed concentration-based treatment standards for the K025 and K026 wastewaters, EPA is instead promulgating technology-based treatment standards.

(2) *Treatment Standards for K022 Wastewaters.* The concentration-based treatment standards promulgated today for K022 are based on performance data generated from one, or a combination of two or more of the following BDAT technologies: biological treatment, steam stripping, carbon adsorption, liquid extraction, and others. (See Section III.A.6.(3) of today's preamble for a discussion of these performance data for multi-source leachate.) Treatment standards promulgated for metals (chromium and nickel) in wastewater forms of K022 are based on chemical precipitation followed by vacuum filtration of wastewaters containing the metals of concern.

One commenter objected to EPA's rationale for regulating chromium and nickel in K022 wastewaters by relaying on performance data from the treatment of listed hazardous wastes that only contained metals. The commenter pointed out that EPA should rely on performance data for metal-bearing wastewater that also contains organics. According to the commenter, this is because K022 wastewaters are likely to contain organics and the performance data from which the Agency was transferring standards lack organics. The commenter believes organics could interfere with the treatment of chromium and nickel. The commenter, however, failed to provide data or information that indicate that the proposed treatment standards for metals could not be achieved for K022 wastewaters. The Agency stands by its rationale for transferring performance data of metal bearing wastewaters to K022 wastewaters.

EPA believes these organics exist at low concentrations such that they would not interfere with the treatment of metals and that if they do exist at higher concentrations, they can easily be treated using chemical or wet air oxidation followed by carbon adsorption in order to reduce their potential interference with metals treatment. At the same time, these organics would then be able to comply with the K022 wastewater treatment standards for organics promulgated in today's rule. As an alternative, these wastewaters (i.e., if they were even higher in concentration) could also be incinerated in order to comply with the organics standards and then treated for metals. All three of these technologies have been demonstrated to treat similar wastes containing both metals and organics.

(3) *Treatment standards for K035 and K083.* The concentration-based treatment standards promulgated today for K035 and K083 wastewaters are based on performance data generated from one, or a combination of two or more of the following BDAT technologies: biological treatment, steam stripping, carbon adsorption, liquid extraction, and others. (See section III.A.6.(3) of today's preamble for a discussion of these performance data for multi-source leachate.) The treatment standard promulgated for nickel in wastewater forms of K083 is based on chemical precipitation followed by vaccum filtration.

EPA is promulgating treatment standards for organics in nonwastewater forms of K035 and K083, primarily as proposed. The treatment standards are based on the incineration of wastes believed to be as difficult to treat as K035 and K083. In addition, EPA does not believe that the constituents in K035 and K083 are likely to interfere with treatment to the extent of making the promulgated treatment standards unachieveable. The treatment standard promulgated for nickel in nonwastewater forms of K083 is based on the stabilization of incineration ash. The Final BDAT Background Document for each one of these wastes provides detailed information on the development of these treatment standards.

Cyclohexanone is one of the constituents that was proposed for regulation in K083 waste. EPA has identified other constituents for regulation in K083 wastes that are as difficult to treat. At this time, EPA is withdrawing cyclohexanone from the list of regulated constituents in K083 nonwastewater. However, EPA is still promulgating treatment standards for cyclohexanone in K083 wastewaters. Available performance data does not indicate any difficulties in analyzing for cyclohexanone in K083 wastewaters.

(4) *Treatment Methods for K025 and K026.* For K025 and K026, EPA pointed out its preference for promulgating a method of treatment over a concentration based standard for these two wastes. This is because there is a lack of characterization data for these wastes which raises the uncertainty as to whether regulation of a very few known BDAT list constituents in these two wastes will provide regulation of other BDAT list constituents that could be in K025 and K026. The performance data from the treatment of wastes believed to be as difficult to treat as K025 and K026 support that wastewater and nonwastewater forms of these two wastes can be treated to meet the promulgated BDAT requirements.

As a result, EPA is promulgating incineration for nonwastewater forms of K025 and K026, and as an alternative for the corresponding wastewater forms. In addition, EPA is also promulgating liquid-liquid extraction followed by steam stripping followed by carbon adsorption as the treatment standard for K025 wastewaters.

BDAT Treatment Standards for K022

[Wastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/l)
Acetophenone	0.010
Phenol	0.039
Chromium (Total)	0.35
Nickel	0.47

Regulated constituent	Maximum for any composite sample, total composition (mg/1)
Toluene	0.080
Diphenylamine	0.52
Diphenylnitrosamine	0.40

BDAT Treatment Standards for K025

[Wastewaters]

	Incineration (INCIN); or liquid-liquid extraction (LLEXT) followed by steam stripping (SSTRP) followed by carbon adsorption (CARBN) as methods of treatment

BDAT Treatment Standard for K025

[Nonwastewaters]

	Incineration (INCIN) as a method of treatment

BDAT Treatment Standards for K026

[Wastewaters and Nonwastewaters]

	Incineration (INCIN) as a method of treatment

BDAT Treatment Standards for K035

[Wastewaters]

Regulated constituent	Maximum for any composite sample, total composition (mg/l)
Benz (a) anthracene	0.059
Chrysene	0.059
Fluoranthene	0.068
Naphthalene	0.059
Phenanthrene	0.059
Pyrene	0.067
o-Cresol	0.11
m,p-Cresols	0.77

Regulated constituent	Maximum for any single grab sample, total composition (mg/l)
Phenol	0.039

The treatment standard for m,p-Cresols is expressed as the sum of the meta- and para-cresol isomers because of the difficulties in distinguishing the individual isomers analytically.

BDAT Treatment Standard for K035

[Nonwastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/kg)
Acenaphthene	3.4
Anthracene	3.4
Benz (a) anthracene	3.4
Benzo (a) pyrene	3.4
Chrysene	3.4
Dibenz (a,h) anthracene	3.4
Fluoranthene	3.4
Fluorene	3.4
Indeno (1, 2, 3-cd) pyrene	3.4
Naphthalene	3.4
Phenanthrene	3.4
Pyrene	8.2

BDAT TREATMENT STANDARDS FOR K083

[Nonwastewaters]

[Revised from no land disposal]

Regulated constituent	Maximum for any single grab sample, total composition (mg/kg)
Benzene	6.6
Aniline	14
Diphenylamine/diphenylnitrosamine	14
Nitrobenzene	14
Phenol	5.6
Cyclohexanone	30

	Maximum for any single grab sample, TCLP (mg/l)
Nickel	0.088

BDAT TREATMENT STANDARDS FOR K083

[Wastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/l)
Aniline	0.81
Phenol	0.039
Cyclohexanone	0.36
Nickel	0.47

Regulated constituent	Maximum for any composite sample, total composition (mg/l)
Benzene	0.14
Diphenylamine	0.52
Diphenylnitrosamine	0.40
Nitrobenzene	0.068

l. K028, K029, K095 and K096 Wastes

K028—Spent catalyst from the hydrochlorinator reactor in the production of 1,1,1-trichloroethane.

K029—Waste from the product steam stripper in the production of 1,1,1-trichloroethane.

K095—Distillation bottoms from the production of 1,1,1-trichloroethane.

K096—Heavy ends from the heavy ends column from the production of 1,1,1-trichloroethane.

The Agency is promulgating final treatment standards for organics in K029, K095 and K096 wastewaters based on the transfer of treatment performance data from wastewaters containing the constituents of concern for K029, K095 and K096 wastes from various data sources including: (1) The Office of Water's Industrial Technology Division (ITD) and National Pollution Discharge Elimination System (NPDES) data (including the Organic Chemicals, Plastics, and Synthetic Fibers (OCPSF) data base); (2) the Hazardous Waste Engineering Research Laboratory (HWERL) database; (3) the Office of Solid Wastes' BDAT data (from previous land disposal restriction rules); and (4) additional wastewater treatment data from literature articles on wet air oxidation and powder activated carbon treatment (PACT).

In the November 22, 1989 notice, the Agency proposed treatment standards for organics in K029, K095, and K096 wastewaters based on the transfer of performance data from rotary kiln incineration of K019 (heavy ends from the distillation of ethylene dichloride in ethylene dichloride production) nonwastewaters. Although no comments were received on the proposed rule, the Agency has modified the proposed treatment standards to reflect actual treatment performance data for wastewaters.

In the November 22, 1989 notice, the Agency proposed two sets of wastewater treatment standards for the majority of U and P wastewaters for which concentration-based standards could be established. One set of standards was based on incinerator scrubber waters while the alternate set of standards was based on a transfer of treatment performance data for wastewaters containing these constituents from the above mentioned data sources. The reader is further referred to the discussion in section III.A.5.(a.)(1.) of today's preamble for additional information.

As stated in the Final Rule for Land Disposal Restrictions for Second Third Wastes (54 FR 26629) and reiterated in the proposed rule for Third Third Wastes (54 FR 48390), when the Agency has appropriate wastewater treatment data from well-designed and well-operated wastewater treatment units, it prefers to use these data rather than incinerator scrubber water concentrations to develop wastewater treatment standards.

Commenters to the proposed rule for First Third, Second Third and Third Third wastes almost unanimously supported the options of promulgating wastewater treatment standards based on the performance of specific wastewater treatment rather than incinerator scrubber water constituent levels. Upon review of all available data and comments, the Agency agrees with the commenters and is today promulgating concentration-based treatment standards based on wastewater treatment data rather than scrubber water for wastes that were proposed in the Third Third rule. While the Agency did not specifically identify the standards based on wastewater treatment data as alternatives for F and K wastewaters, the Agency believes that this is a logical outgrowth of the notice and comment process. As such, the Agency is today modifying the wastewater treatment standards for K029, K095, and K096 wastes.

The Agency is also revoking the 'reserved' status for metals in K029, K095 and K096 wastewaters. Existing waste characterization data for nonwastewaters indicates that these three wastes are essentially all organic and would not be expected to contain any BDAT list metal constituents. No comments were received disputing the Agency's conclusion.

The Agency is also promulgating treatment standards for metal constituents in K028 nonwastewaters based on the transfer of TCLP data from stabilization of F024 (wastes from the production of chlorinated aliphatics such as distillation residues, heavy ends, tars, and reactor clean-out) wastes. As was stated in the November 22, 1989 proposed rule (54 FR 48395), the Agency transferred the metal standards for K028 nonwastewaters based on performance data from proposed standards for F024. Several comments however, were received on the metal standards for F024 and subsequently K028, stating that the metal standards were too low. See section III.A.4.c. for a discussion of these comments.

The Agency is however, promulgating as proposed the concentration-based treatment standards for metals in F024 wastes. Consequently, the Agency is also promulgating the treatment standards for metals in K028 nonwastewaters as proposed.

BDAT TREATMENT STANDARDS FOR K028

[Nonwastewaters]

Regulated constituent	Maximum for any single grab sample, TCLP (mg/l)
Chromium (total)	0.073
Lead	0.021
Nickel	0.088

These standards do not replace the standards for the organics in K028 nonwastewaters that were promulgated with the Second Third wastes.

BDAT TREATMENT STANDARDS FOR K029

[Wastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/l)
Chloroform	0.046
1,2-Dichloroethane	0.21
1,1-Dichloroethylene	0.025
1,1,1-Trichloroethane	0.054
Vinyl chloride	0.27

BDAT TREATMENT STANDARDS FOR K095

[Wastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/l)
1,1,1,2-Tetrachloroethane	0.057
1,1,2,2-Tetrachloroethane	0.057
Tetrachloroethene	0.056
1,1,2-Trichloroethane	0.054
Trichloroethene	0.054
Hexachloroethane	0.055
Pentachloroethane	0.055

BDAT TREATMENT STANDARDS FOR K096

[Wastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/l)
1,1,1,2-Tetrachloroethane	0.057
1,1,2,2-Tetrachloroethane	0.057
Tetrachloroethene	0.056
1,1,2-Trichloroethane	0.054
Trichloroethene	0.054
1,3-Dichlorobenzene	0.036
Pentachloroethane	0.055
1,2,4-Trichlorobenzene	0.055

m. K032, K033, K034, K041, K097, and K098 Wastes.

K032—Wastewater treatment sludge from the production of chlordane.
K033—Wastewater and scrub water from the chlorination of cyclopentadiene in the production of chlordane.
K034—Filter solids from filtration of hexachlorocyclopentadiene in the production of chlordane.
K041—Wastewater treatment sludge from the production of toxaphene.
K097—Vacuum stripper discharge from the chlordane chlorinator in the production of Chlordane.
K098—Untreated process wastewater from the production of toxaphene.

The Agency is today promulgating final treatment standards for wastewater and nonwastewater forms of K032, K033, K034, K041, K097 and K098 wastes. The nonwastewater treatment standards are based on performance data from an EPA incineration test burn that was conducted in June 1989. (The reader is referred to the November 22, 1989 proposed rule for additional information on the test burn (54 FR 483901).) No comments were received on the proposed standards for any of the specific constituents of K032, K033, K034, K041, K097 or K098 nonwastewaters. Therefore, EPA assumes that generators of these wastes agree with the Agency's assessment of the treatability of these wastes and their individual constituents. Details on the selection of regulated constituents and the transfer of performance data for these K wastes are provided in the background document for these halogenated pesticide wastes which can be found in the RCRA docket.

In section III.A.1.(h.)(6.) of the proposed rule for Third Third wastes (54 FR 48390 (November 22, 1989)), the Agency specifically proposed two alternative sets of concentration-based standards for the majority of the U and P wastewaters for which concentration-based standards could be established. One set of standards was based on the concentration of constituents of concern as measured in incinerator scrubber water while the alternate set of standards was based on a transfer of treatment performance data for wastewaters from various data sources. These alternative standards were presented in section III.A.7. of the proposed Third Third rule (54 FR 48467) as treatment standards for wastewater forms of multi-source leachate, but were specifically identified as alternative standards for U and P wastewaters.

As stated in the Final Rule for Land Disposal Restrictions for Second Third Wastes (54 FR 26629) and reiterated in the proposed rule for Third Third Wastes (54 FR 48390), when the Agency has appropriate wastewater treatment data from well-designed and well-operated wastewater treatment units, it prefers to use these data rather than scrubber water concentrations to develop wastewater treatment standards. Commenters to the proposed rules for the First Third, Second Third and Third Third Wastes almost unanimously supported that EPA should promulgate wastewater standards based on the performance of specific wastewater treatment rather than incinerator scrubber water constituent levels. After reviewing all available data and comments, the Agency agrees with the commenters, and is promulgating concentration-based treatment standards based on wastewater treatment data rather than scrubber water for K032, K033, K034, K041, K097 and K098 wastewaters. While the Agency did not specifically identify the standards based on wastewater treatment data as alternatives for these wastewaters, the Agency believes that this is a logical outgrowth of the notice and comment process.

More detailed information on the technical development of the constituent specific treatment standards for wastewaters can be found in the background document entitled, BDAT Background Document for Wastewaters containing BDAT list Constituents.

BDAT TREATMENT STANDARDS FOR K032

[Nonwastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/kg)
Hexachlorocyclopentadiene	2.4
Chlordane	0.26
Heptachlor	0.066
Heptachlor epoxide	0.066

BDAT TREATMENT STANDARDS FOR K032

[Wastewaters]

Regulated constituent	Maximum for any 24-hour composite sample, total composition (mg/l)
Hexachlorocyclopentadiene	0.057
Chlordane	0.0033
Heptachlor	0.0012
Heptachlor epoxide	0.016

BDAT TREATMENT STANDARDS FOR K033

[Nonwastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/kg)
Hexachlorocyclopentadiene	2.4

BDAT TREATMENT STANDARDS FOR K033

[Wastewaters]

Regulated constituent	Maximum for any 24-hour composite sample, total composition (mg/l)
Hexachlorocyclopentadiene	0.057

BDAT TREATMENT STANDARDS FOR K034

[Nonwastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/kg)
Hexachlorocyclopentadiene	2.4

BDAT TREATMENT STANDARDS FOR K034

[Wastewaters]

Regulated constituent	Maximum for any 24-hour composite sample, total composition (mg/l)
Hexachlorocyclopentadiene	0.057

BDAT TREATMENT STANDARDS FOR K041

[Nonwastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/kg)
Toxaphene	2.6

BDAT TREATMENT STANDARDS FOR K041

[Wastewaters]

Regulated constituent	Maximum for any 24-hour composite sample, total composition (mg/l)
Toxaphene	0.0095

BDAT TREATMENT STANDARDS FOR K097

[Nonwastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/kg)
Hexachlorocyclopentadiene	2.4
Chlordane	0.26
Heptachlor	0.066
Heptachlor epoxide	0.066

BDAT TREATMENT STANDARDS FOR K097

[Wastewaters]

Regulated constituent	Maximum for any 24-hour composite sample, total composition (mg/l)
Hexachlorocyclopentadiene	0.057
Chlordane	0.0033
Heptachlor	0.0012
Heptachlor epoxide	0.016

BDAT TREATMENT STANDARDS FOR K098

[Nonwastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/kg)
Toxaphene	2.6

BDAT TREATMENT STANDARDS FOR K098

[Wastewaters]

Regulated constituent	Maximum for any 24-hour composite sample, total composition (mg/l)
Toxaphene	0.0095

n. K036 and K037

K036—Still bottoms from toluene reclamation distillation in the production of disulfoton

K037—Wastewater treatment sludges from the production of disulfoton

Today's rule promulgates treatment standards for the wastewater forms of K037 and the nonwastewater forms of K036 as proposed. Detailed technical descriptions of the specific production processes generating these wastes can be found in the background document for the listing of these wastes.

The Agency promulgated a treatment standard of "No Land Disposal Based on No Generation" for K036 nonwastewaters in the First Third final rule on August 8, 1988 (53 FR 31174, August 17, 1988). EPA amended this standard on May 2, 1989, to apply to wastes generated from the process described in the listing description and disposed after August 17, 1988 (54 FR 18836). In the November 22, 1989 proposed rule for Third Third wastes, the Agency proposed a transfer of concentration-based standards from K037 nonwastewaters (based on the performance of incineration in the First Third final rule) to other forms of K036 nonwastewaters, such as K036 spill residues. The basis of this transfer is the similarity of these two wastes, and the fact that Disulfoton, the regulated constituent in K036, is a regulated constituent in K037 as well.

The Agency promulgated concentration-based treatment standards for K037 wastewaters based on incinerator scrubber water concentration levels in the First Third final rule. In the November 22, 1989 proposed rule for Third Third wastes, the Agency proposed to revise this standard to be consistent with the other organophosphorus pesticide wastewaters, for which concentration-based standards based on biological treatment were promulgated in the Second Third final rule on June 23, 1989.

The Agency stated that the performance achievable by incineration and the performance of biological treatment represent BDAT for nonwastewater and wastewater forms, respectively, of the organophosphorus pesticides. Because the Agency received no comments on this proposal, the Agency is today promulgating concentration-based treatment standards for K036 nonwastewaters and concentration-based treatment standards for K037 wastewaters as proposed. Therefore, the Agency is able to promulgate concentration-based treatment standards for: Disulfoton in K036 nonwastewaters, and Disulfoton and toluene in K037 nonwastewaters. Standards applicable to nonwastewaters are based on the performance achieved by rotary kiln incineration and the concentration of organophosphorus pesticide measured in the ash residuals. Standards applicable to wastewaters are based on the performance achieved by biological treatment and the concentration of organophosphorus pesticide measured in the resultant effluent wastewaters. Where the treatment standards are expressed as concentration-based

standards, other treatment technologies that can achieve these concentration-based treatment standards are not precluded from use by this rule. The regulated constituents and treatment standards for these wastes are presented in the tables at the end of this section.

The Agency points out that the promulgated concentration-based treatment standards for K037 wastewaters are based on the analysis of composite samples rather than grab samples. This sampling procedure is specified for compliance monitoring because the performance data on which these standards are based consisted of analysis of composite effluent samples.

BDAT TREATMENT STANDARDS FOR K036

[Nonwastewaters]

[Revised from no land disposal]

Regulated constituent	Maximum for any single grab sample, total composition (mg/kg)
Disulfoton	0.1

BDAT TREATMENT STANDARDS FOR K037

[Wastewaters]

[Revised based on biotreatment data]

Regulated constituent	Maximum for any single composite sample, total composition (mg/l)
Disulfoton	0.025
Toluene	0.080

o. K042, K085, and K105 Wastes.

K042—Heavy ends or distillation residues from the distillation of tetrachlorobenzene in the production of 2,4,5-T.

K085—Distillation of fractionation column bottoms from the production of chlorobenzenes.

K105—Separated aqueous stream from the reactor product washing step in the production of chlorobenzenes.

The Agency is today promulgating final treatment standards for the wastewater and nonwastewater forms of K042, K085 and K105. The treatment standards for nonwastewaters are based on performance data from an EPA incineration test burn that was conducted in June, 1989. (The reader is referred to the November 22, 1989 proposed rule for additional information on this test burn (54 FR 483901).) The wastewater treatment standards have been modified from the proposed rule and are being promulgated today based on a transfer of performance data from wastewater treatment.

In section III.A.1.(h)(6) of the proposed rule for Third Third wastes (54 FR 48390 (November 22, 1989)), the Agency specifically proposed two alternative sets of concentration-based standards for the majority of the U and P wastewaters for which concentration-based standards could be established. One set of standards was based on the concentration of constituents of concern as measured in incinerator scrubber water while the alternate set of standards was based on a transfer of treatment performance data for wastewaters from various data sources. These alternative standards were presented in section III.A.7. of the proposed Third Third rule (54 FR 48467) as treatment standards for wastewater forms of multi-source leachate, but were specifically identified as alternative standards for U and P wastewaters.

As stated in the Final Rule for Land Disposal Restrictions for Second Third Wastes (54 FR 26629) and reiterated in the proposed rule for Third Third Wastes (54 FR 48390), when the Agency has appropriate wastewater treatment data from well-designed and well-operated wastewater treatment units, it prefers to use these data rather than scrubber water concentrations to develop wastewater treatment standards. Commenters to the proposed rules for the First Third, Second Third and Third Third Wastes almost unanimously agreed that EPA should promulgate wastewater standards based on the performance of specific wastewater treatment rather than incinerator scrubber water constituent levels. After reviewing all available data and comments, the Agency agrees with the commenters, and is promulgating concentration-based treatment standards based on wastewater treatment data rather than scrubber water for K042, K085 and K105 wastewaters. More detailed information on the technical development of the constituent specific treatment standards for wastewaters can be found in the background document entitled, BDAT Background Document for Wastewaters containing BDAT list Constituents.

The Agency received several comments on the proposed standards for the PCB constituents in K085 waste. These standards were listed for seven of the common mixtures of PCBs known originally by the trade name of Aroclor (i.e., the proposed standards were listed for Aroclor 1016, 1221, 1232, 1242, 1248, 1254, and 1260). One commenter stated that an unjustified treatment level for PCBs had been set and that the Agency did not give a rationale for the level selected. The commenter further urged the Agency to set a treatment standard at 50 ppm which is the regulated level under both TSCA and the RCRA California list provision. The Agency disagrees with the commenter. Under HSWA, EPA has been given authority to establish treatment standards at levels that minimize threats to human health and the environment. See S. Rept. No. 284, 98th Cong. 1st Sess. at 17, stating that California list levels—which include a 50 ppm PCB level—are only minimum starting points for establishing treatment standards. (See also 55 FR 6640, Feb. 26, 1990 explaining that current uncertainties as to waste toxicity and mobility warrant retention of the BDAT approach.)

EPA noted in the November 22, 1989 proposal (54 FR 48398), that untreated K085 wastes contain a wide range of PCB concentrations, however if K085 wastes exceed 50 ppm PCBs, they must be incinerated in a TSCA permitted facility (several of the commercial facilities that are permitted for RCRA wastes are also permitted for PCB-contaminated wastes under TSCA) as well as meeting the concentration-based treatment standards being promulgated today. EPA believes that this approach is consistent with the statutory mandate.

Another commenter stated that the proposed PCB concentration-based standard for K085 was inappropriately low because the presence of hexachlorobenzene or pentachlorobenzene at their K085 treatment standard concentration levels interferes with proper performance of SW-846 Method 8080's Electron Capture Detection instrumentation, and therefore PCB levels in K085 cannot be routinely quantified at the BDAT standard level. EPA believes, as stated in the preamble to the proposed rule (54 FR 48398) that incineration virtually destroys hexachlorobenzene and pentachlorobenzene, as well as PCBs, so their ash and scrubber water levels will be too low to cause interference. As stated in the section of this Preamble discussing how the Agency used detection limits to set standards, EPA deliberately set numerical treatment standards above detection limits by using multiple variability factors: Consequently numerical treatment standards for incineration based numbers represent the lowest numbers an analytical instrumentation system can reliably report rather than the

concentration of the constituent actually present in the ash. EPA reiterates that treatability variances are available on a case-by-case basis for generators who cannot meet these standards. In addition, if the waste has been incinerated and analytical methods utilized in good faith, and the standard still proves to be below the detection limit, EPA will consider this to constitute compliance with the treatment standard (see preamble section III.A.1.g).

BDAT TREATMENT STANDARDS FOR K042

[Nonwastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/kg)
1,2,4,5-Tetrachlorobenzene	4.4
o-Dichlorobenzene	4.4
p-Dichlorobenzene	4.4
Pentachlorobenzene	4.4
1,2,4-Trichlorobenzene	4.4

BDAT TREATMENT STANDARDS FOR K042

[Wastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/l)
1,2,4,5-Tetrachlorobenzene	0.055
o-Dichlorobenzene	0.088
p-Dichlorobenzene	0.090
Pentachlorobenzene	0.055
1,2,4-Trichlorobenzene	0.055

BDAT TREATMENT STANDARDS FOR K085

[Nonwastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/kg)
Benzene	4.4
Chlorobenzene	4.4
o-Dichlorobenzene	4.4
m-Dichlorobenzene	4.4
p-Dichlorobenzene	4.4
1,2,4-Trichlorobenzene	4.4
1,2,4,5-Tetrachlorobenzene	4.4
Pentachlorobenzene	4.4
Hexachlorobenzene	4.4
Aroclor 1016	0.92
Aroclor 1221	0.92
Aroclor 1232	0.92
Aroclor 1242	0.92
Aroclor 1248	0.92
Aroclor 1254	1.8
Aroclor 1260	1.8

BDAT TREATMENT STANDARDS FOR K085

[Wastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/l)
Benzene	0.14
Chlorobenzene	0.057
o-Dichlorobenzene	0.088
m-Dichlorobenzene	0.036
p-Dichlorobenzene	0.090
1,2,4-Trichlorobenzene	0.055
1,2,4,5-Tetrachlorobenzene	0.055
Pentachlorobenzene	0.055
Hexachlorobenzene	0.055
Aroclor 1016	0.013
Aroclor 1221	0.014
Aroclor 1232	0.013
Aroclor 1242	0.017
Aroclor 1248	0.013
Aroclor 1254	0.014
Aroclor 1260	0.014

BDAT TREATMENT STANDARDS FOR K105

[Nonwastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/kg)
Benzene	4.4
Chlorobenzene	4.4
o-Dichlorobenzene	4.4
p-Dichlorobenzene	4.4
2,4,5-Tetrachlorophenol	4.4
2,4,6-Tetrachlorophenol	4.4
2-Chlorophenol	4.4
Phenol	4.4

BDAT TREATMENT STANDARDS FOR K105

[Wastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/l)
Benzene	0.14
Chlorobenzene	0.057
o-Dichlorobenzene	0.088
p-Dichlorobenzene	0.090
2,4,5-Trichlorophenol	0.18
2,4,6-Trichlorophenol	0.035
2-Chlorophenol	0.044
Phenol	0.039

p. K044, K045, K046, and K047

K044—Wastewater treatment sludges from the manufacturing and processing of explosives.

K045—Spent carbon from the treatment of wastewater containing explosives.

K046—Wastewater treatment sludges from the manufacturing, formulation and loading of lead-based initiating compounds.

K047—Pink/red water TNT operators.

Today's rule revokes the "No Land Disposal Based on Reactivity" treatment standard for K044, K045, and K047 wastes and promulgates as proposed a treatment standard of "Deactivation". The Agency is also promulgating a nonwastewater treatment standard for lead in the K046 Reactive Subcategory as proposed (also see 54 FR 26607–608, June 23, 1989), based on the transfer of performance data from the stabilization of K046 nonreactive wastes. This treatment standard is based on the performance of deactivation for the reactive wastewaters followed by alkaline precipitation, settling, and filtration to form a nonreactive K046 nonwastewater that is then stabilized for lead.

The Agency received several comments indicating that the BDAT for the K046 Reactive Subcategory should be deactivation followed by stabilization as opposed to just stabilization. The Agency agrees with the commenters and is therefore revising BDAT as deactivation followed by stabilization. In addition, many commenters had questions on the definition of deactivation. To clarify this point, the Agency is defining deactivitation for K044, K045, K046 and K047 wastes to be the process of removing the characteristic of reactivity, by technologies such as incineration or chemical oxidation. See 40 CFR part 268 appendix VI for a list of technologies that used alone or in combination can achieve this standard.

For all K046 wastewaters, the treatment standard is based on the performance of alkaline precipitation, settling, and filtration. The Agency is transferring the performance of this treatment system from K062 wastes. The K062 wastewaters are just as difficult to treat as the K046 wastewaters, based on the concentration of lead in K062 (up to 212 ppm) which is the same or higher than that which has been found in K046 wastewaters (up to 200 ppm).

BDAT TREATMENT FOR K044, K045, K047

[Nonwastewaters and Wastewaters]

[Revised from no land disposal]

Deactivation (Deact) as a method of treatment*

*See CFR 268.42 Table I for a description of this method of treatment.

BDAT TREATMENT STANDARDS FOR K046 REACTIVE AND NONREACTIVE SUBCATEGORIES

[Wastewaters]

Regulated constituent	Maximum for any single composite sample, total composition (mg/l)
Lead	0.037

BDAT TREATMENT STANDARDS FOR K046 REACTIVE SUBCATEGORY

[Nonwastewaters]

Regulated constituent	Maximum for any single composite sample, TCLP (mg/l)
Lead	0.18

q. K048, K049, K050, K051, and K052

K048—Dissolved air floatation (DAF) float from the petroleum refining industry.
K049—Slop oil emulsion solids from the petroleum refining industry.
K050—Heat Exchanger bundle cleaning sludge from the petroleum refining industry.
K051—API separator sludge from the petroleum refining industry.
K052—Tank bottoms (leaded) from the petroleum refining industry.

Wastes identified as K048, K049, K050, K051, and K052 are generated by facilities in the petroleum refining industry. Detailed technical descriptions of the specific processes generating these wastes can be found in the background document for the listing of these waste codes.

In today's rule, EPA is promulgating revised treatment standards for the organic and metal constituents in K048–K052 nonwastewaters and for cyanide in K048–K052 wastewaters. The specific regulated constituents and treatment standards for these wastes are listed in the tables at the end of this section. Treatment standards for organic and metal constituents in K048–K052 wastewaters and cyanide in K048–K052 nonwastewaters were promulgated on August 8, 1988 (53 FR 31159) and are not amended by this rulemaking.

The Agency has also decided to reschedule these wastes to the third-third and thus create a new prohibition effective date for them. The legal authority to take this action comes from "EPA['s] * * * continuing authority to reschedule wastes from one third of the schedule to another." *Chemical Waste Management* v. *EPA*, 869 F. 2d 1526 n.2 (D.C. Cir. 1989) (noting rescheduling of the prohibition for multisource leachate that had already taken effect). Notwithstanding this authority, the Agency is not undertaking this rescheduling casually. The determining factor in EPA's view, is that even though the wastes were prohibited in the first third rule (and granted a two-year national capacity variance), petroleum industry members were in legitimate doubt as to what the ultimate treatment standards would be and, to some extent, what the technological basis for the standards would be.

In particular, the original standards promulgated by EPA were based on treatment of some of the less contaminated petroleum refining wastes. Subsequent efforts to reexamine and possibly amend the promulgated standards were delayed in part because of conflicting claims from the treatment industry regarding the equivalency of performance of three-stage and five-stage solvent extraction technology. The petroleum refining industry itself participated in research efforts regarding treatment tests on some of the more contaminated petroleum refining wastes and generated some useful data which was used in revising the promulgated standards.

The result of this involved process is that it could have been reasonably unclear to a petroleum refinery whether treatment standards could be achieved using solvent extraction technology one type of BDAT technology. Such a facility could have legitimately delayed its investment decision about what treatment technology to use to comply with the land disposal prohibitions. Given this situation, the Agency believes it is acting both reasonably and legally in exercising its authority to reschedule the wastes to the Third Third.

The Agency has also determined that there is inadequate treatment capacity for generated K048–K052 wastes. (See section III.B. below where the Agency is granting a national capacity variance for K048–K052 wastes). The revised standards for organic and metal constituents in K048–K052 nonwastewaters and for cyanide in K048–K052 wastewaters and the previously promulgated standards for organic and metal constituents in K048–K052 wastewaters and cyanide in K048–K052 nonwastewaters will become effective on November 8, 1990 at the completion of a six month national capacity variance being issued for K048–K052 as part of the Third Third rule.

The treatment standard for cyanide in wastewater forms of K048–K052 is promulgated as proposed. Treatment standards for organic and metal constituents in K048–K052 nonwastewaters have been revised as described below.

During the public comment period, the Agency received additional treatment performance data for treatment of organic and metal constituents in K048–K052 nonwastewaters. Treatment performance data were received from four commenters, BP America, Exxon, Amoco, and API, for stabilization of metal constituents in K048–K052 nonwastewaters from five refineries. These data were obtained from stabilization treatment tests of solvent extraction raffinate, incinerator ash, and incinerator combustion gas scrubber water solids using a variety of binders.

The Agency received additional treatment performance data for CF Systems' solvent extraction system from four commenters: CF Systems, Exxon, Shell, and API. These data were obtained from solvent extraction treatment tests of organic constituents in K048–K052 nonwastewaters from ten refineries. Treatment performance data for RCC's B.E.S.T. solvent extraction system were also submitted from two commenters for treatment of organic constituents in K048–K052 nonwastewaters from three refineries. Treatment performance data for multicycle solvent extraction were submitted by one commenter for treatment of organic constituents in K048–K052 nonwastewaters from three refineries. Also, treatment performance data for BP America's filtration/solvent extraction/stabilization process were submitted by one commenter for treatment of organic constituents in K048–K052 nonwastewaters from one refinery. The Agency also has limited data submitted by Thermal Dynamics, Inc. for treatment of organic constituents in K048–K052 nonwastewaters using high temperature thermal distillation from one refinery. The basis for the amended treatment standards is summarized below.

(1) *BDAT Treatment Standards for Metal Constituents.* Today's rule amends the promulgated K048–K052 rulemaking (53 FR 31159) to delete the treatment standards for arsenic and selenium in nonwastewater forms of K048–K052. Today's rule also revises the treatment standard for nickel in nonwastewater forms of K048–K052.

The majority of the stabilization data submitted by industry could not be

considered in developing this promulgated rulemaking for the following reasons: (1) Data were not provided for a majority of the regulated constituents; (2) untreated waste data were not provided, and, therefore, no determination of substantial treatment could be made; (3) detection limits were not provided for undetected samples; and/or (4) treatment was not demonstrated for a majority of the regulated metal constituents.

Treatment performance data that were considered in developing promulgated treatment standards for metal constituents in K048–K052 nonwastewaters are discussed in detail in the amendment to the BDAT background document for these wastes located in the RCRA docket. Statistical comparison showed that data sets for stabilization of solvent extraction raffinate submitted by Exxon and BP America demonstrated better treatment for chromium than the data generated by EPA, as well as that submitted by Amoco for stabilization of incinerator ash. In addition, data submitted by industry indicated significantly higher levels of nickel in the untreated waste than in the waste stabilized by the Agency.

Several commenters stated that the data generated by EPA showed only marginal evidence of treatment by stabilization, and that an error was made in calculating the treatment standard for nickel in K048–K052 nonwastewaters. The Agency acknowledges the error made in the treatment standard calculation for nickel, and agrees with the commenters that marginal evidence of stabilization treatment is shown in the EPA generated data regarding arsenic and selenium. In addition, none of the industry data submitted show substantial treatment for these two constituents. Therefore, the Agency is deleting treatment standards for arsenic and selenium in K048–K052 nonwastewaters. Further, to ensure that the Agency is accounting for the maximum variability in metals concentrations in K048–K052 wastes, the Agency is using the data sets submitted by Exxon and BP America to revise the treatment standard for nickel. Finally, the treatment standard for chromium remains as promulgated in the First Third Rulemaking because the data submitted by Exxon and BP America, as well as by Amoco, indicate that the treatment standard is achievable for the complete range of K048–K052 wastes tested using stabilization treatment.

(2) *BDAT Treatment Standards for Organic Constituents.* Today's rule revises the treatment standards for all sixteen regulated organic constituents in K048–K052 nonwastewaters. In revising these standards, the Agency considered the treatment performance data submitted by industry for the following technologies: CF Systems' three-pass solvent extraction, BP America's multicycle solvent extraction, RCC's solvent extraction, and TDI's high temperature thermal distillation.

The majority of the aforementioned data could not be considered in developing this promulgated rulemaking for the following reasons: (1) Data were not provided for a majority of the regulated organic constituents; (2) untreated waste data were not provided and, therefore, no determination of substantial treatment could be made; (3) a majority of the regulated organic constituents were not detected in the untreated waste; (4) detection limits for the treated waste were several orders of magnitude higher than those achieved in other treated waste data sets, indicating non-optimized laboratory procedures; (5) treatment was not demonstrated for a majority of the regulated organic constituents; and/or, (6) adequate QA/QC data were not provided.

The remaining data sets met the Agency's screening criteria and were used with Agency-generated data from Amoco's fluidized bed incineration and CF Systems' five-pass solvent extraction treatment tests to calculate promulgated treatment standards for organic constituents in K048–K052 nonwastewaters. These treatment performance data are discussed in detail in the amendment to the BDAT background document for these wastes located in the RCRA docket.

Several commenters stated that the data used by EPA to develop the treatment standards do not reflect the wide variability in refinery wastes, and suggested that the Agency use data submitted by the petroleum refining industry to develop a larger database for calculation of treatment standards. However, one commenter stated that the Agency's current use of a variability factor in treatment standard calculations is sufficient, and additional factors to account for waste feed variability would bias the data.

The Agency has addressed the commenters' concerns regarding waste variability in calculating the revised treatment standards for K048–K052 promulgated in today's rule. The data sets that met the Agency's screening criteria were reviewed to determine the most difficult to treat waste (typically containing the highest concentration value) for each regulated constituent. The corresponding treated waste concentration was then multiplied by a variability factor of 2.8 (this variability factor is used by the Agency when attempting to account for variability with only one data point (see the BDAT Methodology Background Document located in the RCRA docket)) to determine the treatment standard for each constituent. A more detailed discussion of the calculation of revised treatment standards for the K048–K052 nonwastewater organics may be found in the amendment to the BDAT background document for these wastes located in the RCRA docket.

Several commenters stated that currently available solvent extraction processes, including the propane extraction system (CF Systems') tested by the Agency, cannot meet the proposed BDAT standards. One commenter stated that the propane extraction system tested by the Agency to develop the proposed treatment standards for organic constituents in K048–K052 nonwastewaters cannot be considered BDAT because it is a pilot-scale unit and, therefore, is not "demonstrated."

The Agency reminds the commenters that BDAT is technology-specific, not process-specific. BDAT for K048–K052 nonwastewater organics is solvent extraction and incineration, both of which are demonstrated treatment technologies for K048–K052 wastes, and data considered by the Agency from both technologies have been used to develop the promulgated treatment standards, thereby ensuring that the treatment standards would not preclude the use of either technology.

The Agency also points out that although the treatment standards were specifically calculated using data from CF Systems' solvent extraction unit, data submitted by RCC shows that their amine extraction technology would be able to meet the treatment standards for all regulated constituents except bis(2-ethylhexyl) phthalate. (High treated waste concentrations reported by RCC for bis(2-ethylhexyl) phthalate were apparently a result of laboratory contamination.) However, the RCC data were bench-scale and could not be considered further since pilot- and full-scale data were available to the Agency. BP America's solvent extraction data, which were used to promulgate treatment standards for K048–K052 nonwastewater organics in the first third rule, indicate that this technology can meet all but four of the revised treatment standards, those for ethylbenzene, bis(2-ethylhexyl) phthalate, as well as the new standards

for xylenes and naphthalene. Also, limited data available from TDI's high temperature thermal distillation unit show that it can meet all of the BDAT treatment standards and should be considered an equivalent BDAT technology to incineration and solvent extraction.

Several commenters stated that BDAT for refinery wastes should be based on both incineration and solvent extraction. As discussed above, treatment data available to the Agency from both technologies were used to develop the revised treatment standards. Therefore, both technologies can meet the revised promulgated standards. Although the solvent extraction data showed somewhat higher treated waste concentrations than the incineration data, the organic constituent removal efficiency for solvent extraction (98% on average) is close to that for available incineration data (99.7% on average). Additionally, solvent extraction provides the benefit of recovering as much as 365,000 barrels of oil per year (provided all of the K048–K052 waste generated per year is treated using solvent extraction technologies versus incineration technologies). This recovery benefit can also be realized using high temperature thermal distillation technologies.

The Agency notes, however, that in choosing to base treatment standards on solvent extraction as well as on incineration, it has chosen a technology that does not destroy or remove toxicants as well as incineration. EPA believes this is a permissible and rational choice to make given that solvent extraction is a recovery technology and the law voices a strong preference for use of such technologies. See, e.g., H.R. Rep. No. 198, 98th Cong. 1st Sess. 31. In addition, solvent extraction does perform substantial treatment on these wastes. Thus, the Agency believes its choice to be consistent with the language of section 3004(m) and also overall statutory goals of encouraging material reuse and waste minimization. See, e.g. RCRA section 1003(6).

Several commenters stated that the treatment standards for xylenes and naphtalene in K048–K052 nonwastewaters, reserved at the time of promulgation of the first third rule, should be based on data recently submitted by the petroleum refining industry or should be transferred from other regulated constituents with similar chemical structures. One commenter stated that the proposed treatment standards for ethylbenzene and phenanthrene in K048–K052 nonwastewaters should not be promulgated because they are below the practical quantitation limits (PQLs) for these constituents. Another commenter stated that none of the BDAT treatment standards should be set below PQLs.

The Agency points out that none of the K048–K052 nonwastewater organic treatment standards are being promulgated at levels below the PQLs for their respective constituents as listed in SW–846 for low level soil, the most similar matrix to incinerator ash and solvent extraction residues of the four matrices for which PQLs are given. In addition, the commenters should keep in mind that the PQLs in SW–846 were established to provide guidance for the analysis of waste samples by establishing minimum performance criteria for analytical laboratories. The PQLs listed in SW–846 do not necessarily represent the lowest limits of analytical performance achievable for any given waste. The PQLs the commenter refers to were obtained from analyzing a non-K048–K052 incinerator ash. The treatment standards for all regulated organic constituents in K048–K052 nonwastewaters are based on data submitted by industry, and the Agency believes that both solvent extraction and incineration technologies can reliably meet these standards on a routine basis.

The Agency wishes to clarify that it believes that combined treatment of the K048–K052 wastes is appropriate and does not constitute impermissible dilution of the more concentrated wastes. This is because these wastes are generated from similar processes, contain similar contaminants, and are amenable to the same treatment technologies. Although the K051 wastes appear to contain higher contaminant concentrations than the other petroleum wastes, the Agency does not consider combined treatment of the petroleum refining wastes to be impermissible dilution of the K051 wastes. In public comments to the proposed treatment standards for these wastes in the First Third rulemaking, which comments were referenced in comments to the proposal in this proceeding, the petroleum refining industry urged EPA to "consider the biological treatment and metal fixation that occurs in a land treatment facility, in tandem with other viable treatment methods as means of meeting the section 3004(m) treatment requirements." Comments of American Petroleum Institute (API), May 23, 1988, p. 44. Although land treatment is a type of land disposal (see section 3004(k)), the argument apparently is that in assessing the level of pre-disposal treatment to impose pursuant to section 3004(m), the postdisposal treatment that occurs in the land treatment unit should also be considered.

EPA responded in the First Third rulemaking that the statute forecloses the result that API is seeking. Land treatment is a type of land disposal and the statute states that a waste must meet the section 3004(m) standards before it is land disposed. See, e.g., Response to Comment Background Document at Docket LDR–9 p. 1621 (August, 1988). EPA continues to believe that the statute is unambiguous on this point: All treatment necessary to meet the section 3004(m) standards must occur before the waste is land disposed. Put another way, the level of pretreatment required before land disposal is not influenced by any treatment that may occur after land disposal. See RCRA sections 3004 (d), (e), and (g) (land disposal can only occur in units receiving waste that "has complied with the pretreatment regulations promulgated under" section 3004(m), or in no-migration units); *see also* RCRA section 3004(m)(2) (hazardous waste may be disposed of "if such waste has been treated to the level or by a method specified in regulations promulgated under this subsection").

EPA continues to believe that these provisions are unambiguous. However, even if it were determined that the Agency has some discretion to interpret these provisions (*see Chevron U.S.A. Inc.* v. *NRDC*, 467 U.S. 837, 843 (1984) stating that "if the statute is silent or ambiguous with respect to the specific issue, the question for the court is whether the agency's answer is based on a permissible construction of the statute"), then the Agency would reach the same result. In our view, the statute is directed to eliminating the "long-term uncertainties associated with land disposal" (see sections 3004 (d)(1)(A), (e)(1)(A) and (g)(5)) before land disposal occurs. Hazardous wastes also are to be "manag(ed) * * * in an appropriate manner in the first instance". Sections 3004 (d)(1)(B) (e)(1)(B), and (g) (5). The most readily available means of achieving these enumerated statutory goals, and the one directly commanded by Congress, is through imposition of the section 3004(m) pretreatment standards (i.e., standards that apply before land disposal). Any section 3004(m) standard that took into account possible treatment after land disposal had occurred would be relying on the "long-term uncertainties associated with land disposal" to achieve the object of section 3004(m): Substantial reductions in waste toxicity and mobility so that

threats to human health and the environment are minimized. This is not a reasonable way to construe the land disposal restriction provisions.

In addition, the reading urged by API would amount, as a practical matter, to an end run around the no migration test in sections 3004 (d), (e), and (g). The result advocated by API would result in partially treated wastes being disposed of in units that had not satisfied the no migration standard. This again is at odds with the natural reading of the statutory scheme which indicates only two alternatives for disposing of prohibited wastes: disposal in a no migration unit or disposal after satisfying the section 3004(m) standard. Again, this appears to EPA to be the very result that Congress legislated against.[2]

The approach API urges is also at odds with the BDAT approach the Agency has adopted to establish the section 3004(m) treatment standards. It would also be at odds with the approach EPA recently outlined that would cap BDAT treatment levels if those levels were ever below *de minimis* concentration levels of hazardous constituents established by EPA as a threshold for determining when threats from land disposal are minimized and wastes are no longer hazardous. See 55 FR 6640 (Feb. 26, 1990). The Agency thus believes it far more reasonable to go forward with its existing interpretation which does not undermine its approach to establishing treatment standards. (This approach was recently upheld as consistent with the statute in *Hazardous Waste Treatment Council* v. *EPA*, 886 F. 2d 355 (D.C. Cir. 1989).)

In short, EPA believes that it is reasonable to read the statute to require that all pretreatment of prohibited wastes occur before they are land disposed. Further, the Agency has determined in today's rule the extent of treatment that satisfies the section >3004(m) standard for the K048–052 wastes. Thus, this level of treatment is required before the wastes can be land disposed (unless disposal is into a no-migration unit).

BDAT TREATMENT STANDARDS FOR K048, K049, K050, K051 AND K052

[Wastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/l)
Cyanides (total)	0.028

REVISED BDAT TREATMENT STANDARDS FOR K048

[Nonwastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/kg)
Benzene	14
Benzo(a)pyrene	12
Bis(2-ethylhexyl)phthalate	7.3
Chrysene	15
Di-n-butylphthalate	3.6
Ethylbenzene	14
Naphthalene	42
Phenanthrene	34
Phenol	3.6
Pyrene	36
Toluene	14
Xylenes (total)	22

Regulated constituent	Maximum for any single grab sample, TCLP (mg/l)
Chromium (total)	1.7
Nickel	0.20

REVISED BDAT TREATMENT STANDARDS FOR K049

[Nonwastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/kg)
Anthracene	28
Benzene	14
Benzo(a)pyrene	12
Bis(2-ethylhexyl)phthalate	7.3
Chrysene	15
Ethylbenzene	14
Naphthalene	42
Phenanthrene	34
Phenol	3.6
Pyrene	36
Toluene	14
Xylenes (total)	22

Regulated constituent	Maximum for any single grab sample, TCLP (mg/l)
Chromium (total)	1.7
Nickel	0.20

REVISED BDAT TREATMENT STANDARDS FOR K050

[Nonwastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/kg)
Benzo(a)pyrene	12
Phenol	3.6

Regulated constituent	Maximum for any single grab sample, TCLP (mg/l)
Chromium (total)	1.7
Nickel	0.20

REVISED BDAT TREATMENT STANDARDS FOR K051

[Nonwastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/kg)
Anthracene	28
Benzene	14
Benzo(a)anthracene	20
Benzo(a)pyrene	12
Bis(2-ethylhexyl)phthalate	7.3
Chrysene	15
Di-n-butylphthalate	3.6
Ethylbenzene	14
Naphthalene	42
Phenanthrene	34
Phenol	3.6
Pyrene	36
Toluene	14
Xylenes (total)	22

Regulated constituent	Maximum for any single grab sample, TCLP (mg/l)
Chromium (total)	1.7
Nickel	0.20

[2] In fact, the scheme being advocated appears to resemble the original House version of the land disposal restriction provisions, which authorized the Agency to evaluate different forms of land disposal under different standards in determining which wastes were prohibited, and did not contain a no-migration test or a mandatory pretreatment provision. See section 5(c) of H.R. 2867, as reported at H.R. Rep. No. 198, 98th Cong., 1st Sess. 4–5 (1983). This scheme was not enacted, but rather was replaced by the present statute.

EPA also finds API's position to be unreasonable because it ignores section 3005(j)(11) which specifically authorizes land disposal in surface impoundments of wastes not meeting the section 3004(m) pretreatment standards provided that certain conditions are met. EPA believes that this provision indicates that when Congress intended to allow the land disposal of wastes not yet satisfying the section 3004(m) standards into land disposal units not meeting the nonmigration test, it said so explicitly. There is no such provision applicable to disposal in land treatment units.

REVISED BDAT TREATMENT STANDARDS FOR K052

[Nonwastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/kg)
Benzene	14
Benzo(a)pyrene	12
o-Cresol	6.2
p-Cresol	6.2
Ethylbenzene	14
Naphthalene	42
Phenanthrene	34
Phenol	3.6
Toluene	14
Xylenes (total)	22

Regulated constituent	Maximum for any single grab sample, TCLP (mg/l)
Chromium (total)	1.7
Nickel	0.20

r. K060

K060—Ammonia still lime sludge from coking operations.

In today's rule, the Agency is promulgating wastewater treatment standards for organic and cyanide constituents as proposed based on the performance of biological treatment followed by settling and clarification. These treatment standards are transferred from the Office of Water Development Document for Effluent Limitations Guidelines and Standards for the Iron and Steel Industry Manufacturing Point Source Category Coke Making Subcategory. In addition, the Agency is promulgating nonwastewater treatment standards for organic and cyanide constituents as proposed based on a transfer of the performance of incineration for K087 wastes, which are generated from the same industry as K060 wastes (coking industry) and have similar or higher concentrations of K060.

In the November 22, 1989, proposed rule, the Agency transferred the performance of alkaline chlorination for F007 through F009 wastewaters to the cyanide constituent of K060 wastewaters. The Agency believed that this was a technically feasible transfer because the F007 through F009 wastewaters were more difficult to treat as a result of the higher concentration of cyanides. Since that time, the Agency has reevaluated the performance of biological treatment for K060 wastewaters and believes that for this waste biological treatment can achieve similar treatment levels for low-concentration cyanides similar to those achieved by alkaline chlorination. Therefore, the Agency is promulgating a numerical treatment standard for the cyanide constituent in K060 wastewaters based on the performance of biological treatment followed by settling and clarification.

The Agency received no comments on the applicability of the technical transfer of the performance of the technologies for these wastes. Therefore, the Agency is promulgating concentration-based treatment standards for this waste as proposed.

BDAT TREATMENT STANDARDS FOR K060

[Revised from no land disposal]

[Wastewaters]

Regulated constituent	Maximum for any 24-hour composite sample, total composition (mg/l)
Benzene	0.17
Benzo(a) pyrene	0.035
Naphthalene	0.028
Phenol	0.042
Cyanides (Total)	1.9

BDAT TREATMENT STANDARDS FOR K060

[Revised from no land disposal]

[Nonwastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/kg)
Benzene	0.071
Benzo(a) pyrene	3.6
Naphthalene	3.4
Phenol	3.4
Cyanides (Total)	1.2

s. K061

K061—Emission control dust/sludge from the primary production of steel in electric furnaces.

In today's rule, the Agency is promulgating wastewater treatment standards for cadmium, chromium, and nickel in K061 wastes as proposed. The treatment standards are based on the performance of chemical reduction, followed by precipitation with sulfides and lime, and sludge dewatering as was set for K062 wastes. For lead, the Agency is promulgating wastewater treatment standards based on data received from the foundry industry. The treatment standard is based on the performance of precipitation with magnesium hydroxide and filtration for wastewaters generated from a cupola furnace. The Agency believes that the performance of this treatment system can achieve the promulgated treatment standards for the other metals (cadmium, chromium, and nickel) because of the metal hydroxide solubilities.

Many commenters also suggested that the Agency develop treatment standards for this waste based on a transfer of treatment data from the Effluent Guidelines Point Source Category of the Iron and Steel Manufactures. The Agency disagrees with the commenters and does not believe that Effluent Guidelines data represents a K061 wastewater. The data show low level of metals in the waste and there is no corresponding influent and effluent concentration levels for the metals. EPA therefore excluded this data in the development of the treatment standards.

Many commenters suggested that the transfer of the performance of treatment for K062 was not an appropriate transfer due to the chemical and physical differences between the two wastes, i.e., pH of wastewaters, influent lead concentrations, and settling differences between hydroxides (K062) and oxides (K061). The Agency disagrees with the commenters and believes that chemical and physical differences between the two wastes does not prevent treatment to the same concentration level. The Agency believes that changes to the treatment system such as the addition of other precipitating agents to alter the pH can aid in the performance of the treatment system thereby achieving the treatment standards.

In addition, the Agency received data from generators of K061 wastewaters. These data indicated that K061 wastewaters contained higher concentration of lead than are typically found in K062 wastewaters. Therefore, the Agency evaluated all of the available wastewater data from comment submissions and from the Effluent Guidelines database. Data submitted by the foundry industry indicated that lead concentrations can be substantially reduced by precipitation and filtration. The Agency believes that these treatment data better represent the typical concentration of lead found in K061. Therefore, the Agency is using these data to develop a numerical treatment standard for lead. The calculation of the treatment standard can be found in the Final Addendum Background document for K061 wastewaters.

EPA promulgated treatment standards for nonwastewater forms of K061 as part of the First Third final regulation on August 8, 1988. Two subcategories for nonwastewater forms of K061 were defined: the low zinc subcategory (less

than 15%) and the high zinc subcategory (greater than 15%). The treatment standard for the low zinc subcategory was based on the performance of stabilization. For the high zinc subcategory, the final standard was "No Land Disposal Based on High Temperature Metals Recovery as a Method of Treatment" technology (53 FR 31221). Due to a shortage in high temperature metals recovery capacity, the effective date of this treatment standard was delayed until August, 1990. An interim numerical standard based on performance of stabilization technology is in force until that time.

In the proposed rule, the Agency requested comments on the extension of the existing, interim treatment standard for another year. The Agency received comments indicating that industry is in the process of building recovery processes, thus alleviating the Agency's concern at proposal that an additional extension of the interim stabilization standard would reward dilatory conduct in developing optimal treatment. The Agency believes it appropriate to extend the interim standard as an alternative to high temperature recovery for one additional year.

The Agency also proposed to amend the existing treatment standard for high zinc K061 wastes to be resmelting in a high temperature metal recovery furnace. EPA has decided not to amend the existing standard. The standard itself is presently under review by a panel of the District of Columbia Circuit Court of Appeals (*API* v. *EPA*, No. 88-1606) and the Agency is concerned that the change in the treatment standard it proposed could confuse the matters at issue in that case without resolving them. The Agency therefore has decided not to change the description of the existing treatment standards for these wastes.

BDAT TREATMENT STANDARDS FOR K061

[Wastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/l
Cadmium	1.61
Chromium	0.32
Lead	0.51
Nickel	0.44

t. K086

K086—Solvent washes and sludges, caustic washes and sludges, or water washes and sludges from the cleaning of tubs and equipment used in the formulation of ink from pigments, driers, soaps, and stabilizers containing chromium and lead.

Today's rule revokes most of the treatment standards promulgated in the First Third final rule (53 FR 31168, August 17, 1988) for K086 (solvents-wash subcategory). Today's rule, however, keeps the previously promulgated treatment standards for metals regulated in K086.

In the proposed Third Third rule, EPA explained its determination not to subcategorize K086 (beyond subcategorization for wastewaters and nonwastewaters). This determination was based on the available characterization data of K086 and on the available treatment performance data for wastes believed as difficult to treat as K086. Commenters concurred and supported EPA's determination for regulating two forms of K086. The Agency is thus adopting this proposed approach in the final rule of K086 wastes.

The Agency proposed to revise most of the existing treatment standards for organic constituents regulated in the K086 solvent wash subcategory waste. (The existing treatment standards were promulgated in the First Third final rule (see 53 FR 31220, August 17, 1988)). Also, the Agency proposed to expand the list of regulated constituents in K086 to include acetohenone, di-n-butylphthalate, butylbenzylphthalate, diethylphthalate, dimethylphthalate, di-n-octylphthalate, and cyanide (total). This list of additional organics is adopted in today's rule. As noted in the Third Third proposed rule and the proposed BDAT Background Document Addendum for K086, the proposed revisions to the K086 treatment standards are consistent with the U and P treatment standards development protocol unless otherwise noticed. All the proposed treatment standards for K086 wastes were based on incineration.

Commenters fully supported the proposed revisions to the treatment standards for K086. They point out that the proposed standards for most of the constituents are more representative of K086 wastes. However, commenters also urged the Agency to develop the treatment standards for organics in K086 wastewaters based on performance data from wastewater treatment technologies rather than on incineration scrubber waters.

As stated in the Final Rule for Land Disposal Restrictions for Second Third Wastes (54 FR 26629) and reiterated in the proposed rule for Third Third Wastes (54 FR 48390), when the Agency has appropriate wastewater treatment data from well-designed and well-operated wastewater treatment units, it prefers to use these data rather than scrubber water concentrations to develop wastewater treatment standards.

Commenters on the proposed First Third, Second Third, and Third Third rules almost unanimously supported that EPA should promulgate wastewater standards based on the performance of specific wastewater treatment rather than incinerator scrubber water constituent levels. After reviewing all available data and comments, the Agency agrees with this comment, and is promulgating concentration-based treatment standards based on wastewater treatment data rather than scrubber water for all wastes that were proposed in the rule for Third Third Wastes. While the Agency did not specifically identify the standards based on wastewater treatment data as alternatives for F and K wastewaters, the Agency believes that this is a logical outgrowth of the notice and comment process. As such, the Agency is today modifying the wastewater treatment standards for K086.

The treatment standards promulgated today for organics in wastewater forms of K086, are based on performance data generated from a combination of two or more of the following BDAT technologies: biological treatment, steam stripping, carbon adsorption, liquid extraction, and other. (See section III.A.6. of today's preamble for a discussion of these performance data.) These treatment standards are expressed as concentration-based standards; however technologies capable of reaching the standard are not excluded from being used.

Comments were received indicating detection limit discrepancies in nonwastewater forms that contain cyclohexanone and methanol. Based on the available data, EPA believes that cyclohexanone and methanol may not be amenable to quantification and a concentration based treatment standards may not be a viable regulatory option. (See section III.A.5.6.)

Cyclohexanone and methanol are two of several organic constituents that were proposed for regulation in K086 wastes. Due to complications in analysis for these two constituents in nonwastewater treatment residues, EPA is withdrawing cyclohexanone and

methanol from the list of regulated constituents for K086 nonwastewaters. EPA identified other organic constituents in K086 that are as difficult to treat as cyclohexanone and methanol and thus believe that by regulating these other organic constituents, cyclohexanone and methanol should also be treated. However, EPA is still promulgating revised treatment standards for cyclohexanone and methanol in wastewater forms of K086. Available data for cyclohexanone and methanol containing wastewater do not indicate any analytical problems similar to those in nonwastewaters containing cyclohexanone and methanol. Therefore, EPA determined it is not necessary to specify a method of treatment or an indicator or surrogate constituent for these two constituents in nonwastewater forms of K086.

EPA is reaffirming the treatment standards for chromium (total) and lead for all forms of K086 wastes, as explained below. Today's rule abolishes K086 waste subcategories (beyond wastewaters and nonwastewaters) and revokes almost all of the treatment standards promulgated on August 17, 1988 (53 FR 31167). However, EPA is retaining the wastewater and nonwastewater chromium and lead treatment standards that were established in the First Third final rule and making them applicable to all forms of K086. These standards are based on the wastewater treatment residues resulting from the hexavalent chromium reduction to trivalent chromium followed by chemical precipitation and filtration of a wastewater believed similar to K086 wastewaters.

The treatment standards for cyanide (total) are based on residues from the alkaline chlorination of wastewaters containing cyanide. Detailed information for the development of the treatment standards for all these regulated constituents can be found in the Final Addendum BDAT Background Documents for K086.

BDAT TREATMENT STANDARDS FOR K086

[Wastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/l)
Acetone	0.28
Acetophenone	0.010
n-Butyl alcohol	5.6
Cyclohexanone	0.36
1,2-Dichlorobenzene	0.088
Methyl isobutyl ketone	0.14
Methyl ethyl ketone	0.28
Cyanides (Total)	1.9

BDAT TREATMENT STANDARDS FOR K086—Continued

[Wastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/l)
Chromium (Total)	0.32
Lead	0.037

Regulated constituent	Maximum for any composite sample, total composition (mg/l)
Bis(2-ethylhexyl)phthalate	0.28
Butylbenzylphthalate	0.017
Diethyl phthalate	0.20
Dimethyl phthalate	0.047
Di-n-butyl phthalate	0.057
Di-n-octyl phthalate	0.017
Ethyl acetate	0.34
Ethyl benzene	0.057
Methanol	*5.6
Methylene chloride	0.089
Naphthalene	0.059
Nitrobenzene	0.068
Toluene	0.080
1,1,1-Trichloroethane	0.054
Trichloroethylene	0.054
Xylenes (Total)	0.32

*Standard for methanol is based on analysis of a composite sample using SW-846 Method 8000.

BDAT TREATMENT STANDARDS FOR K086

[Nonwastewaters]

Constituent	Maximum for any single grab sample, total composition (mg/kg)
Acetone	160
Acetophenone	9.7
Bis(2-ethylhexyl)phthalate	28
n-Butyl alcohol	2.6
Butylbenzylphthalate	7.9
1,2-Dichlorobenzene	6.2
Diethyl phthalate	28
Dimethyl phthalate	28
Di-n-butyl phthalate	28
Di-n-octyl phthalate	28
Ethyl acetate	33
Ethyl benzene	6.0
Methyl isobutyl ketone	33
Methyl ethyl ketone	36
Methylene chloride	33
Naphthalene	3.1
Nitrobenzene	14
Toluene	28
1,1,1-Trichloroethane	5.6
Trichloroethylene	5.6
Xylenes (Total)	28
Cyanide (Total)	1.5

Regulated constituent	Maximum for any single grab sample, TCLP (mg/l)
Chromium	0.094
Lead	0.37

5. Development of Treatment Standards for U and P Wastewaters and Nonwastewaters Excluding Metal Salts and Organometallics

Today's rule promulgates treatment standards for wastewater and nonwastewater forms of U and P wastes (as defined in 40 CFR 261.33(e) and (f)) that are identical to treatment standards for multi-source leachate identified as F039 (see section III.A.6. for additional discussion of treatment standards for multi-source leachate). Thus, this section of the preamble presents a discussion of the development of these standards. Treatment standards for other U and P wastes that are listed specifically as metal salts or organometallics are discussed in previous sections of today's rule. (**Note:** Treatment standards for additional U and P wastes have already been promulgated in 53 FR 31174 (August 17, 1988) and 54 FR 26594 (June 23, 1989)).

This section of the preamble also includes a discussion of the promulgated treatment standards for U and P wastes that have been identified as potentially reactive, exist primarily as gases, or are cyanogens. The specific U and P waste codes covered by the following discussion are listed at the end of this section in the table of standards.

In the proposed rule, EPA grouped all of the U and P wastes into various treatability groups based on similarities in elemental composition (e.g., carbon, halogens and metals) and the presence of key functional groups (e.g., phenolics, esters, and amines) within the structure of the individual chemical. The Agency has also accounted for physical and chemical factors that are known to affect the selection of treatment alternatives and to affect the performance of the treatment, such as volatility and solubility, when developing these treatability groups. The use of the chemical (e.g., pesticides and pharmaceuticals) was also important in establishing these groups. Emphasizing the use of these chemicals allowed the Agency to identify issues specific to these groups of chemicals, to target potential sources of data, and to solicit comments and data from specific industries and public interest groups.

While the Agency presented the proposed treatment standards for U and P wastes according to these treatability groups, the promulgated treatment standards are presented in this section according to the physical form (i.e., wastewaters and nonwastewaters) and whether the treatment standards are concentration-based or technology-based. More information on the

development of specific treatment standards for these wastes can be found in the background document for U and P wastes. While the background documents for these wastes in the proposed rule were presented according to treatability groups, only one background document (in five volumes) for these wastes exists for the final rule and is presented similar to the following discussion.

a. Concentration-based Standards for Specific Organics

The regulated constituents for the U and P wastes for which the Agency is promulgating concentration-based standards generally are those specific constituents for which the U and P waste is listed (as specified in 40 CFR 261.33 (e) and (f)). However, for several U and P wastes additional constituents have been selected for regulation for various reasons. More detail on the selection of regulated constituents can be found in the proposed background documents. The regulated constituents for these wastes and the promulgated treatment standards are presented in the tables at the end of each section. See also treatment standards for F039 in section III.A.6. of today's rule.

(1) *Wastewaters.* As explained in preamble section III.A.1, the Agency is adopting in this notice the definition of wastewaters that was used to promulgate treatment standards in the First and Second Third final rules—that is, wastewaters are those wastes containing less than 1% TOC and less than 1% TSS. See also the general discussion of the wastewater definition in section III.A.1. of today's rule. More detailed information on the wastes covered by this section can be found in the Final BDAT Background Document for U and P Wastes and Multi-Source Leachates (F039), Volume A: Wastewater Forms of Organic U and P Wastes and Multi-Source Leachates (F039) For Which There Are Concentration-based Treatment Standards.

In the November 22, 1989 proposed rule for Third Third wastes, the Agency proposed two alternative sets of concentration-based standards for most of these wastewaters. One set of standards was based on the concentration of these constituents in incinerator scrubber water. These scrubber water numbers were proposed because the Agency was not certain that the alternate standards would be available in time for proposal. The alternate set of standards was based on a transfer of performance data from various sources including: (1) The Office of Water's Industrial Technology Division (ITD) and National Pollution Discharge Elimination System (NPDES) data (specifically from the Organic Chemicals, Plastics, and Synthetic Fibers (OCPSF) database); (2) the Hazardous Waste Engineering Research Laboratory (HWERL) database; (3) the Office of Solid Waste's BDAT data (from previous land disposal restrictions rules); and (4) additional wastewater treatment data from literature articles on wet air oxidation (WAO) and PACT. These alternative wastewater treatment standards were presented in section III.A.7. of the proposed Third Third rule as treatment standards for wastewater forms of multi-source leachate. When the Agency has appropriate wastewater treatment data from well-designed and well-operated wastewater treatment units, it prefers to use these data rather than scrubber water concentrations to develop wastewater treatment standards. (This does not, however, preclude the Agency from establishing treatment standards for other wastes based on constituent concentrations in incinerator scrubber waters.) Also, commenters unanimously requested that the U or P wastewater standards be based on the performance of biological treatment rather than incinerator scrubber water constituent levels. For these reasons, the Agency has chosen to finalize the treatment standards based on the proposed alternate standards with some revisions. None of today's final wastewater standards in this section are based on scrubber water concentrations.

As stated in the November 22, 1989 proposed rule, the Agency also conducted wastewater treatment tests for selected U and P chemicals using wet air oxidation, powdered activated carbon treatment (PACT), and carbon adsorption. In addition to these data, the Agency received performance data on the treatment of multi-source leachate wastewaters just prior to proposal. The results of these tests were not available in time to analyze for the proposal, but were placed in the administrative docket to the proposed rule and noticed for comment.

Most of the aforementioned data supported the achievability of EPA's preferred proposed treatment standards (the alternate set of standards). The Agency reviewed all of these data during the comment period to determine whether they could be considered best demonstrated available technology. In reviewing these data, the Agency also considered the influent concentration of the treated constituent, whether the treated stream was representative of that U and P wastewater, and how achievable the detection limit is in similar or other matrices based on other data received. The Agency has revised some of the proposed wastewater standards in this final rule based on data received just prior to proposal.

Commenters requested that the U and P wastewater standards be based on the performance of biological treatment rather than wet air oxidation followed by PACT. Where biological treatment data were not available, the Agency promulgated standards as proposed based on Office of Water data, or in some cases, used wastewater data based on the performance of wet air oxidation followed by PACT or wastewater data generated by treaters of leachate.

Proposed standards were revised for a number of reasons: (1) Based on a review of recently received multi-source leachate wastewater data, (2) based on a review of the recently completed wet air oxidation/PACT study and (3) based on a review of the existing data used to generate the proposed standards and comments received on the proposed standards. More detail on these revisions can be found on a constituent basis in the background document for these wastewaters. Where proposed standards were inconsistently large because of poor data availability, the Agency reviewed alternate sources of data to develop standards that are more consistent with similar constituents but still considered achievable by treatment. The following discussion explains in more detail the rationale for these revisions to the proposed standards. The constituents for which standards were changed from the proposed standards as presented in section III.A.7. of the Third Third proposed rule as treatment standards for wastewater forms of multi-source leachate are listed in a table at the end of this section. This table includes multi-source leachate organic constituents as well as U and P organic wastewaters.

Constituents for which multi-source leachate data were used to develop standards are given the reference code (1), Revisions Based on Multi-Source Leachate Data, in the table at the end of this section. For the majority of constituents, the multi-source leachate data supported the achievability of the proposed standards. Some of the multi-source leachate data were not used, however, because they did not show substantial treatment. Where multi-source leachate data showed a proposed standard could not be met, and demonstrated substantial treatment using a technology that could be considered BDAT, those data were used

instead. Also, where a constituent had an exceedingly large standard because of lack of good data, multi-source leachate data were used to develop a more appropriate standard whenever possible.

Constituents for which WAO/PACT data were used to develop standards are given the reference code (2), Revisions Based on WAO/PACT Data, in the table at the end of this section. More information on these data can be found in the Onsite Engineering Report of Wet Air Oxidation and PACT System Treatability Study at Zimpro/Passavant, March 1990. The Agency found that WAO followed by PACT performed better than WAO alone. Influent concentrations were designed to be high enough to represent U and P wastewaters. These data demonstrated that a number of constituents could be substantially treated by wet air oxidation followed by PACT. Where these data showed substantial treatment, they were used to develop standards for constituents for which the Agency does not have good biological treatment data or multi-source leachate data demonstrating substantial treatment.

Constituents for which the Agency reexamined the data that were used for proposal are given the reference code (3), Revisions Based on Review of Existing Data, in the table at the end of this section. The data sources and transfer choices used for the proposed standards were reevaluated. These constituents include those for which changes were made as a result of comments on the proposed standards. The standards in this category were changed for a variety of reasons. The standards for 1,4-Dioxane and ethylene oxide, which were inconsistently larger than other constituents in their treatability group, were revised based on a transfer of treatment data from ethyl ether. The standards for methacrylonitrile and propanenitrile (ethyl cyanide), which were inconsistently larger than other constituents in their treatability group, were revised based on a transfer of treatment data for acrylonitrile. The standard for 1,1,2-Trichloro-1,2,2-trifluoroethane was revised based on a transfer of treatment data from hexachloroethane. The remaining constituents in this category have revised standards due to a change in the methodology for calculating variability factors and accuracy correction factors when HWERL or NPDES data were used to develop treatment standards. More information on these revisions can be found in the background document for these wastewaters.

None of today's promulgated U and P wastewater standards are based on incinerator scrubber water. However, it should be noted that when the Agency promulgates concentration-based standards, the regulated community may use any method of treatment to achieve these standards, so long as it does not constitute land disposal or impermissible dilution.

Many of the new wastewater data include analysis of composite samples rather than grab samples. Thus, the Agency has developed many of the concentration-based treatment standards based on an analysis of composite samples rather than grab samples. Where data from analysis of composite samples were used, the Agency so indicates in the appropriate table of treatment standards at § 268.43. More information on the Agency's use of grab and composite standards can be found in the preamble section III.A.1.

The Chemical Manufacturing Association (CMA) calculated wastewater treatment standards for many constituents based on data contained in the OCPSF database using a modified BDAT Methodology, and submitted these suggested limits to the Agency for review. EPA did not use the CMA standards, but did consider the OCPSF data base, the analyses conducted by EPA's Industrial Technology Division, and the BDAT methodology. EPA's analysis differs from CMA's and sometimes produced higher and lower limits. For example, the standard suggested by CMA for chloroform in wastewaters is lower (i.e., more stringent) than that promulgated by the Agency specifically for chloroform in K009 and K010 wastewaters. In developing the BDAT standards, the Agency examined data beyond that contained in the OCPSF data base. Thus, our selection of BDAT sometimes involved the analysis of data beyond that included in CMA's suggested limits.

Finally, EPA is promulgating treatment methods as standards for several wastewater forms of U and P wastes for which the Agency had proposed concentration-based standards. After examining certain information received following the proposed rule, EPA adjusted treatment standards for many nonwastewater forms of U and P wastes and realized that several types of analytical problems associated with nonwastewaters applied to wastewaters as well. Section III.A.5.a.(2), immediately following, discusses these problems at length.

Consequently EPA is promulgating treatment methods as standards for wastewater forms of the following U and P wastes: P082, N-nitrosodimethylamine; U017, benzal chloride; U073, 3,3'-dichlorobenzidine; U074, cis-1,4-dichloro-2-butene; U091 3,3'-dimethoxybenzidine.

CONCENTRATION-BASED BDAT TREATMENT STANDARDS FOR U AND P WASTEWATERS

Waste code	Regulated organic constituents	*Total composition (mg/l)
U002	Acetone	0.28
U003	Acetonitrile	0.17
U004	Acetophenone	0.010
U005	2-Acetylaminofluorene	0.059
U009	Acrylonitrile	0.24
U012	Aniline	0.81
U018	Benz(a)anthracene	0.059
U019	Benzene	0.14
U022	Benzo(a)pyrene	0.061
U024	bis-(2-Chloroethoxy) methane.	0.036
U025	bis-(2-Chloroethyl) ether	0.033
U027	bis-(2-Chloroisopropyl) ether.	0.055
U029	Bromomethane	0.11
U030	4-Bromophenyl phenyl ether.	0.055
U031	n-Butyl alcohol	5.6
U036	Chlordane	0.0033
U037	Chlorobenzene	0.057
U038	Chlorobenzilate	0.10
U039	p-Chloro-m-cresol	0.018
U043	Vinyl chloride	0.27
U044	Chloroform	0.046
U045	Chloromethane (methyl chloride).	0.19
U047	2-Chloronaphthalene	0.055
U048	2-Chlorophenol	0.044
U050	Chrysene	0.059
U051	Pentachlorophenol	0.089
U051	Phenanthrene	0.059
U051	Pyrene	0.067
U052	o-Cresol	0.11
U052	Cresol (m- and p-isomers).	0.77
U057	Cyclohexanone	0.36
U060	o,p'-DDD	0.023
U060	p,p'-DDD	0.023
U061	o,p'-DDE	0.031
U061	p,p'-DDE	0.031
U061	o,p'-DDT	0.0039
U061	p,p'-DDT	0.0039
U063	Dibenzo(a,h)anthracene	0.055
U066	1,2-Dibromo-3-chloropropane.	0.11
U067	1,2-Dibromoethane	0.028
U068	Dibromomethane	0.11
U070	o-Dichlorobenzene	0.088
U071	m-Dichlorobenzene	0.036
U072	p-Dichlorobenzene	0.090
U075	Dichlorodifluoromethane	0.23
U076	1,1-Dichloroethane	0.059
U077	1,2-Dichloroethane	0.21
U078	1,1-Dichloroethylene	0.025
U079	trans-1,2-Dichloroethene	0.054
U080	Methylene chloride	0.089
U081	2,4-Dichlorophenol	0.044
U082	2,6-Dichlorophenol	0.044
U083	1,2-Dichloropropane	0.85
U084	cis-1,3-Dichloropropene	0.036
U084	trans-1,3-Dichloropropene.	0.036

CONCENTRATION-BASED BDAT TREATMENT STANDARDS FOR U AND P WASTEWATERS—Continued

Waste code	Regulated organic constituents	*Total composition (mg/l)
U093	p-Dimethylaminoazobenzene.	0.13
U101	2,4-Dimethyl phenol	0.036
U105	2,4-Dinitrotoluene	0.32
U106	2,6-Dinitrotoluene	0.55
U108	1,4-Dioxane	0.12
U111	Di-n-propylnitrosoamine	0.40
U112	Ethyl acetate	0.34
U115	Ethylene oxide	0.12
U117	Ethyl ether	0.12
U118	Ethyl methacrylate	0.14
U120	Fluoranthene	0.068
U121	Trichloromonofluoromethane.	0.020
U127	Hexachlorobenzene	0.055
U128	Hexachlorobutadiene	0.055
U129	alpha-BHC	0.00014
U129	beta-BHC	0.00014
U129	delta-BHC	0.023
U129	gamma-BHC	0.0017
U130	Hexachlorocyclopentadiene.	0.057
U131	Hexachloroethane	0.055
U137	Indeno(1,2,3,-c,d)pyrene	0.0055
U138	Iodomethane	0.19
U140	Isobutyl alcohol	5.6
U141	Isosafrole	0.081
U142	Kepone	0.0011
U152	Methacrylonitrile	0.24
U155	Methapyrilene	0.081
U157	3-Methylchloanthrene	0.0055
U158	4,4-Methylene-bis-(2-chloroaniline).	0.50
U159	Methyl ethyl ketone	0.28
U161	Methyl isobutyl ketone	0.14
U162	Methyl methacrylate	0.14
U165	Naphthalene	0.059
U168	2-Naphthylamine	0.52
U169	Nitrobenzene	0.068
U170	4-Nitrophenol	0.12
U172	N-Nitroso-di-n-butylamine	0.40
U174	N-Nitrosodiethylamine	0.40
U179	N-Nitrosopiperidine	0.013
U180	N-Nitrosopyrrolidine	0.013
U181	5-Nitro-o-toluidine	0.32
U183	Pentachlorobenzene	0.055
U185	Pentachloronitrobenzene	0.055
U187	Phenacetin	0.081
U188	Phenol	0.039
U192	Pronamide	0.093
U196	Pyridine	0.014
U203	Safrole	0.081
U207	1,2,4,5-Tetrachlorobenzene.	0.055
U208	1,1,1,2-Tetrachloroethane	0.057
U209	1,1,2,2-Tetrachloroethane	0.057
U210	Tetrachloroethene	0.056
U211	Carbon tetrachloride	0.057
U220	Toluene	0.080
U225	Tribromomethane (bromoform).	0.63
U226	1,1,1-Trichloroethane	0.054
U227	1,1,2-Trichloroethane	0.054
U228	Trichloroethene	0.054
U239	Xylene(s)	0.32
U240	2,4-Dichlorophenoxyacetic acid.	0.72
U243	Hexachloropropene	0.035
U247	Methoxychlor	0.25
P004	Aldrin	0.021
P020	2-sec-Butyl-4,6-dinitrophenol.	0.066
P022	Carbon disulfide	0.014
P024	p-Chloroaniline	0.46
P037	Dieldrin	0.017
P047	4,6-Dinitrocresol	0.28
P048	2,4-Dinitrophenol	0.12
P050	Endosulfan I	0.023
P050	Endosulfan II	0.029
P050	Endosulfan sulfate	0.029
P051	Endrin	0.0028
P051	Endrin aldehyde	0.025
P059	Heptachlor	0.0012
P059	Heptachlor epoxide	0.016
P060	Isodrin	0.021
P077	p-Nitroaniline	0.028
P082	N-Nitrosodimethylamine	0.40
P101	Ethyl cyanide	0.24
P123	Toxaphene	0.0095

*These standards are a mixture of grab and composite samples. Each standard is identified as either grab or composite in the tables found at § 268.43.

BASIS OF REVISIONS TO U, P AND F039 WASTEWATER STANDARDS

Regulated organic constituents	Reference for revision
Acetone	1
Acetonitrile	3
Acrolein	3
Acetophenone	1
4-Aminobiphenyl	3
Aramite	1
Benzo(b)fluoranthene	3
Benzo(g,h,i)perylene	3
Bromodichloromethane	3
Bromomethane	3
4-Bromophenyl phenyl ether	3
n-Butyl alcohol	1
Butyl benzyl phthalate	3
2-sec-Butyl-4,6-dinitrophenol	2
Carbon tetrachloride	3
Carbon disulfide	1
p-Chloroaniline	2
Chlorobenzene	3
Chlorobenzilate	3
2-Chloro-1,3-butadiene	3
Chlorodibromomethane	3
bis-(2-Chloroethoxy) methane	1
bis-(2-Chloroethyl) ether	3
2-Chloroethyl vinyl ether	3
bis-(2-Chloroisopropyl) ether	3
p-Chloro-m-cresol	3
2-Chloronaphthalene	3
2-Chlorophenol	3
3-Chloropropene	3
O-Cresol	3
Cresol (m- and p- isomers)	3
Cyclohexanone	1
1,2-Dibromo-3-chloropropane	3
1,2-Dibromoethane	3
Dibromomethane	3
Dibenzo(a,h)anthracene	3
tris-(2,3-Dibromopropyl) phosphate	3
m-Dichlorobenzene	1
o-Dichlorobenzene	3
p-Dichlorobenzene	3
3,3'-Dichlorobenzidine	3
cis-1,4-Dichloro-2-butene	3
trans-1,4-Dichloro-2-butene	3
Dichlorodifluoromethane	3
2,4-Dichlorophenol	3
2,6-Dichlorophenol	3
1,2-Dichloropropane	3
cis-1,3-Dichloropropene	3
trans-1,3-Dichloropropene	3
3,3'-Dimethoxybenzidine	3
p-Dimethylaminoazobenzene	3
1,4-Dinitrobenzene	3
2,4-Dinitrotoluene	3
2,6-Dinitrotoluene	3
Di-n-octyl phthalate	3
Diphenylamine	3
1,2-Diphenyl hydrazine	3
Diphenylnitrosoamine	3
1,4-Dioxane	3
Disulfoton	1
Endrin aldehyde	3
Ethyl acetate	3
Ethyl benzene	3
Ethyl cyanide	3
Ethyl ether	3
Ethyl methacrylate	1
Ethylene oxide	3
Famphur	1
Hexachlorobenzene	3
Hexachlorobutadiene	3
Hexachloroethane	3
Hexachloropropene	3
Indeno(1,2,3,-c,d)pyrene	3
Isobutyl alcohol	1
Isosafrole	2
Kepone	1
Methacrylonitrile	3
Methanol	1
Methapyrilene	2
3-Methylchloanthrene	3
4,4-Methylene-bis-(2-chloroaniline)	3
Methyl ethyl ketone	1
Methyl isobutyl ketone	1
Methyl methacrylate	1
Methyl methanesulfonate	1
2-Naphthylamine	3
p-Nitroaniline	3
5-Nitro-o-toluidine	3
N-Nitrosodiethylamine	3
N-Nitrosodimethylamine	3
N-Nitroso-di-n-butylamine	3
N-Nitrosomethylethylamine	3
N-Nitrosomorpholine	3
N-Nitrosopiperidine	3
N-Nitrosopyrrolidine	3
Pentachlorobenzene	3
Pentachlorodibenzo-furans	1
Pentachloronitrobenzene	3
Pentachlorophenol	3
Phenacetin	2
Phenol	1
Phorate	1
Pronamide	2
Pyridine	3
Safrole	2
1,2,4,5-Tetrachlorobenzene	3
Tetrachlorodibenzo-p-dioxins	1
1,1,1,2-Tetrachloroethane	3
1,1,2,2,-Tetrachloroethane	3
2,3,4,6-Tetrachlorophenol	3
Tribromomethane (bromoform)	3
1,2,4-Trichlorobenzene	3
2,4,5-Trichlorophenol	1
2,4,6-Trichlorophenol	1
1,2,3-Trichloropropane	3
1,1,2-Trichloro-1,2,2-trifluoroethane	3
Xylene(s)	3

Note: This table includes constituents regulated under multi-source leachate that may not be U or P waste codes, or may be U or P wastes which are not being promulgated in today's rule (i.e., Famphur P097 was finalized in the 2nd 3rd Final Rule, January 11, 1989 and is included here only because it is a regulated constituent in multi-source leachate).

References for the basis of the revised standards are as follows:
1—Revisions are based on analysis of treatment data previously submitted for multi-source leachate
2—Revisions are based on analysis of treatment data from EPA's WAO/PACT study for selected U and P chemicals
3—Revisions are based on re-analysis of existing treatment data and comments

(2) *Nonwastewaters.* EPA is promulgating nonwastewater concentration-based standards for the majority of U and P wastes as proposed. All promulgated concentration-based standards reflect the performance of well-designed and well-operated incineration systems and were developed primarily using the results of fourteen incinerator test burns (not to be confused with test burns carried out as part of the RCRA permitting process) which EPA undertook for the development of treatment standards for specific F and K wastes plus selected U and P wastes. The Agency reexamined these data together with other data and comments submitted during the comment period. Based on this re-analysis, the Agency changed the proposed treatment standards for approximately seventy-five constituents. These changes are summarized in the tables at the end of this section.

These changes took the form of either different numerical values for concentration-based standards or promulgating incineration as a method of treatment for wastes for which EPA had proposed concentration-based standards. Where the values of the numerical standard changed, some promulgated standards are lower and some are higher than the proposed standards. In no case, did EPA promulgate a concentration-based standard for a waste code for which a method of treatment was proposed.

In the course of developing the proposed standards, the Agency had examined the logistics of generating incineration data, considering relative availability, expense, and ease for nonwastewater forms of all of these organic U and P waste codes. EPA decided to select a limited number of U and P waste code compounds (representing the various classifications inherent to the structure of these chemicals) for additional testing in two test burns prior to the proposed rule. These new data were used in conjunction with the data from the previous twelve test burns to develop the proposed treatment standards for the remaining untested wastes. The compounds that were tested were selected to represent the treatability of each group of waste codes, based on similarities in chemical structure i.e., presence of key functional groups, elemental composition (including chlorine, sulfur, and nitrogen), number of carbon atoms, arrangement and number of aromatic and aliphatic rings, isomer and homologue series, and degree of chlorination.

The two burns were designed such that the physical forms, concentrations, and soil content of the feed would represent the range of U and P wastes as EPA anticipates they will be generated. The treatability test consisted of two 6-hour burns consisting of 11 liquids and 7 solids. Clean fill (i.e., dirt) was added to produce ash representing that resulting from incineration of a waste spilled on soil. Four sample sets of ash and scrubber water were analyzed for BDAT list constituents. (More information on the test burn can be found in the Onsite Engineering Report Treatment Technology Performance and Operation for John Zink Company, October, 1989).

Through these incineration tests, EPA demonstrated that incineration is BDAT for a wide variety of U and P organic compounds—halogenated, non-halogenated, volatiles, semivolatiles, and pesticides. EPA's evidence for this is that these compounds are present at significant levels in untreated wastes and then appear at or near detection levels in the ash residues from these tests. Thus, data from these incineration tests assumed a critical role in developing concentration-based and technology-based treatment standards for nonwastewaters.

Detection limits represent the lowest values of a contaminant that an analytical measurement procedure can reliably measure in a particular matrix (e.g., incinerator ash). Detection limits are especially significant in developing concentration-based standards based on incinerator performance because a well-designed and well-operated incineration system appears to reduce the concentrations of virtually all of the investigated organic compounds to detection limits. EPA treats the detection limit as the quantitative expression of the post-treatment concentration and therefore calculates concentration-based standards by assuming that the detection limit represents the lowest level to which incineration can lower a contaminant's concentration.

Several sources of data received after the proposed rule was published led EPA to make the changes between the proposed and final rules discussed in the rest of this section. One source was commenters' data, especially the "Interlaboratory Ash Study" discussed in the following section. Another source was an in-house study by EPA's Office of Research and Development pointing out recently discovered major problems in quantifying analytes for which EPA had proposed concentration-based standards. Additionally, EPA reevaluated its own calculations and modified several sets of standards to ensure a consistent methodology.

Comments about the proposed concentration-based standards fell into two groups: comments about treatment standards for individual waste codes and one substantial comment from a group of waste treatment industry representatives dealing primarily with the issue of detection limits in incinerator ash. This comment provided EPA with a significant amount of ash characterization data. Although some aspects of this data were flawed. EPA considered this study carefully when evaluating the standards before promulgation; the Response to Comments Background Document presents EPA's critique of this study's strengths and weaknesses. Subsection (1) of the following discussion of comments presents a detailed discussion of how EPA evaluated this commenter's ash data. Subsection (2) describes all of the changes between the proposed and final standards, and subsection (3) discusses the other significant comments received on the proposed concentration-based standards and analytical issues.

(a) Use of the Interlaboratory Ash Study. One commenter, representing the waste treatment industry, submitted a study undertaken by several laboratories associated with commercial incineration facilities to verify whether industry labs can reliably quantify the regulated constituents at the level of both the proposed and previously promulgated concentration-based standards in incinerator ash. The study's secondary purpose was to identify those regulated constituents for which concentration-based standards may be altogether inappropriate (i.e., inferring that standards expressed as methods are more appropriate). The commenter analyzed many RCRA-regulated constituents, virtually all the organics on the BDAT list, in samples of incinerator ash at levels near the concentration-based standards. These data included six detection limits reported by each of six laboratories representing the average of seven replicate detection limit determinations made on a single sample of ash from a commercial incineration facility.

These data also included six sets of seven spike recoveries reported by the six laboratories—42 recoveries in all for each analyte. (Recoveries represent the

fraction of a known quantity of the compound in question added to a sample and then measured (i.e., recovered) in subsequent analysis.)

EPA evaluated the commenter's detection limit and recovery data for each regulated organic constituent by first comparing these detection levels to those obtained by EPA during its various test burns. For most of these, the commenter's detection levels fell within an order of magnitude of EPA's detection levels. As a result, EPA did not raise concentration-based standards for those analytes where the commenter's detection limits fell very close to those EPA achieved.

Consequently, EPA made several sets of changes between the proposed and final standards following analysis of this commenter's data. These changes primarily occurred when EPA reevaluated cases where the commenter reported higher detection limits than EPA used to calculate standards. Although EPA had generally used the highest of the set of up to fourteen incinerator ash concentrations as the basis of the Third Third proposed standards for many compounds, some exceptions were made in the case of apparent outliers and where EPA believed a particular raw waste matrix best represented the waste in question.

Most of the changes in the numerical values between proposal and promulgation arose from an EPA reevaluation of the use of recovery factors in calculating concentration-based standards. EPA had calculated the proposed concentration-based standards for halogenated aliphatics, aromatics and polynuclear aromatics using an average recovery factor of several compounds. However, concentration-based standards for the rest of these wastes were calculated using a recovery factor from a single compound, not the average of several compounds. To ensure consistency among all concentration-based standards, EPA chose to recalculate standards for halogenated aliphatics, aromatics and polynuclear aromatics using a single compound recovery factor. The following compounds were affected:

1. Halogenated aliphatics: U044, chloroform; U076, 1,1-dichloroethane; U077, 1,2-dichloroethane; U078, 1,1-dichloroethylene; U079, trans-1,2-dichloroethylene; U080, methylene chloride; U083, 1,2-dichloropropane; U084, cis-1,3-dichloropropene; U084, trans-1,3-dichloropropene; U131, hexachloroethane; U208, 1,1,1,2-tetrachloroethane; U209, 1,1,2,2-tetrachloroethane; U210, tetrachloroethylene; U211, carbon tetrachloride; U226, 1,1,1-trichloroethane; U227, 1,1,2-trichloroethane; and U243, hexachloropropene. The proposed standard for U228, trichloroethylene had been calculated using single-compound recoveries and therefore did not need to be recalculated.

2. Aromatics: U239, total xylenes. The proposed standards for U019, benzene and U220, toluene; U239, had been calculated using single-compound recoveries and therefore did not need to be recalculated.

3. Polynuclear aromatics: U005, 2-acetylaminofluorene; U018, benzo(a)anthracene; U022, benzo(a)pyrene; U050, chrysene; U063, dibenzo(a,h)anthracene; U120, fluoranthene; U137, indeno(1,2,3-c,d)pyrene; U157, 2-methylchlorolanthrene; U165, naphthalene; U051, naphthalene, pentachlorophenol, phenanthrene, pyrene and total xylenes. The proposed standard for U051, toluene had been calculated using single-compound recoveries and therefore did not need to be recalculated.

A second set of changes to numerical values resulted from EPA's decision not to base concentration-based standards for U and P nonwastewaters on data from three of the fourteen test burns and to recalculate the concentration-based standards with data from the other test burns involving matrices more similar to U and P matrices. These burns incinerated K011, K013 and K014, acrylonitrile-cyanide wastes; K024, phthalic anhydride wastes and K037 disulfoton (an organophosphate pesticide) wastes. EPA's reason for excluding these burns from the database for U and P nonwastewater is that each of these waste matrices has a relatively unique composition in terms of including very few chemical compounds. By contrast, the test burns EPA chose for the promulgated standards, namely those incinerating creosote wastes (K001), ethylene dichloride wastes (K019), and veterinary pharmaceutical wastes (K102), all involved matrices which are both difficult to treat and difficult to analyze. The Background Document for Organic U and P wastes and Multisource Leachate, Volume C, discusses the difference among these waste matrices in more detail. Nonwastewater standards affected by this decision are:

1. Halogenated pesticides and chlorobenzenes: P060, Isodrin; and U142, Kepone.

2. Miscellaneous halogenated organics: U045, chloromethane; U158, 4,4'-methylenebis (2-chloroaniline) and U075, dichlorodifluoromethane.

3. Oxygenated organics: U159, methyl ethyl ketone; U002, acetone; U108, 1,4-dioxane; U112, ethyl acetate; and U117, ethyl ether.

4. Organonitrogens: U009, acrylonitrile; U172, N-nitroso-di-n-butylamine; U179, N-nitrosopiperidine; U180, N-nitropyrrolidine; U181, 5-nitro-o-toluidine.

5. Pharmaceutical wastes: U155, methapyriline.

EPA is promulgating a higher concentration-based standard for U043, vinyl chloride because the commenter's reported detection limits lie well above the detection limits which EPA used to develop concentration-based standards. The promulgated standard for vinyl chloride reflects the choice of a different and higher detection limit from the ethylene chloride (K019) waste matrix.

EPA reevaluated its choice of recovery values for P047, 4,6-dinitro-o-cresol; P048, 2,4-dinitrophenol; U004, acetophenone; and U170, 4-nitrophenol to ensure consistency with the methodology. Therefore the numerical values have changed between proposal and promulgation for these four compounds.

(b) Changes from Concentration-Based Standards to Methods of Treatment as Standards. The rest of the changes consisted of promulgating standards expressed as methods of treatment for U and P wastes for which the Agency had proposed concentration-based standards. For P003, acrolein; U003, acetonitrile; U073, 3,3'-dichlorobenzidine; U038, chlorobenzilate; U168, 2-naphthylamine; U093, p-dimethylaminoazobenzene; and U057, cyclohexanone, the data submitted by a commenter representing the hazardous waste treatment industry reported such drastic detection limit discrepancies or extreme recoveries that EPA believes these analytes belong in the category of those not amenable to quantification. EPA notes that the proposed wastewater standard for P003, acrolein, had been a concentration-based standard while the nonwastewater standard was a method of treatment: promulgated standards for both forms of P003, acrolein, are methods of treatment.

For 2-chloro-1,3 butadiene, a constituent of F039 leachate not regulated as a U or P waste, the commenter reported zero recoveries for several sets of replicates and extremely variable recoveries for another. Based on EPA's own experience in quantifying 2-chloro-1,3 butadiene, the Agency is promulgating a treatment method for 2-chloro-1,3 butadiene rather than a

concentration-based standard as proposed.

For U017, benzal chloride, the Agency solicited comments on data with adequate QA/QC verifying that incineration reduces benzal chloride to detection levels. One commenter suggested that the Agency regulate benzyl alcohol and benzaldehyde, hydrolysis products of benzal chloride, as benzal chloride surrogates. The commenter stated that EPA used surrogates in regulating phthalates in the Second Third rule. However, the Agency believes that this situation is different because there is no way to correlate and codify how well the concentrations of benzyl alcohol and benzylaldehyde in a waste matrix reflect the concentration of benzal chloride, especially in a waste already containing substituted benzenes. Although the commenter did provide EPA with certain limited analytical data demonstrating quantification of benzal chloride with SW-846 method 8015 in a waste stream from a remediation project, the commenter did not characterize the matrix or the treatment process well enough for EPA to set numerical treatment standards for U017. Therefore, since EPA received no specific information demonstrating successful measurement of benzal chloride, EPA is promulgating incineration as a technology-based standard for benzal chloride as U017.

It should be noted that EPA is promulgating, as proposed, the concentration-based standard for benzal chloride as a constituent of K015 nonwastewaters. EPA believes benzal chloride can be quantified in K015 nonwastewaters more easily than in U017 nonwastewaters for the following reasons: EPA's data show that K015 untreated nonwastewaters contain so much benzal chloride (at least 90%) that instability in water does not hinder benzal chloride identification and also that incineration has successfully treated K015 nonwastewaters. However, the composition of any U and P wastes is, by the definition of these wastes, extremely variable, and the benzal chloride composition may very well fall below the level of reliable quantification.

EPA also changed several standards in response to information in a recently released EPA Office of Research and Development (ORD) study, EPA/600/S4-89/010, "USEPA Method Study 36: SW-846 Methods 8270/3510 GC/MS Method for Semivolatile Organics: Capillary Column Technique; Separatory Funnel Liquid-Liquid Extraction". This study evaluates the analytical methods most commonly used to quantify semivolatile analytes, a category of organic chemical including more than half of the compounds regulated in this rule. Although this study was carried out in support of the RCRA ground water monitoring regulations and consequently looked only at aqueous matrices rather than at the incinerator ash matrices used to develop these nonwastewater concentration-based standards, the study documents such serious analytical problems with several Third Thirds analytes that EPA has chosen to promulgate incineration as a treatment standard rather than the proposed concentration-based standards. These analytes are: U197, p-benzoquinone; U132, hexachlorophene; U166, 1,4-naphthoquinone; U167, 1-naphthylamine; P082, N-nitrosodimethylamine; U184, pentachloroethane; and U201, resorcinol plus the leachate components aramite, benzenethiol, phthalic anhydride, dibenzo(a,e)pyrene, tris (2,3-dibromophosphate) and dibenzo(a,i)pyrene.

This study determined how reliably these analytes can be quantified in aqueous matrices by examining the recoveries obtained and the precision achieved over the course of multiple analyses by several laboratories. Statistical analysis indicated that the recovery data for the analytes listed above were so unrealistically high or low that EPA has declined to recommend the use of SW-846 methods 3510/8270 for quantifying these analytes in ground-water monitoring at RCRA-permitted facilities.

In promulgating the Third Third final rule, EPA chose to incorporate this recommendation about the severity of the problems associated with SW-846 methods 3510/8270 and therefore move these analytes into the category of those compounds to be regulated with technology-based standards. The reason for this decision is that the study documents significant problems with GC/MS (gas chromatography/mass spectrometry) which is the technique used almost exclusively to quantify organic compounds in all environmental samples and is the basis not only of SW-846 8270, but for most other SW-846 methods for organic analytes) which are common to most methods used to quantify these compounds.

EPA makes one exception, however, in the case of P020 (Dinoseb), to its decision to promulgate methods as standards for those analytes recommended for deletion from methods 3510 plus 8270 in this ORD study. Since EPA has specific analytical data on the incineration of Dinoseb and since the data was of sufficient QA/QC, EPA is promulgating the concentration-based Dinoseb standards as proposed.

In reviewing its own data, EPA also determined that inadequate documentation exists demonstrating the successful quantification of U074, cis- and trans-1,4-dichloro-2-butene. Considering this together with the problems in quantifying these compounds as a pair because their widely different boiling points complicate their behavior in the GC/MS apparatus, EPA is promulgating incineration as a method rather than the proposed concentration-based standard.

These decisions affect leachate standards as follows:

1. All nonwastewater leachate numbers will change as the concentration-based-standard for that U or P waste constituent changes.

2. Compounds identified in the study as problem analytes by Method 36 will be dropped from the list of wastewater and nonwastewater leachate components, with the exception of P082, N-nitrosodimethylamine, for which the Agency has data indicating that it can be successfully quantified in wastewaters. Consequently EPA is promulgating a concentration-based-standard for P082 wastewaters while promulgating methods of treatment as standards for P082 nonwastewaters.

3. Compounds, namely benzal chloride and 1,4-dichloro-2-butene, for which EPA decided to promulgate methods as standards rather than concentration-based-standards as proposed will be dropped from the list of leachate components.

4. Compounds dropped because the commenter's incinerator ash study identified problems with quantifying them in ash due to questionable detection limits and recovery values will be dropped from the list of leachate nonwastewater components but will remain on the list of leachate wastewater components because the analytical problems identified by the commenter's study apply only to the incinerator ash matrix and not to aqueous matrices from other treatment processes.

(c) Changes and Treatability Groups. EPA received several other comments about the proposed concentration-based-standards for nonwastewaters. The proposed rule described how EPA developed each concentration-based-standard for each waste in a treatability group. Each treatability group section discussed how the chemistry of waste codes compared to a compound incinerated in one of EPA's fourteen test burns. In addition, the proposal solicited

comments on issues specific to that treatability group as a whole (i.e., comments on SO_x controls for the Organosulfur Wastes), or pertinent to individual members of that treatability group (i.e., information on possible methods for benzal chloride analysis in the Miscellaneous Halogenated Organic Wastes section).

Treatability-group oriented information describing how each concentration-based-standard for each U and P waste is presented in the Background Document for Organic U and P wastes and Multisource Leachate, Volume C. The following discussion addresses waste-specific comments, but the previous discussion contains this preamble's primary explanation of those promulgated standards which differ from the proposed standards. Furthermore, those F and K wastes which were grouped with similar U and P wastes are discussed elsewhere in this preamble, in the section identified by the F and K wastes.

The following paragraphs review those treatability-group oriented issues which generated significant comments, especially those for which EPA explicitly solicited comments in the proposed rule. These paragraphs summarize the comments and EPA's response in order to provide the regulated community with a coherent picture of the issues evaluated in developing the promulgated standards rather than to be an exhaustive summary of each decision made for each U and P waste regulated in this group. Such comprehensive summaries appear in the Background Document for Organic U and P wastes and Multisource Leachate, Volumes B and C; these present in detail how EPA developed the proposed standards and then modified them for promulgation in response to information subsequently.

(A) Brominated Organics. In the proposed rule, EPA solicited comment on several process design and air emissions control issues unique to bromine incineration. Issues of particular interest were operating conditions needed to ensure adequate bromine oxidation and the need for air pollution control devices. EPA particularly wanted information indicating whether treatment standards promulgated in this rule should mandate a maximum bromine concentration in the feed to the incinerator and the use of air emissions control devices. The Agency also solicited comment on the appropriateness of biodegradation as BDAT for P017, bromoacetone.

EPA received no substantive comments on the proposed bromine standards. Specifically, commenters did not provide the process design or emissions control information EPA solicited in light of bromine's unique corrosive properties.

Therefore, EPA is promulgating the nonwastewater standards as proposed in the absence of specific comments. EPA continues to believe that combustion of these wastes could pose risks from air emissions at particular facilities. The Agency, however, is unable to resolve these concerns at this time. Since any problem is likely to be site-specific, EPA believes, given our current limitations, that the best way to evaluate and control potential problems with objectionable air emissions from burning brominated wastes is a permit-by-permit approach through the use of the omnibus permit authority in section 3005(c)(3).

(B) Aromatics and Other Hydrocarbons. The only comments received dealt with fuel substitution as an alternate treatment method for those wastes in this group which are not amenable to quantification.

(C) Oxygenated Organics. In the proposed rule, the Agency solicited comments on three sets of issues involving analytical methods: (1) Difficulties the regulated community may have experienced analyzing U031, n-butanol; U112, ethyl acetate; and U117, ethyl ether using methods the Agency only recently authorized; (2) analytical data characterizing attempts to quantify P003, acrolein, since the Agency questioned the acrolein data generated in the fourteen EPA test burns; and (3) data characterizing attempts to quantify methanol in waste matrices, particularly with SW-846 methods. (See 54 FR 48413, November 22, 1989.)

The Agency received no substantive information in response to these requests. Although one commenter submitted analytical data showing that the commenter's system had treated U154, in the commenter's waste stream to low levels, this data could not support a numerical standard for methanol because the commenter's data did not describe the treatment system or the influent waste stream in enough detail to assure the Agency that this system could successfully treat the wide variety of U154 wastes the regulated community must manage. More importantly, the commenter's data did not address the analytical difficulties encountered in quantifying methanol.

Another commenter challenged the Agency's decision to set a treatment method as a standard for U154 rather than to transfer the Solvents Rule methanol number, promulgated in November 1986, to U154. EPA believes that the analytical difficulties associated with quantifying methanol in U and P matrices are significantly more severe than those associated with quantifying methanol in a TCLP extract, as is the basis of the F001–F005 Solvents Rule methanol standards. Therefore, EPA chose incineration and oxidation as methods for methanol in U and P wastes to ensure methanol destruction. Parenthetically, EPA notes that 53 FR 31164 (August 17, 1988) explains how EPA developed the Solvents Rule F001–F005 standards.

(D) Organo-Nitrogen Compounds. In designating incineration as Best Demonstrated Available Technology for organonitrogen wastes, EPA considered defining "BDAT incineration" for organonitrogens as including process controls to minimize No_x emissions.

The proposed rule solicited comment on several air-emission-related technical problems and regulatory issues anticipated to complicate the incineration of organonitrogen wastes (see 54 FR 48417, November 22, 1989). The issues all arise from the corrosive behavior of oxidized nitrogen compounds. EPA specifically solicited comments on three aspects of incinerating organonitrogen wastes: (1) Information on incinerator feed stream concentrations of nitrogen demonstrated to have been successfully incinerated; (2) information on incinerator design and operation—especially air pollution control devices—believed to meet the requirements of the Clean Air Act under Sections 108, 110 and 111 and under the Prevention of Significant Deterioration program's New Source Review, and (3) comments on whether to invoke the omnibus permitting requirements of RCRA (final sentence of section 3005) for units burning these wastes, or alternatively, to prohibit burning these wastes in combustion units without appropriate air pollution controls.

Several commenters urged the Agency to leave responsibility for air quality at hazardous waste treatment facilities to the RCRA permitting process under 40 CFR parts 264 and 270 and consequently not to include air emission controls in the land disposal restriction regulations as part of the definition of the treatment system. EPA received limited data characterizing NO_x generation at several RCRA-permitting test burns incinerating several organonitrogen wastes plus a narrative description of emissions control systems at one of these incinerators. These data showed low NO_x emissions. However, this information was not detailed enough in terms of specifying process design and operation parameter values for the Agency to use in defining BDAT as

incineration plus specified emissions controls for all facilities disposing of organonitrogen wastes.

The RCRA permitting procedure requires Regional or State approval of the entire incinerator system, including process feed as well as air emission control units. Additionally, NO_x emissions are specifically limited under the Clean Air Act stationary source permit requirements. Since both these permits are issued on an individual facility basis, allowing individualized process controls, and since EPA lacks adequate data to dictate realistic NO_x control system design, EPA agrees with the commenters and chooses not to mandate air emission controls for organonitrogen incineration systems. A permit-by-permit determination under the RCRA omnibus authority may be the most appropriate mechanism for providing air emission controls for facilities burning these wastes. (These points by and large apply to proper controls on burning brominated and sulfur-rich wastes as well, and were discussed earlier in this section.) EPA intends to provide guidance to permit writers with respect to facilities burning these wastes.

(E) Organosulfur Wastes. The Agency is promulgating treatment methods as standards for all eighteen organosulfur waste codes as proposed: incineration for organosulfur nonwastewaters, and incineration alone or wet air/chemical oxidation followed by carbon adsorption for organosulfur wastewaters.

Just as for NO_x emission with the Organonitrogens category, EPA considered defining "BDAT incineration" for organosulfur as including process controls to minimize SO_x emissions. The proposed rule solicited comment on several potential technical problems and regulatory issues anticipated to complicate the incineration of organosulfur wastes (see 54 FR 48417, November 22, 1989). The issues all arise from the corrosive behavior of oxidized sulfur compounds, some of which are regulated under the Clean Air Act as well as the noxious odors of many of these organic sulfur compounds. EPA specifically solicited comments on three aspects of incinerating organosulfur wastes: (1) Information on incinerator feed stream concentrations of sulfur demonstrated to have been successfully incinerated; (2) information on incinerator design and operation—especially air pollution control devices—believed to meet the requirements of the Clean Air Act under Section 108,110 and 111 and under the Prevention of Significant Deterioration program's New Source Review, and (3) comments on whether to invoke the omnibus permitting requirements of RCRA (final sentence of section 3005) for units burning these wastes, or alternatively, to prohibit burning these wastes in combustion units without appropriate air pollution controls.

As was the case with questions raised in the proposed rule about incineration of organonitrogen wastes and NO_x emisssions, several commenters urged the Agency to leave responsibility for air quality at hazardous waste treatment facilities to the RCRA permitting process under 40 CFR parts 264 and 270 and consequently not to include air emission controls in the land disposal restriction regulations as part of the definition of the treatment system. EPA received no data whatsoever characterizing SO_x emissions or emission control systems.

The RCRA permitting procedure required Regional or State approval of the entire incinerator system, including process feed as well as air emission control units. Additionally SO_x emissions are specifically limited by Clean Air Act stationary source permit requirements. Since both these permits are issued on an individual facility basis, allowing individualized process controls, and since EPA lacks adequate data to dictate realistic SO_x control system design in this reule, EPA agrees with these commenters and chooses not to mandate air emission controls for organosulfur incineration systems. At this time, EPA believes that permit-by-permit determinations under the RCRA omnibus authority are most appropriate for units that may burn these wastes. EPA intends to provide guidance to permit writers with respect to facilities burning these wastes.

EPA proposes treatment technologies as standards for all eighteen of the organosulfur wastes, partly because of the difficulties in analyzing these wastes. One commenter submitted a package of data characterizing both chemical oxidation treatment, namely chlorine dioxide, as well as an analytical method for organosulfur wastes. However, EPA cannot develop numerical treatment standards based on this data because the method does not quantify the individual U and P organosulfur compounds nor does it differentiate regulated from unregulated organosulfur compounds; the commenter's analytical method gives a "total organic sulfur" number which EPA cannot use to develop standards because it gives no indication how much comes from U and P organosulfur wastes in a mixture and how much of this "total organic sulfur" number comes from nontoxic and unregulated organosulfur compounds in the waste stream. Furthermore, the commenter's suggested method, chemical oxidation, is already the treatment method mandated as a standard for organosulfur wastewaters.

(F) Miscellaneous Organic Halogenated Wastes. As it did for Organonitrogen Wastes and Organosulfur Wastes, EPA requested comments on the need for controlling sulfur dioxide emissions in the course of incinerating P026, P118, U020 and U062. As discussed in the section on organosulfur wastes, EPA received no substantive comments on emission controls used in incinerating organosulfur compounds. Although EPA is not building specifying emission control systems into its definition of BDAT for these wastes, EPA intends that the issues of air emissions will be dealt with on a permit-by-permit basis through the section 3005(c)(3) omnibus permits authority.

CHANGES IN CONCENTRATION-BASED STANDARDS FOR U, P, AND F039 NONWASTEWATERS

Code	Constituent	Revised (mg/kg)	Proposed (mg/kg)
P047	4,6-Dinitro-o-cresol	160	140
P048	2,4-Dinitrophenol	160	140
P060	Isodrin	0.066	0.010
U002	Acetone	160	0.14
U004	Acetophenone	9.7	9.6
U005	2-Acetylaminofluroene	140	13
U009	Acrylonitrile	84	0.28
U018	Benz (a) anthracene	8.2	3.6
U022	Benzo (a) pyrene	8.2	3.6
U043	Vinyl chloride	33	0.035

CHANGES IN CONCENTRATION-BASED STANDARDS FOR U, P, AND F039 NONWASTEWATERS—Continued

Code	Constituent	Revised (mg/kg)	Proposed (mg/kg)
U044	Chloroform	5.6	6.2
U045	Chloromethane	33	5.6
U050	Chrysene	8.2	3.6
U051	Naphthalene	3.1	1.5
U051	Pentachlorophenol	7.4	7.4
U051	Phenanthrene	3.1	1.5
U051	Pyrene	8.2	1.5
U051	Xylenes (total)	28	33
U063	Dibenz (a,h) anthracene	8.2	13
U075	Dichlorodifluoromethane	7.2	10
U076	1,1-Dichloroethane	7.2	6.2
U077	1,2-Dichloroethane	7.2	6.2
U078	1,1-Dichloroethylene	33	6.2
U079	trans-1,2-Dichloroethylene	33	6.2
U080	Methylene chloride	33	31
U083	1,2-Dichloropropane	18	15
U084	cis-1,3-Dichloropropene	18	15
U084	tans-1,-*Dichloropropene*	18	15
U108	1,4-Dioxane	170	280
U112	Ethyl acetate	33	5.6
U117	Ethyl ether	160	140
U120	Fluoranthene	8.2	3.6
U131	Hexachloroethane	28	30
U137	Indeno (1,2,3-c,d)pyrene	8.2	3.6
U142	Kepone	0.13	0.043
U155	Methapyriline	1.5	0.89
U157	3-Methylcholanthrene	15	33
U158	4,4'-Methylenebis (2-chloroaniline)	35	29
U159	Methyl ethyl ketone	36	200
U165	Naphthalene	3.1	5.9
U170	4-Nitrophenol	29	65
U172	N-Nitroso-di-n-butylamine	17	54
U179	N-Nitroso-piperidine	35	220
U180	N-Nitroso-pyrrolidine	35	220
U181	5-Nitro-o-toluidine	28	56
U208	1,1,1,2-Tetrachloroethane	42	6.2
U209	1,1,2,2-Tetrachloroethane	42	6.2
U210	Tetrachloroethylene	5.6	6.2
U211	Carbon tetrachloride	5.6	6.2
U226	1,1,1-Trichloroethane	5.6	6.2
U227	1,1,2-Trichloroethane	5.6	6.2
U239	Xylenes (total)	28	33
U243	Hexachloropropene	28	37
F039	Disulfoton	6.2	0.1
F039	Famphur	15	0.1
F039	Methyl parathion	4.6	0.1
F039	Parathion	4.6	0.1
F039	Phorate	4.6	0.1
F039	Acenaphthene	4.0	9.1
F039	Anthracene	4.0	7.7
F039	Benzo (ghi) perylene	1.5	1.8
F039	Bromodichloromethane	15	16
F039	Butyl benzyl phthalate	7.9	15
F039	Chlorodibromomethane	15	16
F039	Fluorene	4.0	7.7
F039	Silvex, (2,4,5-TP)	7.9	2.1
F039	2,4,5-T	7.9	2.1
F039	Cyanides (total)	1.8	1.5
F039	Arsenic	5.6	.....
F039	Barium	52	100
F039	Chromium	5.2	5.0
F039	Mercury	0.025	0.2
F039	Selenium	5.7	5.6

Note: The constituents regulated in U or P waste codes are also regulated in F039 nonwastewaters.

CHANGES FROM CONCENTRATION-BASED STANDARDS TO TECHNOLOGY-BASED STANDARDS FOR U AND P NON-WASTEWATERS

Constituent	Revised for codes:
Acetonitrile	U003
Acrolein	P003

CHANGES FROM CONCENTRATION-BASED STANDARDS TO TECHNOLOGY-BASED STANDARDS FOR U AND P NON-WASTEWATERS—Continued

Constituent	Revised for codes:
Benzal chloride	U017
1,4-Dichloro-2-butene (cis and trans)	U074

CHANGES FROM CONCENTRATION-BASED STANDARDS TO TECHNOLOGY-BASED STANDARDS FOR U AND P NON-WASTEWATERS—Continued

Constituent	Revised for codes:
p-Benzoquinone	U197
Chlorobenzilate	U038

CHANGES FROM CONCENTRATION-BASED STANDARDS TO TECHNOLOGY-BASED STANDARDS FOR U AND P NON-WASTEWATERS—Continued

Constituent	Revised for codes:
Cyclohexanone	U057
3,3'-Dichlorobenzidine	U073
p-Dimethylaminoazobenzene	U093
Hexachlorophene	U132
1,4-Naphthoquinone	U166
1-Naphthylamine	U167
2-Naphthylamine	U168
N-Nitrosodimethylamine	U082
Pentachloroethane	U184
Resorcinol	U201

Constituents for which concentration-based standards have been dropped for F039 nonwastewaters

Acetonitrile
Acrolein
Acrylamide
2-Chloro-1,3-butadiene
1,4-Dichloro-2-butene
Aramite
Benzenethiol
p-Benzoquinone
Benzal chloride
Chlorobenzilate
Cyclohexanone
Dibenzo (a,e) pyrene
Dibenzo (a,i) pyrene
3,3'-Dichlorobenzidine
p-Dimethylaminoazobenzene
Hexachlorophene
1,4-Naphthoquinone
1-Naphthylamine
2-Naphthylamine
N-Nitrosodimethylamine
Pentachloroethane
Phthalic anhydride
Resorcinol
4-Aminobiphenyl
Diphenylamine
Diphenylnitrosamine
Methanol
Cyanides (amenable)
Thallium
Tris-(2,3-dibromopropyl phosphate)

CONCENTRATION-BASED BDAT TREATMENT STANDARDS FOR U AND P NON-WASTEWATERS

Waste code	Regulated organic constituents	Total composition (mg/kg)
U002	Acetone	160
U004	Acetophenone	9.7
U005	2-Acetylaminofluorene	140
U009	Acrylonitrile	84
U012	Aniline	14
U018	Benz(a)anthracene	8.2
U019	Benzene	36
U022	Benzo(a)pyrene	8.2
U024	bis-(2-Chloroethoxy) methane.	7.2
U025	bis-(2-Chloroethyl) ether.	7.2
U027	bis-(2-Chloroisopropyl) ether.	7.2
U029	Bromomethane	15

CONCENTRATION-BASED BDAT TREATMENT STANDARDS FOR U AND P NON-WASTEWATERS—Continued

Waste code	Regulated organic constituents	Total composition (mg/kg)
U030	4-Bromophenyl phenyl ether.	15
U031	n-Butyl alcohol	2.6
U036	Chlordane, alpha and beta.	0.13
U037	Chlorobenzene	5.7
U039	p-Chloro-m-cresol	14
U043	Vinyl chloride	33
U044	Chloroform	5.6
U045	Chloromethane (methyl chloride).	33
U047	2-Chloronaphthalene	5.6
U048	2-Chlorophenol	5.7
U050	Chrysene	8.2
U051	Lead (measured in mg/l in TCLP extract).	0.51
U051	Napthalene	3.1
U051	Pentachlorophenol	7.4
U051	Phenanthrene	3.1
U051	Pyrene	8.2
U051	Toluene	28
U051	Xylenes	28
U052	o-Cresol	5.6
U052	Cresol (m- and p-isomers).	3.2
U060	o,p'-DDD	0.087
U060	p,p'-DDD	0.087
U061	o,p'-DDD	0.087
U061	p,p'-DDD	0.087
U061	o,p'-DDE	0.087
U061	p,p'-DDE	0.087
U061	o,p'-DDT	0.087
U061	p,p'-DDT	0.087
U063	Dibenzo(a,h)anthracene	8.2
U066	1,2-Dibromo-3-chloropropane.	15
U067	1,2-Dibromoethane	15
U068	Dibromomethane	15
U070	o-Dichlorobenzene	6.2
U071	m-Dichlorobenzene	6.2
U072	p-Dichlorobenzene	6.2
U075	Dichlorodifluoromethane.	7.2
U076	1,1-Dichloroethane	7.2
U077	1,2-Dichloroethane	7.2
U078	1,1-Dichloroethylene	33
U079	trans-1,2-Dichloroethene.	33
U080	Methylene chloride	33
U081	2,4-Dichlorophenol	14
U082	2,6-Dichlorophenol	14
U083	1,2-Dichloropropane	18
U084	cis-1,3-Dichloropropene	18
U084	trans-1,3-Dichloropropene.	18
U101	2,4-Dimethyl phenol	14
U105	2,4-Dinitrotoluene	140
U106	2,6-Dinitrotoluene	28
U108	1,4-Dioxane	170
U111	Di-n-propylnitrosoamine	14
U112	Ethyl acetate	33
U117	Ethyl ether	160
U118	Ethyl methacrylate	160
U120	Fluoranthene	8.2
U121	Trichloromonofluoromethane.	33
U127	Hexachlorobenzene	37
U128	Hexachlorobutadiene	28
U129	alpha-BHC	0.066
U129	beta-BHC	0.066
U129	delta-BHC	0.066
U129	gamma-BHC	0.066
U130	Hexachlorocyclopentadiene.	4.8
U131	Hexachloroethane	28

CONCENTRATION-BASED BDAT TREATMENT STANDARDS FOR U AND P NON-WASTEWATERS—Continued

Waste code	Regulated organic constituents	Total composition (mg/kg)
U137	Indeno(1,2,3,-c,d)pyrene.	8.2
U138	Iodomethane	65
U140	Isobutyl alcohol	170
U141	Isosafrole	2.6
U142	Kepone	0.13
U152	Methacrylonitrile	84
U155	Methapyrilene	1.5
U157	3-Methylchloanthrene	15
U158	4,4-Methylene-bis-(2-chloroaniline).	35
U159	Methyl ethyl ketone	36
U161	Methyl isobutyl ketone	33
U162	Methyl methacrylate	160
U165	Naphthalene	3.1
U169	Nitrobenzene	14
U170	4-Nitrophenol	29
U172	N-Nitroso-di-n-butylamine.	17
U174	N-Nitrosodiethylamine	28
U179	N-Nitrosopiperidine	35
U180	N-Nitrosopyrrolidine	35
U181	5-Nitro-o-toluidine	28
U183	Pentachlorobenzene	37
U185	Pentachloronitrobenzene.	4.8
U187	Phenacetin	16
U188	Phenol	6.2
U192	Pronamide	1.5
U196	Pyridine	16
U203	Safrole	22
U207	1,2,4,5-Tetrachlorobenzene.	19
U208	1,1,1,2-Tetrachloroethane.	42
U209	1,1,2,2-Tetrachloroethane.	42
U210	Tetrachloroethene	5.6
U211	Carbon tetrachloride	5.6
U220	Toluene	28
U225	Tribromomethane (bromoform).	15
U226	1,1,1-Trichloroethane	5.6
U227	1,1,2-Trichloroethane	5.6
U228	Trichloroethene	5.6
U239	Xylene(s)	28
U240	2,4-Dichlorophenoxyacetic acid.	10
U243	Hexachloropropene	28
U247	Methoxychlor	0.18
P004	Aldrin	0.066
P020	2-sec-Butyl-4,6-dinitrophenol.	2.5
P024	p-Chloroaniline	16
P037	Dieldrin	0.13
P047	4,6-Dinitro-p-cresol	160
P048	2,4-Dinitrophenol	160
P050	Endosulfan I	0.066
P050	Endosulfan II	0.13
P050	Endosulfan sulfate	0.13
P051	Endrin	0.13
P051	Endrin aldehyde	0.13
P059	Heptachlor	0.066
P059	Heptachlor epoxide	0.066
P060	Isodrin	0.066
P077	p-Nitroaniline	28
P101	Ethyl cyanide	360
P123	Toxaphene	1.3

b. Technology-based Standards for Specific Organics

As explained in section III.A.1.(h)(2) of the proposed rule (54 FR 48387), the Agency has determined that for many U and P wastes, as well as for some F and K wastes, several complications arise in terms of how reliably the primary hazardous constituents can be quantified. These complications formed the basis of the Agency's decision to promulgate technology-based BDAT treatment standards (i.e., a method (or methods) of treatment) rather than concentration-based constituent specific standards for these wastes.

The proposed rule set methods of treatment as standards for a significant fraction of Third Third U and P wastes. In the course of evaluating information received since the publication of the proposed rule, information coming both from comments about the proposed rule and from internal EPA studies and reviews, EPA is promulgating methods of treatment as the final treatment standard for U and P wastes for which EPA has proposed concentration-based standards. The reasons for this set of changes are discussed in section III.A.5.(a). Since the standards had originally been proposed as concentration-based standards, the section on nonwastewaters with concentration-based-standards is the appropriate place to discuss these.

In developing treatment standards for the proposed rule, EPA found that for any particular hazardous constituent, there are four categories of quantification complications: (1) There are no methods, such as one in SW-846, that are currently verified for the quantification of the constituent of interest in treatment residuals; (2) calibration reagents (i.e., standard solutions of known purity for validating compliance with QA/QC procedures) of that chemical are not currently available on the commercial market; (3) the chemical is unstable in water and immediately hydrolyses into a different entity (i.e., it reacts with water); and (4) the U or P waste is not specifically listed as a single chemical entity (e.g. P030 is listed as "soluble cyanide salts, not otherwise specified"). Chemical specific complications were presented in the appropriate section of the proposed rule preamble that discussed the specific treatability group where the U or P chemical has been classified.

The information EPA received after the proposed rule did not invalidate this scheme for classifying analytical problems, but it did add compounds into the categories of "problem analytes" listed above which EPA had previously considered amenable to quantification. The main reason is that incinerator ash is a more problematic matrix for quantification of organic analytes than EPA had realized; elemental carbon and silicon in ash absorb organic constituents and bind them onto the ash particle so that their true concentration cannot be determined by instrumental analyses.

The Agency is promulgating certain methods of treatment as the treatment standard for many U and P wastewaters and nonwastewaters. Generally, for U and P nonwastewaters, this process is relatively easy because incineration processes are relatively indiscriminate in the destruction of organics due to the high temperatures, efficient mixing, and consistent residence times available from a well-designed and well-operated incinerator. However, in the case of wastewater treatment technologies, there are more chemical specific factors to consider such as: water solubility, instability, molecular size, volatility, elemental composition, and polarity of the specific chemical that is to be treated. Other waste characteristics will also effect the efficiency of treatment such as: total organic carbon, oil and greases, total dissolved solids, total suspended solids, pH, and alkalinity/acidity.

(1) *Nonwastewaters.* The Agency is promulgating the proposed technology-based standards, namely, incineration as a method of treatment, for the organic U and P wastes determined to be unquantifiable as proposed. Additionally, for those unquantifiable U and P wastes containing only carbon, hydrogen or oxygen, EPA is promulgating fuel substitution as an alternative to incineration. In the previous section of the preamble, the Agency identified additional U and P wastes for which the proposed concentration-based standards have been changed to technology-based standards (i.e., incineration). The technology has not changed, but the number of wastes to be regulated with incineration, or fuel substitution where appropriate as a method has increased.

The Agency received numerous comments requesting that the methods proposed as the treatment standard include fuel substitution as a method of treatment. Commenters noted that many organic U and P wastes in the "not amenable to quantification category", such as cumene, have significant energy recovery value and are thus blended for fuel substitution. One commenter further stated that without this change in the standard, these wastes would require incineration at a much greater expense. The commenter urged the Agency to allow fuel substitution for several particularly flammable waste streams which had been mixed with other wastes and comprised less than ten percent of the resulting mixture. The ten percent cutoff was intended to prevent the generation of acid combustion products.

The Agency agrees to allow fuel substitution as a treatment method for wastes not amenable to quantification which contain only carbon, hydrogen or oxygen in their molecular structure. In terms of the treatability groups identified in the proposed rule, this means fuel substitution is promulgated here as an alternative method for these groups: all "Aromatics and Other Hydrocarbons", all "Polynuclear Aromatics", all "Oxygenated Hydrocarbons and Heterocyclics" and those "Pharmaceutical" and "Phenolic" compounds which do not contain molecular constituents other than carbon, hydrogen or oxygen.

The Agency notes that this final rule sets fuel substitution as an alternative method for a larger set of wastes than did the proposed rule; fuel substitution was proposed as an alternative to incineration for "Oxygenated Hydrocarbons and Heterocyclics" alone. Additionally, several wastes in these treatability groups have been added to the category of wastes not amenable to quantification since the proposed rule and thus fuel substitution and incineration is being promulgated as a standard for these wastes for which the Agency had proposed concentration-based standards. These wastes are: U057, cyclohexanone; U166, 1,4-naphthoquinone; U197, p-benzoquinone; and U201, resorcinol.

In other words, EPA bans fuel substitution as an alternative to incineration for all unquantifiable U and P wastes which contain halogens, sulfur or nitrogen. Eliminating these wastes removes the potential for unregulated SO_x, NO_x or halogen emissions from boilers or other thermal combustion facilities not yet regulated as types of treatment units under 40 CFR 264. EPA believes that wastes without halogens, sulfur or nitrogen can be treated by fuel substitution as well as by incineration because the aromatic and aliphatic (both saturated and unsaturated) components of these wastes are typically used as fuel because of their high heating value; and the oxygenated and phenolic components are already partially oxidized.

To summarize the promulgated rule for nonwastewater forms of U and P wastes no amenable to quantification:

EPA is promulgating "Incineration (INCIN) as the Method of Treatment" for those organic U and P wastes containing nitrogen, phosphorous, sulfur, chlorine, bromine or fluorine in their molecular structure and "Incineration (INCIN) or Fuel Substitution (FSUBS) as a Method of Treatment" for those organic U and P wastes containing only carbon, hydrogen and oxygen in their molecular structure. See 40 CFR 268.42 Table 1 for a detailed description of the technology standard referred to by the five letter technology code in the parentheses.

Incineration as a method of treatment for nonwastewater forms of:
P002—1-Acetyl 2-thiourea
P007—Muscimol (5-Aminoethyl 3-isoxazolol)
P008—4-Aminopyridine
P014—Benzene thiol (Thiophenol)
P016—Bis-chloromethyl ether
P017—Bromoacetone
P018—Brucine
P022—Carbon disulfide
P023—Chloroacetaldehyde
P026—1-(o-Chlorophenyl) thiourea
P027—3-Chloropropionitrile
P028—Benzyl chloride
P034—2-cyclohexyl-4,6-dinitrophenol
P042—Epinephrine
P045—Thiofanox
P046—alpha, alpha-Dimethylphenethylamine
P047—4,6-dinitrocresol salts
P049—2,4-Dithiobiuret
P054—Aziridine
P057—2-Fluoroacetamide
P058—Fluoroacetic acid, sodium salt
P064—Isocyanic acid, ethyl ester
P066—Methomyl
P067—2-Methylaziridine
P069—Methyllactonitrile
P070—Aldicarb
P072—1-Naphthyl-2-thiourea (Bantu)
P075—Nicotine and salts
P082—N-Nitrosodimethylamine
P084—N-Nitrosomethylvinylamine
P093—N-Phenylthiourea
P095—Phosgene
P108—Strychnine and salts
P116—Thiosemicarbazide
P118—Trichloromethanethiol
U003—Acetonitrile
U006—Acetyl Chloride
U007—Acrylamide
U010—Mitomycin C
U011—Amitrole
U014—Auramine
U015—Azaserine
U017—Benzal chloride
U020—Benzenesulfonyl Chloride
U021—Benzidine
U026—Chloronaphazine
U033—Carbonyl fluoride
U034—Trichloroacetaldehyde
U035—Chlorambucil
U038—Chlorobenzilate
U041—n-Chloro-2,3-epoxypropane
U042—2-Chloroethyl vinyl ether
U046—Chloromethyl methyl ether

Incineration as a method of treatment for nonwastewater forms of:
U049—4-chloro-o-toluidine hydrochloride
U059—Daunomycin
U062—Diallate
U073—3,3'Dichlorobenzidine
U074—(cis)-1,4-Dichloro-2-butene
U074—(trans)-1,4-Dichloro-2-butene
U091—3,3-Dimethoxybenzidine
U092—Dimethylamine
U093—p-Methylaminoazobenzene
U095—3,3'-Dimethylbenzidine
U097—Dimethylcarbomyl chloride
U110—Dipropylamine
U114—Ethylene bis-dithiocarbamic acid
U116—Ethylene thiourea
U119—Ethyl methane sulfonate
U132—Hexachlorophene
U143—Lasiocarpine
U148—Maleic Hydrazide
U149—Malononitrile
U150—Melphalan
U153—Methanethiol
U156—Methyl chlorocarbonate
U163—N-Methyl N-nitro N-nitroguanidine
U164—Methylthiouracil
U167—1-Naphthylamine
U168—2-Naphthylamine
U171—2-Nitropropane
U173—N-Nitroso-di-n-ethanolamine
U176—N-Nitroso-N-ethylurea
U177—N-Nitroso-N-methylurea
U178—N-Nitroso-N-methylurethane
U184—Pentachloroethane
U191—2-Picoline
U193—1,3-Propane sultone
U194—n-Propylamine
U200—Reserpine
U202—Saccharin and salts
U206—Streptozotocin
U218—Thioacetamide
U219—Thiourea
U222—o-Toluidine hydrochloride
U234—sym-Trinitrobenzene
U236—Trypan Blue
U237—Uracil mustard
U238—Ethyl carbamate
U240—salts and esters of 2,4-D
U244—Thiram

Incineration or fuel substitution as methods of treatment for nonwastewater forms of:
P001—Warfarin (>0.3%)
P003—Acrolein
P005—Allyl alcohol
P088—Endothall
P102—Propargyl alcohol
U001—Acetaldehyde
U008—Acrylic acid
U016—Benz (c) acridine
U053—Crotonaldehyde
U055—Cumene (isopropyl benzene)
U056—Cyclohexane
U057—Cyclohexanone
U064—1,2,7,8-Dibenzopyrene
U085—1,2:3,4-Diepoxybutane
U089—Diethyl stilbestrol
U090—Dihydrosafrole
U094—7,12-Dimethyl benz (a) anthracene
U113—Ethyl acrylate
U122—Formaldehyde
U123—Formic acid

Incineration or fuel substitution as methods of treatment for nonwastewater forms of:
U124—Furan
U125—Furfural
U126—Glycidaldehyde
U147—Maleic anhydride
U154—Methanol
U166—1,4-Naphthoquinone
U182—Paraldehyde
U186—1,3-Pentadiene
U197—p-Benzoquinone
U201—Resorcinol
U213—Tetrahydrofuran
U248—Warfarin (<0.3%)

(2) *Wastewaters.* EPA has typically proposed two alternative methods of treatment as the treatment standard for these U and P wastewater treatability groups. In all cases, the Agency believes that incineration, while not always practical for wastewaters, will provide an efficient destruction of these organic U and P constituents in wastewaters. While the Agency does not want to identify incineration as the primary BDAT treatment technology for these wastewaters, it also does not want to preclude its use. In addition, the Agency does not want to process needless variances for a technology that is recognized to be effective. Therefore, in all cases, "Incineration as a Method of Treatment" is promulgated as one of the alternative treatment standards for wastewater forms of these organic U and P wastes.

However, other oxidation-based treatment technologies are more appropriate than incineration for aqueous waste streams and EPA is promulgating several treatment systems based on oxidation followed by carbon absorption as methods for these wastewaters. The wastewater treatment technology that most closely resembles incineration is wet air oxidation. It is specifically designed to destroy organics in wastewaters and efficiently oxidizes organics in aqueous media by operating at relatively high temperatures and high pressures. Furthermore, wet air oxidation is typically performed on wastewaters that contain relatively high concentrations of organics (i.e., those that are at or near the 1% TOC cut-off for wastewaters). For wastewaters that contain significantly lower concentrations of organics, chemical oxidation typically provides the necessary destruction of organics to levels that can then be adsorbed onto activated carbon (as a mandatory

polishing step). Electrolytic oxidation is also included under chemical oxidation because the process actually performs a form of chemical oxidation induced by electricity and because the Agency has data indicating its effectiveness in destroying cyanides and other organic species with complex bonds.

Since these technologies are known to provide effective treatment for constituents that can be analyzed, the Agency is therefore promulgating oxidation methods followed by carbon adsorption as alternative treatment technologies for most of the organic U and P constituents that requires specified methods of treatment.

None of these technologies have been specifically identified as better than the others due to the current lack of data for those constituents that are difficult to analyze, or for any other surrogate/indicator parameters. However, the Agency is currently investigating the potential use of surrogates/indicators that could be used in future rulemakings to ensure complete destruction and to determine which technology performs best for these U and P constituents in wastewaters.

For quite a few of the organic and some inorganic U and P wastes that require specified methods of treatment, concentration-based treatment standards have not been promulgated because the compounds are relatively unstable in water. This instability implies that they should easily be destroyed with any chemical oxidant (and most probably at ambient temperature and air pressure).

Commenters requested that EPA allow biological treatment for all U and P wastewaters not regulated by numerical standards. EPA rejects the use of biological treatment for any of the U and P wastes which cannot be analytically quantified. Because influent concentrations of these compounds cannot be measured, the treatment unit operators cannot control the levels of these compounds reaching the working organisms in the biological treatment unit, or document that the wastes are effectively biodegraded. The risk of sending unmeasurable quantities of these wastes to a biological treatment unit includes the possibility of shock loads that would disable the plant's working organisms, and allowing these wastes to exit untreated in the effluent until the biological treatment system could be restored to working order.

Even the presence of an activated carbon unit downstream from the biological treatment unit, an option EPA had proposed, might not prevent high concentrations of the shock load components from passing through the entire treatment system with essentially no treatment. A shock load high enough in organic components could push the activated carbon unit to breakthrough, sending the shock load components untreated to land disposal.

Consequently, EPA is precluding the use of biological treatment as a sole mechanism to achieve compliance with BDAT. Biotreatment that is performed in units prior to the use of a BDAT technology or in otherwise exempted units is not precluded from use by these regulations.

Commenters suggested that EPA drop the requirement that activated carbon follow chemical/wet air oxidation or biological treatment. EPA believes that the promulgated treatment standard option of oxidation, electrolytic, chemical or wet-air, followed by activated carbon is superior to the commenters' suggestions because oxidation is more rugged than biotreatment: less easily disabled by a refractory influent stream and more easily restored to working order than a biological treatment unit. As discussed in the proposed rule, wet-air oxidation is most appropriate for those wastewaters near the wastewater cutoff level (i.e. 1% TOC), while chemical oxidation effectively treats those wastes with lower percentages of TOC. EPA's decision to require activated carbon following the oxidation step ensures a backup system to compensate for the uncertainty about final effluent concentrations of these U and P wastes inherent in any process treating unquantifiable wastes. Most importantly, however, since spent activated carbon from treating these wastewaters becomes a nonwastewater form of these wastes (54 FR 48384), and thus must be incinerated according to the promulgated nonwastewater standard, requiring activated carbon treatment ensures that both wastewater and nonwastewater forms of these wastes go to incineration, a method demonstrated to successfully treat a wide variety of organic wastes.

EPA's response to commenters stating that requiring both oxidation and carbon absorption for these U and P wastewaters puts an arbitrary and heavy burden on those generators who had been using biological treatment alone or other simple methods of pre-disposal treatment is that the volume of these wastes generated is small enough that arranging for the promulgated treatment process does not pose an undue burden. Furthermore, some of these wastes are sufficiently refractory that the oxidation-carbon adsorption sequence is necessary to ensure consistent and complete treatment.

In the proposed rule, EPA also solicited data demonstrating the feasibility of regulating TOC or COD (chemical oxygen demand) as a surrogate for these U and P wastewaters: By setting a concentration-based limit on the TOC or COD level of a waste to be land-disposed, EPA would necessarily limit the concentration of a organic toxic materials in that waste. Commenters objected to this proposed practice as unrealistic. No information was submitted demonstrating that TOC or COD could be reliable surrogates for these unquantifiable organic compounds. Consequently, EPA is not promulgating the use of TOC or COD as surrogates.

One commenter objected to the method-based standard requiring activated carbon following biological treatment; the commenter reported that his plant routinely sent pharmaceutical wastes to the facility's in-plant industrial waste treatment plant and stated that the activated-carbon requirement was superfluous. EPA has removed the biological-treatment option for wastewater forms of wastes not amenable to quantification and explains this decision, including the requirement that the spent activated carbon be incinerated, in the section III.a.5.a.(3).

For wastewater forms of organic U and P wastes not amenable to quantification: EPA is promulgating "Incineration (INCIN) as the Method of Treatment" or, alternatively, "Chemical oxidation (CHOXD) or wet-air oxidation (WETOX) followed by carbon adsorption (CARBN)." See 40 CFR 268.42 Table 1 for a detailed description of the technology standard referred to by the five letter technology code in the parentheses.

(Wet air oxidation or chemical oxidation), followed by carbon adsorption; or incineration as methods of treatment for wastewater forms of:
P001—Warfarin (>0.3%)
P002—1-Acetyl 2-thiourea
P003—Acrolein
P005—Allyl alcohol
P007—Muscimol (5-Aminoethyl 3-isoxazolol)
P008—4-Aminopyridine
P014—Benzene thiol (Thiophenol)
P016—Bis-chloromethyl ether
P017—Bromoacetone
P018—Brucine

(Wet air oxidation or chemical oxidation), followed by carbon adsorption; or incineration as methods of treatment for wastewater forms of:
P023—Chloroacetaldehyde
P026—1-(o-Chlorophenyl) thiourea
P027—3-Chloropropionitrile
P028—Benzyl chloride
P034—2-cyclohexyl-4,6-dinitrophenol
P042—Epinephrine
P045—Thiofanox
P046—alpha, alpha-Dimethylphenethylamine
P047—4,6-dinitrocresol salts
P049—2,4-Dithiobiuret
P054—Aziridine
P057—2-Fluoroacetamide
P058—Fluoracetic acid, sodium salt
P064—Isocyanic acid, ethyl ester
P066—Methomyl
P067—2-Methylaziridine
P069—Methyllactonitrile
P070—Aldicarb
P072—1-Naphthyl-2-thiourea (Bantu)
P075—Nicotine and salts
P084—N-Nitrosomethylvinylamine
P088—Endothall
P093—N-Phenylthiourea
P095—Phosgene
P102—Propargyl alcohol
P108—Strychnine and salts
P116—Thiosemicarbazide
P118—Trichloromethanethiol
U001—Acetaldehyde
U006—Acetyl Chloride
U007—Acrylamide
U008—Acrylic acid
U010—Mitomycin C
U011—Amitrole
U014—Auramine
U015—Azaserine
U016—Benz(c)acridine
U017—Benzal chloride
U020—Benzenesulfonyl chloride
U021—Benzidine
U026—Chloronaphazine
U033—Carbonyl fluoride
U034—Trichloroacetaldehyde
U035—Chlorambucil
U041—n-Chloro-2,3-epoxypropane
U042—2-Chloroethyl vinyl ether
U046—Chloromethyl methyl ether
U049—4-Chloro-o-toluidine hydrochloride
U053—Crotonaldehyde
U055—Cumene (isopropyl benzene)
U056—Cyclohexane
U059—Daunomycin
U062—Diallate
U064—1,2,7,8-Dibenzopyrene
U073—3,3'Dichlorobenzidine
U074—1,4-Dichloro-2-butene
U085—1,2:3,4-Diepoxybutane
U089—Diethyl stilbestrol
U090—Dihydrosafrole
U091—3,3-Dimethoxybenzidine
U092—Dimethylamine
U094—7,12-Dimethyl benz(a)anthracene
U095—3,3'-Dimethylbenzidine
U097—Dimethylcarbomyl chloride
U110—Dipropylamine
U113—Ethyl acrylate
U114—Ethylene bis-dithiocarbamic acid
U116—Ethylene thiourea

(Wet air oxidation or chemical oxidation), followed by carbon adsorption; or incineration as methods of treatment for wastewater forms of:
U119—Ethyl methane sulfonate
U122—Formaldehyde
U123—Formic acid
U124—Furan
U125—Furfural
U126—Glycidaldehyde
U132—Hexachlorophenene
U143—Lasiocarpine
U147—Maleic anhydride
U148—Maleic Hydrazide
U149—Malononitrile
U150—Melphalan
U153—Methane thiol
U154—Methanol
U156—Methyl chlorocarbonate
U163—N-Methyl N-nitro N-nitroguanidine
U164—Methylthiouracil
U166—1,4-Naphthoquinone
U167—1-Naphthylamine
U171—2-Nitropropane
U173—N-Nitroso-di-n-ethanolamine
U176—N-Nitroso-N-ethylurea
U177—N-Nitroso-N-methylurea
U178—N-Nitroso-N-methylurethane
U182—Paraldehyde
U184—Pentachloroethane
U186—1,3-Pentadiene
U184—Pentachloroethane
U191—2-Picoline
U193—1,3-Propane sultone
U194—n-Propylamine
U197—p-Benzoquinone
U200—Reserpine
U201—Resorcinol
U202—Saccharin and salts
U206—Streptozotocin
U213—Tetrahydrofuran
U218—Thioacetamide
U219—Thiourea
U222—o-Toluidine hydrochloride
U234—sym-Trinitrobenzene
U236—Trypan Blue
U237—Uracil mustard
U238—Ethyl carbamate
U240—salts and esters of 2,4-D
U244—Thiram
U248—Warfarin (<3%)

c. U and P Wastes That are Potentially Reactive

These wastes were grouped together because they are either highly reactive or explosive, or they are polymers that tend to be highly reactive. These wastes pose a significant risk during handling due to their reactivity; this is reflected in the fact that there are no standard SW-846 methods for analyzing reactivity. Because of the difficulties in handling and analyzing these wastes, the Agency is promulgating treatment standards expressed as required methods of treatment (thus eliminating the need to analyze treatment residues).

The Agency investigated several options for developing treatment standards for these wastes, including incineration, chemical oxidation and chemical reduction. Most of these wastes are curently managed by incineration. Other wastes included in this group can be recovered or recycled.

For the purpose of BDAT determinations, the Agency has identified four subcategories according to similarities in treatment, chemical composition, and structure. These groups are: (1) Incinerable Reactive Organics and Hydrazine Derivatives; (2) Incinerable Inorganics; (3) Fluorine Compounds; and, (4) Recoverable Metallics. The discussion of the treatment standards applicable to each subcategory are as follows.

(1) *Incinerable Reactive Organics and Hydrazine Derivatives.*

P009—Ammonium picrate
P081—Nitroglycerin
P112—Tetranitromethane
U023—Benzotrichloride
U096—a, a-Dimethyl benzyl hydroperoxide
U103—Dimethyl sulfate
U160—Methyl ethyl ketone peroxide
P068—Methyl hydrazine
P105—Sodium azide
U086—N, N-Diethylhydrazine
U098—1, 1-Dimethylhydrazine
U099—1, 2-Dimethylhydrazine
U109—1, 2-Diphenylhydrazine
U133—Hydrazine

EPA has grouped these wastes into a treatability group together because they contain no metal constituents and have high inherent fuel values. Consequently, because of the similar characteristics, these wastes can be treated with the same technologies.

The Agency does not believe, however, that concentration-based treatment standards can be established for these wastes at this time. The major problems in establishing concentration-based standards for these wastes are: (1) EPA does not currently have an analytical method for measuring many of these wastes in treatment residues; and (2) where the Agency does have methods, there are no data available on the treatment of these chemicals. In cases when there is no verified analytical method for a particular waste, EPA tries to find an appropriate measurable surrogate or indicator compound; however, no constituent has been identified in these wastes that could be used as a surrogate or indicator compound. (See section III.A.1.h.(2) for a detailed discussion of analytical problems.)

One of the specific problems encountered in analysis of P068, P105, P112, U023, U098, U099, and U103 is that these wastes break down quickly in water (hydrolyze) and that the analysis of wastewater forms of these wastes is very difficult as well as often hazardous due to the intensity of the reaction. See further discussion on the impact of instability in water on the development of treatment standards in section

III.A.1.h.(2.)(c.) of today's notice. In addition, the Agency lacks data on what effects the hydrolysis products would have on the environment. Besides, verified analytical methods do not currently exist for the quantification of these hydrolysis products in treatment residues.

Another analytical problem is created because P081 wastes are only quantifiable by HPLC methods (Note: EPA rejects HPLC methods for waste treatment residual matrices for reasons discussed in section III.A.1.h.(2.)(a.).) In addition, there are no verified SW-846 analytical methods for measuring P009 and U133 in treatment residues.

These analytical problems preclude setting concentration-based treatment standards; consequently, the Agency proposed "Thermal Destruction" (e.g., incineration) as a required method of treatment for the nonwastewater forms of these U and P wastes (54 FR 48427). The Agency, however, reconsidered the treatment technologies applicable for treatment of wastes in this treatability group as a result of information in the comments.

EPA continues to believe that incineration is an applicable technology because data indicate that most of of these wastes are currently incinerated by commercial, as well as military facilities. Additionally, since most these wastes have high Btu values, EPA also believes that these wastes (e.g., hydrazine is used in rocket fuel) are excellent candidates for fuel substitution. Nevertheless, the Agency has also determined that these wastes can be chemically deactivated using chemical oxidation and chemical reduction technologies.

Based on all the available information, the Agency is promulgating "Incineration (INCIN), Fuel Substitution (FSUBS), Chemical Oxidation (CHOXD), or Chemical Reduction (CHRED) as Methods of Treatment" for P009, P068, P081, P105, P112, U023, U086, U096, U098, U099, U103, U109, U133 and U160 nonwastewaters. See § 268.42 Table 1 in today's rule for a detailed description of the technology standard referred to by the five letter technology code in the parentheses.

The Agency proposed "Incineration or Carbon Adsorption" as required methods of treatment for the wastewater forms of this treatability group. During the comment period, EPA received information about the treatment capabilities of other technologies and reevaluated the technologies applicable for treatment of wastewaters in this treatability group.

EPA still believes that incineration is applicable because it will destroy the constituents present in the wastewaters. Carbon adsorption is also applicable because wastewater forms of these wastes can easily be adsorbed due to the branched and ionic nature of their structures. (It should be noted that after adsorption (and before disposal) the contaminated carbon must be treated in compliance with the treatment standard for nonwastewaters.) However, data has also been provided that indicate that some of these wastewaters (i.e., P068) can be treated by ozone/ultraviolet light oxidation; hence, the Agency believes that chemical oxidation and chemical reduction to be applicable technologies for destruction of the constituents in these waste streams. EPA also has information indicating that biodegradation is capable of destroying the compounds in wastewater forms of this treatability group.

The Agency believes all the above mentioned applicable technologies are demonstrated and available hence, "best". Therefore, EPA is promulgating "Incineration (INCIN), Chemical Oxidation (CHOXD), Chemical Reduction (CHRED), Carbon Adsorption (CARBN), or Biodegradation (BIODG) as Methods of Treatment" for P009, P068, P081, P105, P112, U023, U086, U096, U098, U099, U103, U109, U133 and U160 wastewaters. See section 268.42 Table 1 in today's rule for a detailed description of the technology standard referred to by the five letter technology code in the parentheses.

Although there is an SW-846 method for U109, the Agency is not establishing a numerical standard for this waste since it is very similar to P068, U086, U098, U099, and U133 (all are hydrazine compounds) and it is the Agency's belief that the promulgated methods will provide effective treatment for this waste.

The Agency is unaware of any alternative treatment or recycling technologies that have been examined specifically for these U and P wastes and solicited data and comments on such technologies but received no response on this issue. In any case, the treatment standard does not preclude recycling (provided the recycling is not a use constituting disposal; see § 261.33, first sentence).

BDAT TREATMENT STANDARDS FOR P009, P068, P081, P105, P112, U023, U086, U096, U098, U099, U103, U109, U133, AND U160

[Nonwastewaters]

Incineration (INCIN), fuel substitution (FSUBS), chemical oxidation (CHOXD), or chemical reduction (CHRED) as methods of treatment *

* See § 268.42 Table 1 in today's rule for a detailed description of the technology standard referred to by the five letter technology code in the parentheses.

BDAT TREATMENT STANDARDS FOR P009, P068, P081, P105, P112, U023, U086, U096, U098, U099, U103, U109, U133, AND U160

[Wastewaters]

Incineration (INCIN), chemical oxidation (CHOXD), chemical reduction (CHRED), carbon adsorption (CARBN), or biodegradation (BIODG) as methods of treatment *

* See § 268.42 Table 1 in today's rule for a detailed description of the technology standard referred to by the five letter technology code in the parentheses.

(2) Incinerable Inorganics.

P006—Aluminum phosphide
P096—Phosphine
P122—Zinc phosphide (>10%)
U135—Hydrogen sulfide
U189—Phosphorus sulfide
U249—Zinc phosphide (<10%)

These wastes were grouped together because they consist of compounds containing only inorganics such as sulfur, nitrogen, phosphorous, and metals. Additionally, these compounds are either extremely toxic gases or can generate toxic gases under aqueous conditions. Treatment technologies for these wastes should include equipment to prevent releases of the toxic gases into the environment.

The Agency does not believe that numerical treatment standards can be established for these wastes at this time. The major problem in establishing concentration-based standards for these wastes is that EPA does not currently have an analytical method for measuring these wastes in treatment residues. For example, one of the specific problems encountered in analysis of P006 wastes is that they break down quickly in water (hydrolyze), making the analysis of wastewater forms of these wastes very difficult. In cases when there is no analytical method for a particular waste, EPA tries to find an appropriate measurable surrogate or indicator

compound; however, no constituent has been identified in these wastes that could be used as a surrogate or indicator compound for nonwastewaters. See section III.A.1.h.(2) for a detailed discussion of analytical problems.

Data available at the time of proposal indicated that these wastes were being incinerated by some commercial treatment facilities. Therefore, the Agency proposed a treatment standard of "Thermal Destruction" for the nonwastewater forms of these wastes. EPA has reevaluated the applicable technologies for wastes in this treatability group as a result of information submitted in the comments.

One commenter specifically requested that chemical oxidation be a method of treatment for phosphine gas (P096) and hydrogen sulfide gas (U135). This commenter said that both gases are flammable and toxic to inhalation and can be treated by controlled reaction with aqueous solutions of potassium permanganate. The commenter stated that this treatment allows the margin of safety that venting into an incinerator does not since both gases, when heated, emit highly toxic oxides, either sulfur or POX. The Agency agrees with the commenter that chemical oxidation and chemical reduction technologies are applicable for treatment of wastes in this treatability group.

The Agency continues to believe that incineration can be used to effectively and safely treat these wastes. However, because most of these wastes will contain high concentrations of sulfur and phosphorous when discarded as off-spec products, they will require as part of the treatment the use of air pollution control equipment capable of controlling the emissions of phosphorous and sulfur to acceptable levels (see the discussion of this issue as it relates to organo-nitrogens and organo-sulfur U and P wastes in section III.A.3.g.). EPA does not believe that fuel substitution is applicable for wastes in this treatability group because of the hazards associated with the toxic gases that can be generated.

Based on the information presented above, the Agency is promulgating "Incineration (INCIN), Chemical Oxidation (CHOXD), or Chemical Reduction (CHRED) as Methods of Treatment" for P006, P069, P122, U135, U189, and U249 nonwastewaters. See section 268.42 Table 1 in today's rule for a detailed description of the technology standard referred to by the five letter technology code in the parentheses.

For wastewater forms of P006, P096, P122, U135, U189, and U249, the Agency proposed a standard of "Chemical Oxidation Followed by Precipitation as Insoluble Salts". EPA has reconsidered the "insoluble salts" requirement and believes that because most of these P and U wastes are generated in small quantities it places a large burden on treatment facilities treating these wastes by incineration or chemical treatment to require use of chemicals that will precipitate a small portion of their total waste volume to insoluble salts when other chemicals may be more desirable for their specific treatment needs. EPA also believes that the individual facility discharge limits will control releases into the environment of any soluble compounds generated as a result of treating these compounds.

EPA has also reconsidered the technologies proposed as BDAT as a result of information submitted in the comments. One commenter submitted information indicating that incineration is the best treatment for these wastewaters. The Agency does not believe that treatment using technologies that usually require aeration steps such as biodegradation technologies are applicable because of the toxicity of the gases that could be formed during treatment. Additionally, carbon adsorption is not considered applicable technology for inorganic compounds that do not have branched molecular structures. The Agency believes that thermal and chemical destruction technologies such as incineration, chemical oxidation and chemical reduction provide safer and more effective treatment than either biodegradation or carbon adsorption.

The Agency is promulgating a standard of "Incineration (INCIN), Chemical Oxidation (CHOXD), or Chemical Reduction (CHRED) as Methods of Treatment" for P006, P096, P122, U135, U189, U249 wastewaters. See § 268.42 Table 1 in today's rule for a detailed description of the technology standard referred to by the five letter technology code in the parentheses.

The Agency is currently unaware of any alternative treatment or recycling technologies that have been examined specifically for these wastes and solicited data and comments on these, but received no response on this issue. The final rule, in any case, does not preclude recycling (provided the recycling does not involve burning as fuel or is not a use constituting disposal; see § 261.33, first sentence).

BDAT TREATMENT STANDARDS FOR P006, P096, P122, U135, U189, AND U249

[Nonwastewaters and wastewaters]

Incineration (INCIN), chemical oxidation (CHOXD), or chemical reduction (CHRED) as a method of treatment *

* See section 268.42 Table 1 in today's rule for a detailed description of the technology standard referred to by the five letter technology code in the parentheses.

(3) *Fluorine Compounds.*

P056—Fluorine
U134—Hydrofluoric Acid

These wastes were grouped together because of their physical form and because they contain fluorine. Both of these chemicals may be generated as gases (although U134 is often generated as an aqueous acid). Both of these chemicals are also highly reactive and highly corrosive.

The Agency proposed a treatment standard of "Solubilization in Water Followed by Precipitation as Calcium Fluoride" as a method for the nonwastewater form of these wastes, based on the chemical properties of aqueous fluoride ions and the insolubility of calcium fluoride. The Agency also proposed recovery as an alternative specified method. The Agency requested comments and data on these options.

EPA has reconsidered the "insoluble salts" requirement and believes that generally P056 and U134 wastes are generated in such small quantities that it places a large burden on treatment facilities treating these wastes by chemical treatment to require use of chemicals that will precipitate a small portion of their total waste volume to insoluble salts when other chemicals may be more desirable for their specific treatment needs. EPA also believes that the individual facility discharge limits for fluoride will control releases into the environment of any soluble compounds generated as a result of treating these compounds. Therefore, the Agency is not finalizing the insoluble salt requirement.

EPA is promulgating "Adsorption (ADGAS) followed by Neutralization (NEUTR) as a Method of Treatment" for P056 nonwastewaters and "Neutralization (NEUTR) or Adsorption (ADGAS) followed by Neutralization (NEUTR) as Methods of Treatment" for U134 nonwastewaters since this waste can exist as an acidic solution or a gas. See § 268.42 Table 1 in today's rule for a detailed description of the technology standard referred to by the five letter

technology code in the parentheses. EPA believes "adsorption" instead of "solubilization" better describes the process of releasing a gas into a liquid media and that "neutralization" of the resulting acidic waste allows the regulated community greater flexibility than "precipitation as calcium fluoride". The Agency made this decision as a result of information indicating that most facilities are currently treating gaseous forms of P056 and U134 by reacting the gases with alkaline solution and that it is common practice to neutralize waste hydrofluoric acid (U134).

One commenter said these fluorine compounds are mixed with other wastes requiring incineration and that they can be safely incinerated and that incineration should be an allowed technology. The Agency is not precluding incineration as long as the acid off-gases are scrubbed with alkaline reagents to achieve the treatment standard of "Adsorption (ADGAS) followed by Neutralization (NEUTR)". In this case, the water will act as the adsorbent and the alkaline reagents will neutralize the acidity.

The Agency has collected data for the wastewater forms of these wastes (see BDAT Background Document for Wastewaters Containing BDAT List Constituents in the RCRA Docket). Based on these data, the Agency proposed a concentration-based treatment standard of 35 mg/l fluoride for P056 and U134 wastewaters. This standard is based on the treatment performance of lime precipitation followed by filtration. The Agency received no comments concerning the wastewater standard and is thus, promulgating this standard as proposed.

BDAT TREATMENT STANDARDS FOR P056

[Nonwastewaters]

Adsorption (ADGAS) followed by neutralization (NEUTR) as a method of treatment *

BDAT TREATMENT STANDARDS FOR U134

[Nonwastewaters]

Neutralization (NEUTR) or adsorption (ADGAS) followed by neutralization (NEUTR) as methods of treatment *

BDAT TREATMENT STANDARDS FOR P056 AND U134

[Wastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/l)
Fluoride	35

* See § 268.42 Table 1 in today's rule for a detailed description of the technology standard referred to by the five letter technology code in the parentheses.

(4) *Recoverable Metallics.*

P015—Beryllium dust
P073—Nickel carbonyl
P087—Osmium tetroxide

The Agency has identified the wastes in this group as metal wastes that have a high potential for recovery. Because there are so little data on these wastes, characterization is very difficult. All the wastes in this group contain metallic elements (i.e., beryllium, osmium, and nickel) that can be recovered due to their high economic value. Information available to the Agency indicates that recovery of these metallic elements from these wastes is feasible and is currently practiced.

The Agency proposed a standard of "Recovery as a Method of Treatment" for both nonwastewater and wastewater forms of these wastes. At the time of proposal, the Agency was not aware of any treatment alternatives applicable to these wastes and solicited comments and information to help identify alternative treatment.

Several commenters stated that it is inappropriate to establish recovery as the only acceptable treatment method for nickel carbonyl (P073). One commenter generates very small quantities of P073 (typically less than two pounds per year) and said that due to the highly reactive nature of the chemical, long-term storage in order to obtain quantities sufficient to justify recovery either on-site or off-site would present a significant safety hazard. This commenter currently disposes of P073 by oxidation, either thermally in an incinerator, or chemically in a laboratory scale treatment facility followed by stabilization and feels that this is the only safe, economical and environmentally sound treatment method for small quantities of nickel carbonyl.

The Agency agrees that it may not always be practical to recover small quantities of nickel and that oxidation of wastewaters followed by stabilization of nonwastewaters will provide an effective treatment for nickel carbonyl (P073). Since EPA has performance data for chemical treatment of nickel in wastewaters believed to be similar to P073 wastewaters and stabilization data for nickel in nonwastewaters believed to be similar to P073 nonwastewaters, the Agency has decided to develop concentration-based standards for P073 nonwastewaters and wastewaters. EPA is promulgating a concentration-based standard of 0.32 mg/l nickel for P073 nonwastewaters and a concentration-based standard of 0.44 mg/l nickel for P073 wastewaters. This standard will allow generators the flexibility to use any appropriate method of treatment to achieve the numerical standards.

Another commenter stated that it is inappropriate to establish a treatment standard based only on recovery as a method of treatment for beryllium dust (P015) and osmium tetroxide (P087) and suggested that EPA develop quantitative or alternate technology standards. However, the Agency received neither performance data nor information regarding alternate treatment methods for these compounds during the comment period and has no performance data in the BDAT data base to develop concentration-based treatment standards. On the other hand, the Agency did receive a comment from a producer of beryllium and beryllium-containing products which said that although only very small quantities of P015 are generated at any one time, recovery is a viable and preferred treatment method in light of the high economic value of the recovered beryllium. Additionally, the Agency is aware that it is current practice to recover osmium from P087 using bench-scale technologies because of the high economic value of the recovered osmium. Consequently, the Agency believes that recovery is BDAT for P015 and P087 nonwastewaters and wastewaters and is promulgating "Recovery (RMETL or RTHRM) as a Method of Treatment" for all forms of P015 and P087. As noted through the preamble, Congress expressed a strong preference in the land disposal ban legislative history for recovery as opposed to treatment followed by disposal. See, e.g., H.R. Rep. No. 198 at 31. The standard for these wastes is consistent with the Congressional preference.

BDAT TREATMENT STANDARDS FOR P015, AND P087

Recovery (RMETL or RTHRM) as a method of treatment *

* See § 268.42 Table 1 in today's rule for a detailed description of the technology standard referred to by the five letter technology code in the parentheses.

BDAT TREATMENT STANDARDS FOR P073

[Nonwastewaters]

Regulated constituent	Maximum for any single grab sample, TCLP Leachate (mg/l)
Nickel	0.32

BDAT TREATMENT STANDARDS FOR P073

[Wastewaters]

Regulated constituent	Maximum for any single grab sample, total composition (mg/l)
Nickel	0.44

d. Gases

P076—Nitric oxide
P078—Nitrogen dioxide
U115—Ethylene oxide

These wastes are typically found as gaseous materials when existing at high concentrations. The Agency is promulgating thermal or chemical treatment as a method of treatment for these wastes in contrast to the proposed standard of recovery as a method of treatment. The Agency acknowledges that these wastes are unlikely to exist in any forms amenable to land disposal but is promulgating these standards in the interest of completeness.

In the proposed rule, the Agency solicited information on whether these wastes are actually being land disposed, how such land disposal takes place, whether anyone intends to land dispose of these wastes in the future and any treatability data that may lead to appropriate numerical land-disposal standards for these wastes.

In soliciting comments on appropriate land-disposal standards for wastes in the gaseous form, EPA wanted information about the physical forms other than empty containers these gases take when discarded. 40 CFR 261.7(a)(1)(i) and 40 CFR 261.7(a)(2) state that "a container that has held hazardous waste that is a compressed gas is empty when the pressure in the container approaches atmospheric [pressure]" and "any hazardous waste remaining in an empty container * * * is not subject to regulation under * * * part 268."

Since cylinders depressurized to atmospheric pressure are explicitly defined as non-hazardous waste (assuming the cylinder itself is not hazardous when disposed), the two physical forms in which these three wastes will most likely pose land-disposal problems are damaged cylinders unacceptable for recycling or reuse and rinsewater used to clean such cylinders. Commenters reported that damaged cylinders pose significant risk of explosion and thus are very dangerous to store and handle; furthermore most cylinder-handling firms refuse to take damaged cylinders. Therefore, commenters report they have been expeditiously treating their damaged cylinders on-site on their own initiative and these commenters strongly urged EPA to set as the treatment standard the chemical and thermal treatment currently being used. EPA agrees. Such activities will require permits under subpart X (Miscellaneous Units) of 40 CFR part 264.

One commenter submitted information about an oxidation process that had been used to treat wastewaters high in ethylene oxide. Although the commenter did not provide rigorous enough documentation of his treatment process design and operation and about his analytical procedures for EPA to use his data to calculate concentration-based standards for ethylene oxide, his data nevertheless support EPA's claim that oxidation processes are BDAT for ethylene oxide wastewaters and nonwastewaters.

U115 (ethylene oxide) can be oxidized to carbon dioxide and water so EPA can specify chemical or thermal oxidation for U115 nonwastewaters and incineration or chemical oxidation plus carbon absorption or biological treatment plus carbon absorption for U115 wastewaters.

However, in choosing appropriate treatment methods for the other two gases, EPA confronts the fact that oxidation is inappropriate for P076 (nitric oxide, NO) and P078 (nitrogen dioxide, NO_2) because the resulting oxidation product is the undesirable NO_x equilibrium mixture. Consequently, EPA is promulgating as treatment standards for P076 and P078 a method suggested by one of the commenters: venting into a reducing solution. EPA leaves the means of venting to the treatment facility and requires only that the effluent, gas or washwater, ultimately be sent through a reducing solution to transform NO and NO_2 to N_2 and O_2.

EPA is promulgating "Venting Into a Reducing Medium as the Method of Treatment (ADGAS)" for P076 and P078, nonwastewaters and wastewaters; "Thermal or Chemical Oxidation (INCIN, CHOXD) as a Method of Treatment" for nonwastewater forms of U115 and "Incineration (INCIN) of Chemical (CHOXD) or Wet-Air Oxidation (WETOX) Followed by Carbon Adsorption (CARBN) as Methods of Treatment" for U115 wastewaters.

BDAT TREATMENT STANDARDS FOR P076 AND P078

[Wastewaters and Nonwastewaters]

Venting into a reducing medium (ADGAS) as a method of treatment

BDAT TREATMENT STANDARDS FOR U115

[Nonwastewaters]

Thermal or chemical oxidation (INCIN, CHOXD) as a method of treatment

BDAT TREATMENT STANDARDS FOR U115

[Wastewaters]

Incineration (INCIN) or chemical (CHOXD) or wet air oxidation (WETOX) followed by carbon absorption (CARBN) as a method of treatment

e. U and P Cyanogens

P031—Cyanogen
P033—Cyanogen chloride
U246—Cyanogen bromide

Today's rule promulgates "Chemical Oxidation (CHOXD) (such as alkaline chlorination), Wet Air Oxidation (WETOX), or Incineration (INCIN) as a Method of Treatment" for amenable and total cyanides for P031, P033, and U246. For these wastes, the Agency is promulgating technology-based standards rather than concentration-based standards because of the high toxicity of these wastes. The Agency received no comments on the use of the above methods of treatment for these wastes.

BDAT TREATMENT STANDARDS FOR P031, P033, U246 [Nonwastewaters and wastewaters]
Chemical oxidation (CHOXD), wet air oxidation (WETOX), or incineration (INCIN) as a method of treatment [1]

[1] See § 268.42, Table 1 in today's rule for a detailed description of the technology standard referred by the five letter technology code in the parentheses.

6. Development of Treatment Standards for Multi-Source Leachate

a. Background

In the preamble to the proposed rule (54 FR 48461–48469), EPA summarized its efforts to develop a regime for managing, under the land disposal restrictions program, leachate derived from the disposal of hazardous wastes, and treatment residues derived from treating such leachate. Reiterating briefly, EPA reconsidered the approach it adopted in the First Third final rule for such leachate (53 FR 31146–31150) due to concerns about available treatment capacity and (to a lesser extent) treatability. As a result, on March 7, 1989, EPA changed certain rules pertaining to the modification of permits (54 FR 9596). This was followed on May 2, 1989 by a final rule that rescheduled the prohibition date for most multi-source leachate to that of the Third Third (54 FR 18836). Throughout these changes, however, EPA adhered (and continues to adhere) to the principle that leachate derived from a listed hazardous waste is a hazardous waste, no matter when the listed waste was initially disposed. If such listed waste is a listed solvent, dioxin, or RCRA section 3004(g) waste, the leachate is itself prohibited from land disposal no later than May 8, 1990. These principles have been upheld by the Court of Appeals for the District of Columbia Circuit in *Chemical Waste Management* v. *EPA*, 869 F.2d 1526, 1536, 1536–37 (D.C. Cir. 1989).

b. Final Approach for Regulating Multi-Source Leachate

In developing treatment standards for multi-source leachate and residues from treating such leachate (referred to collectively as "multi-source leachate" throughout this preamble), EPA solicited comment on two options: whether to apply to the multi-source leachate the treatment standards for the wastes from which the leachate is derived, or whether to designate such multi-source leachate as a separate treatability group with a separate treatment standard. EPA has decided to adopt the second approach, which had almost unanimous support in the public comments. In today's final rule, therefore, the Agency is establishing a separate treatability group for multi-source leachate and is giving it the Hazardous Waste No. F039. The Agency is also adopting one set of wastewater and nonwastewater treatment standards consisting of approximately 200 constituents. (As explained in section (4) below, however, the permit writer has the discretion to narrow the number of constituents that must be regularly analyzed and to determine the frequency of testing.) The following sections discuss in greater detail the Agency's final approach for regulating multi-source leachate.

(1) *Definition of Multi-source Leachate.* Leachate is defined in 40 CFR 260.10 as any liquid, including any suspended components in the liquid, that has percolated through or drained from hazardous waste. Leachate that is derived from the treatment, storage, or disposal of listed hazardous wastes is classified as a hazardous waste by virtue of the "derived-from" rule in 40 CFR 261.3(c)(2). Multi-source leachate is leachate that is derived from the treatment, storage or disposal of more than one listed hazardous waste (54 FR 8264; February 27, 1989).

The Agency solicited comment on whether multi-source leachate should be defined as being derived from more than one treatability group instead of from more than one listed hazardous waste. A number of commenters favored the idea of a definition based on more than one treatability group, stating that if the leachate was derived from only a few similar wastes, it would be burdensome to analyze for constituents that would not be present in the originating listed waste. Other commenters, however, stated that such a definition would be unnecessary and confusing to implement. EPA agrees with those commenters that a definition based upon treatability groups would be difficult to implement in this final rule. There is not sufficient time to develop all potential treatability groups, nor to provide public notice necessary to implement the treatability group concept within the time constraints of this final rule. The Agency believes, moreover, that compliance with the multi-source leachate standards need not be overly burdensome due to the flexibility allowed the permit writer (in the facility's waste analysis plan) to determine constituents to monitor and to decide testing frequency (see section (4) below). The Agency, therefore, is defining multi-source leachate as leachate that is derived from more than one listed waste.

There is one definitional clarification to be made pertaining to leachate derived from more than one listed dioxin-containing waste. The Agency requested comments specifically on whether to consider leachate derived exclusively from F020–F023 and F026–F028 dioxin-containing wastes to be single-source leachate. The majority of commenters supported such a classification, therefore, the Agency is adopting this classification in today's rule. These wastes are acute hazardous dioxin wastes (with the exception of F028) subject to special management standards and (as practical matter) special and appropriate public and regulatory scrutiny. The leachate derived from only these hazardous wastes most often will have the same attributes as the underlying wastes (see 54 FR 46482), and thus would require the same scrutiny and should be subject to the same management standards. Therefore, leachate derived exclusively from F020–F023 and F026–F028, and no other listed hazardous wastes, is single-source leachate that is classified as, and must meet the treatment standards for, the underlying waste codes, F020–F023 and F026–F028. Further discussion of this classification is found in section d. below.

(2) *Single Waste Code for Multi-source Leachate.* EPA has decided to establish a separate treatability group for multi-source leachate, and to designate such leachate by its own waste code. Hazardous Waste No. F039.[3] It should be noted, therefore, that when today's rule is effective, a generator does not have the option to continue classifying their multi-source leachate (under the waste code carry-through) as all the listed wastes from which it is derived; multi-source leachate must be classified as F039.

Although there were some commenters who urged the Agency to retain the waste code carry-through approach for multi-source leachate, the Agency is persuaded that if multi-source leachate is to be considered a distinct treatability group (a virtual consensus in the comments), then multi-source leachate should have a separate waste code and separate treatment standards. Not only does this appear to be the only logical result of creating a separate

[3] As was explained in the proposed rule, this does not mean that such waste is newly identified or listed for purposes of RCRA hammers, or other RCRA purposes such as eligibility for interim status. Rather, the Agency is making a bookkeeping change in the way it designates a type of waste that already is listed and identified.

treatability group, but the rules will be easier to implement and enforce if there is a single treatment standard for multi-source leachate rather than the large number of potential treatment standards (depending on the number of wastes from which the leachate is derived), the result of using the alternative waste code carry-through approach. In addition, it would be harder and more confusing to evaluate situations where multi-source leachate also exhibits a hazardous waste characteristic under the waste code carry-through approach (see 54 FR 48464). A further advantage of establishing a separate waste code and separate treatment standards is that it assures treatment of all hazardous constituents that may be present in the multi-source leachate, a result less certain under the waste code carry-through approach. Thus, EPA sees the treatment standards adopted today as somewhat more protective than those that would apply under a waste code carry-through approach.

The Agency is promulgating a treatment standard for multi–source leachate that includes concentration-based standards for virtually the entire list of BDAT constituents. Because multi-source leachate derives potentially from any and all of the listed hazardous waste, the treatment standard must account for this possibility, and must consequently include all of the potential constituents that may be present. (See § 268.41(a) where the Agency adopted the same approach for F001–F005 as well as treatment standards promulgated in this rule for K086 wastes.)

The Agency is not saying that all multi-source leachate contains all of the BDAT list constituents; obviously, some leachates do not. The Agency recognizes that it is unnecessary and wasteful to monitor constituents that are not present. Working out which constituents to monitor is a site-specific determination, however. The Agency is today promulgating an implementation scheme to account for such site-specific determinations. This implementation scheme is similar to that used by EPA's Effluent Guidelines program, which requires an initial analysis that may include all toxic organics, followed by subsequent analyses for only those pollutants which would reasonably be expected to be present. This implementation scheme is discussed in greater detail in section (4) below.

(3) *Separate Waste Code for Multi-Source Leachate.* As was already mentioned, EPA is listing multi-source leachate by a separate waste code, Hazardous Waste No. F039. Commenters supported this decision on the grounds that multi-source leachate is a distinct type of waste different from the underlying wastes from which it is derived. In addition, they asserted that they will face fewer administrative obstacles, particularly with respect to permit modifications, if multi-source leachate and its treatment residues have a separate waste code. This raises certain issues relating to state authorization and CERCLA reportable quantities that are discussed below.

EPA requested and received comment on whether designating multi-source leachate by a single waste code should be considered a HSWA regulation immediately effective in authorized States. A number of commenters stated that the rule should be considered to be adopted pursuant to HSWA, and thus be effective immediately in all states (RCRA section 3006(g)). EPA agrees with these comments, and has concluded that the designation of multi-source leachate is a HSWA regulation, in that it effectuates the requirements of RCRA section 3004(m) to set treatment standards for prohibited wastes. As was discussed at 54 FR 9606 (March 7, 1989), Class One through Three permit modification procedures are appropriate and will be used by EPA to implement such HSWA requirements in authorized and unauthorized States. Since EPA will be modifying the RCRA permit in order to implement these HSWA requirements, a state may not need to take any action to recognize the effectiveness of the modification.

The Agency has determined that listing multi-source leachate as a separate waste code is indeed more strict than applying the waste-code carry through principal because: (1) Designating multi-source leachate as a separate waste code requires the monitoring and treatment of more BDAT constituents than would be required under the waste-code carry through approach to regulating multi-source leachate; and, (2) standards for dioxins and furans in multi-source leachate wastewaters are more strict than those that have applied under the waste-code carry through approach.

All hazardous wastes listed pursuant to RCRA section 3001, as well as any solid waste that meets one or more of the characteristics of a RCRA hazardous waste (as defined at 40 CFR 261.21–261.24), are hazardous substances as defined at Section 101(14) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended. The CERCLA hazardous substances are listed at 40 CFR 302.4 along with their Reportable Quantities (RQs). CERCLA section 103(a) requires that persons in charge of vessels or facilities from which a hazardous substance has been released in a quantity that is equal to or greater than its RQ immediately notify the National Response Center at (800) 424–8802 or at (202) 426–2675. In addition, section 304 of the Superfund Amendments and Reauthorization Act of 1986 (SARA) requires the owner or operator of a facility to report the release of a CERCLA hazardous substance or an extremely hazardous substance to the appropriate State Emergency Response Commission (SERC) or Local Emergency Planning Committee (LEPC) when the amount released equals or exceeds the RQ for the substance or one pound where no RQ has been set.

Under section 102(b) of CERCLA, all hazardous wastes newly designated under RCRA will have a statutorily imposed RQ of one pound unless and until adjusted by regulation under CERCLA. In order to coordinate the RCRA and CERCLA rule-makings with respect to new waste listings, the Agency today is making final regulatory amendments under CERCLA authority in connection with the listing of EPA Hazardous Waste No. F039. The Agency will designate EPA Hazardous Waste No. F039 as a hazardous substance under Section 102(b) of CERCLA and establish the RQ for EPA Hazardous Waste No. F039 at one pound.

The RQ for this waste stream is based on the RQs of the hazardous constituents of concern identified under RCRA for the waste stream (50 FR 13456, April 4, 1985). Thus, if a newly listed hazardous waste has only one constituent of concern, the waste will have an RQ that is the same as the RQ for the constituent. If, as in this case, the hazardous waste has more than one constituent of concern, the lowest RQ assigned to any of the constituents will be the RQ for the hazardous waste. RQs are set at 1; 10; 100; 1000; and 5000 pounds. EPA Hazardous waste No. F039 contains several constituents that have RQs of one pound (*e.g.*, mercury, dieldrin, vinyl chloride, etc.); therefore, the RQ of this waste is also one pound. The list of hazardous constituents for this waste may be found at 40 CFR 268.43(a), Table CCW. The definition of multi-source leachate, F039, may be found at 40 CFR 261.31.

(4) *Permit modifications and implementation procedures.* It would appear that listing multi-source leachate by a separate waste code necessitates amending many RCRA permits that do not already include a narrative

description for multi-source leachate and multi-source leachate treatment residues. EPA has also concluded that this designation as a single waste code may require some modification to existing permits in order to treat, store, or dispose of the new waste code, and that such modifications are appropriately achieved through the procedures in 40 CFR 270.42(g).[4] These procedures require the submission of a Class 1 modification by the date on which the waste becomes subject to the new requirements (August 8, 1990). The regulations further specify a subsequent submission of a Class 2 or 3 permit modification request, if appropriate. EPA believes that a Class 1 submission is all that is required when a permit is simply being changed by substituting the F039 waste code for the multiple waste codes that are carried through with the leachate. (If a facility wants to make additional operation changes or introduce the leachate into units not previously permitted to manage the waste, then the appropriate modification procedures would apply before the activity can commence.)

As described more fully in section III.G. of this preamble, it will take some time for permit writers to incorporate specific land disposal restriction procedures into waste analysis plans (WAPs) at all facilities. For facilities that already have a permit, a permit modification will be required to incorporate new procedures in the WAP. Some commenters suggested that any changes to the WAP should be treated as a Class 1 modification. Using the existing permit modification regulations in 40 CFR 270.42, one could question whether it is most appropriate to apply the Class 1 procedures (intended for WAP changes to conform with Agency guidance or regulations, as specified in item B(2)(a) of appendix I), or whether the Class 2 process should be used (see item B(2)(b)). Presented with this question, and responding to commenters who desired an expeditious way to address the appropriate F039 waste analysis procedures, the Agency is today establishing a new Class 1 permit modification (with prior approval) for this purpose. (See item B(1)(b) in appendix I to 40 CFR 270.42.) EPA believes that this classification strikes the proper balance between a streamlined mechanism for upgrading the WAP for F039, while maintaining Agency oversight and approval of the proposal change. All persons on the facility mailing list will also be provided with notice that the facility has requested a change to its WAP (see 40 CFR 270.42(a)).

A few commenters suggested that the initial list of constitutents to be analyzed should not be the entire BDAT list, but rather, it should be a list of all the constituents associated with all the hazardous wastes that has been disposed of in the land disposal unit. Commenters suggested this approach is particularly appropriate for non-commercial facilities that have stable and well-defined waste streams that are land disposed. Indeed, such an approach is basically a case of a generator developing waste characterization information based on his knowledge of how the waste—in this case, leachate—was generated. The Agency believes this is a generally valid approach, and may be considered on a site-specific basis. As discussed in more detail in preamble section III.G., however, in most cases there is still a need for corroborative testing.

The Agency believes that in order to assure compliance with the land disposal restrictions, the following procedures should be followed by treatment, storage, and disposal facilities. First, obtain an initial analysis of all regulated constituents in F039. Based on the results of this analysis, and any other information that should be considered, develop a list of constituents to be analyzed on a regular frequency. This testing scheme should be supplemented with perhaps less frequent, broader analyses to make sure that changes in the composition of the leachate are detected.

This approach is suggested pending an opportunity for the Agency to prescribe the appropriate constituents for analysis and testing frequency for the facility. It is therefore recommended that interim status facilities incorporate such an approach into the WAPs that they maintain pursuant to 40 CFR 265.13.

For both permitted and interim status facilities, the Agency retains its authority (particularly where a revised WAP has *not* been Agency-approved) to determine that, based on an inspection or other information, the testing frequencies and/or protocols are inadequate at a particular facility. In such cases, EPA (or an authorized State) may take a number of actions, including, but not limited to, modifying a facility's permit or pursuing an enforcement action.

(5) *Treatment standards for multi-source leachate.* The F039 treatment standard being promulgated today is based on the data used in the development of the proposed standards, as will as on treatability data received just prior to publication of the proposed rule (see 54 FR 84863, referencing these data). Today's promulgated treatment standard regulates the entire BDAT list of constituents. More information on how the standards for each constituent were developed can be found in the Final BDAT Background Document for Organic U and P Wastes and Multi-Source Leachates (F039), available in the RCRA docket.

As was discussed earlier in section (1), some commenters suggested that multi-source leachate constituent standards should be based on treatability groups, so as not to trigger analysis of the whole BDAT list if the leachate was derived from only a few similar wastes. Other commenters suggested that multi-source leachate standards should be facility-specific. The Agency believes there is some merit to the concept of treatability groups for multi-source leachate, and acknowledges the need for site-specific considerations in implementing the treatment standard. However, the Agency believes that one set of wastewater and nonwastewater standards based on the BDAT list, implemented as stated above (with determination of constituents and frequency of monitoring left to the judgement of the permit writer) is a reasonable and appropriate way to regulate multi-source leachate.

Under the BDAT methodology for determining treatment standards, when the Agency does not have data for a constituent, data may be transferred from a structurally similar compound that is harder to treat and likely to be treated by the same technology. Such transfers use as a starting point constituents within the same treatability group. Frequently within a particular treatability group, constituents that can not be adequately analyzed (and for which methods of treatment are established as the treatment standard) are included in addition to those constituents for which numerical treatment standards are set. The constituent from which data are transferred to the other constituents in the treatability group is the surrogate for any constituents in that treatability group that cannot be analyzed. It is EPA's conclusion in the case of multi-source leachate, however, that establishing numerical treatment standards for each BDAT list

[4] EPA reiterates that the designation of the new waste code for multi-source leachate does not mean that such waste is newly identified or listed under RCRA. Rather, because some permits may restrict management to specified waste codes or types of wastes, it is appropriate to treat such modifications as if they were newly listed waste, as the waste code has been newly changed.

constituent obviates the need to specify methods of treatment for any constituent. In other words, the constituents on the BDAT list serve as surrogates for those constituents that may be present in the multi-source leachate that cannot be adequately analyzed. Several comments were received that agreed with this decision.

Most of the multi-source leachate nonwastewater treatment standards are based on a direct transfer of U and P nonwastewater treatment standards. The remaining organic and metal constituent treatment standards for multi-source leachate are based on treatment performance data transferred from D, F, and K wastes. For the most part, these treatment standards were confirmed as being achievable by performance data on the treatment of multi-source leachate that were received just prior to proposal (that were placed in the record for the proposed rule). These data were analyzed by EPA during the comment period, and were available for public comment and reply comment. The majority of these data show no difficulty in achieving the proposed multi-source leachate nonwastewater standards, most of which were based on incineration as BDAT.

There were other data for a small number of constituents, however, that showed difficulty in meeting the proposed standards. For example, the Agency received data just prior to proposal on the treatment of nonwastewater forms of multi-source leachate by sludge drying of a treatment residue from biological treatment. Many of these data supported the proposed standards; however, detection limits reported for some constituents in nonwastewater leachate indicated that treatment standards based on detection limit data from an incinerator ash matrix may not be routinely achievable. Therefore, data from analysis of the leachate matrix were used to calculate today's revised nonwastewater constituent treatment standards for disulfoton, famphur, parathion, phorate and methyl parathion.

Most of the wastewater constituent treatment standards were transferred from treatment data developed for various other EPA regulatory programs, and are based on data from numerous sources. (These data apply to the development of treatment standards for other wastewaters besides multi-source leachate. Further discussion of these data is presented in preamble section III.A.5.) Additional data were reviewed during the comment period, including data from a recently completed EPA study of wastewater treatment by wet air oxidation followed by PACT or activated carbon, as well as additional performance data from the treatment of multi-source leachate wastewaters which were received just prior to publication of the proposed rule. (These data were placed in the record for the proposed rule for public comment.)

Commenters stated that wastewater standards should not be based on wet air oxidation followed by PACT nor on scrubber water constituent concentrations. The commenters recommended that the Agency base the wastewater constituent standards on biological treatment performance data. The Agency agrees with the commenters that treatment standards normally should be based on wastewater treatment data rather than constituent concentrations in incinerator scrubber water. Therefore whenever the biological treatment performance data demonstrated substantial treatment and met BDAT QA/QC requirements, they were used to set today's revised wastewater constituent treatment standards.

Generally, data on wet air oxidation followed by PACT supported the proposed wastewater constituent treatment standards. In addition, most of the treatment data on multi-source leachate wastewaters show no problems achieving the proposed standards. Whenever multi-source leachate treatment data showed difficulty meeting the proposed standard, while at the same time showed substantial treatment of a constituent by a demonstrated, available technology, these data were used in developing today's revised numerical standards. (Details on the development or transfer of these wastewater standards per constituent can be found in the Final BDAT Background Document for Organic U and P Wastes and Multi-Source Leachates (F039), available in the RCRA docket.)

c. Multi-Source Leachate That Exhibits a Characteristic of Hazardous Waste

EPA is not promulgating separate standards for multi-source leachate that exhibits a characteristic of hazardous wastes. By proposing standards for all of the BDAT list constituents, all of the constituents and properties that define any particular characteristic will be addressed. This is consistent with the Agency's resolution of situations where prohibited listed wastes also exhibit a characteristic: the specific treatment standard for the listed waste controls because it is more specific, and in the case of the standard for multi-source leachate, addresses the constituent that causes the waste to exhibit the characteristic. Should multi-source leachate or its treatment residues exhibit a characteristic at the point of disposal, however, it must be treated to meet the treatment standard for that characteristic. Finally, if multi-source leachate simply exhibits a characteristic of hazardous waste without being derived from a listed waste, it is subject to the treatment standard for that characteristic.

d. Multi-Source Leachate Containing Dioxins and Furans

EPA proposed that the waste code carry-through principle should not apply to multi-source leachate derived, in part, from the disposal of listed dioxin-containing wastes. Consequently, the dioxin land disposal prohibition in RCRA section 3004(e) would not apply to such multi-source leachate (albeit the leachate remains within the ambit, at least, of the statutory hard hammer in RCRA section 3004(g)), and application of the management standards for acute hazardous wastes would not apply to multi-source leachate. Rather, EPA proposed to establish treatment standards for dioxins and furans as part of the standards for multi-source leachate (see 54 FR 48464–48465). This proposed approach was based primarily on analytical data demonstrating either non-detectable or very low levels of these constituents are present in the leachate (using analytical methods capable of analyzing orders of magnitude below the standard limit of detection of 1 ppb). *Id.*

All of the comments agreed with the Agency that multi-source leachate should not be classified under a listed dioxin waste code or prohibition. EPA is adopting this position in the final rule for the reasons stated in the proposal. In addition, the Agency notes that by classifying leachate that is derived from the listed dioxin waste codes, and no other hazardous waste, as single source leachate, the Agency is retaining the dioxin classification for the type of leachate most likely to be sufficiently contaminated with dioxins and furans to warrant the special status and scrutiny required for these wastes.

The final issue presented at proposal was whether the treatment standards for multi-source leachate should include a treatment standard for dioxins and furans, or whether a surrogate constituent could indicate treatment of these constitutents. The Agency examined all available multi-source leachate data and was unable to develop an adequate surrogate for dioxin (the Agency's efforts are

documented fully in the Response to BDAT-Related Comments Background Document). The Agency, therefore, is promulgating treatment standards for dioxins and furans in both the wastewater and nonwastewater forms of multi-source leachate.

e. Status of Multi-source Leachate that is Mixed with Other Prohibited Wastes

EPA reiterates that if another prohibited waste is mixed with multi-source leachate, that waste must still meet the treatment standard applicable to that waste. Thus, once the treatment standards for multi-source leachate become effective, if the treatment standard for any constituent in the prohibited waste is stricter than the standard for that constituent in multi-source leachate, then the entire mixture would have to meet that stricter standard (see § 268.41(b)). (Conversely, if the standard for multi-source leachate is stricter than for the non-leachate prohibited waste, the mixture would have to meet the standard for multi-source leachate.) *Id.* EPA is not reopening this 1986 regulation for review, but is restating that rule here in order to make sure that the regulated community realizes that §§ 268.41(b) and 268.43(b) apply.

A number of commenters stated that they would like to combine leachate from various parts of their plant in order to facilitate treatment. As stated in the preamble to the proposed rule (54 FR 48462), single-source leachate (i.e., leachate derived-from only one waste code such as might be expected from a monofill) cannot be combined to create multi-source leachate, and single-source leachate from separate facilities cannot be combined to create multi-source leachate (this is analogous to the principle that one ordinarily cannot dilute to create a new treatability group). The Agency agrees, however, that it is permissible to combine various multi-source leachate streams at one facility in order to facilitate treatment (so long as the treatment does not constitute land disposal).

It should be noted that at least for the short term, the status of mixtures of multi-source leachate and First Third prohibited wastes is controlled by a stay order entered by a panel of the District of Columbia Circuit Court of Appeals. The order states that "as to anything contaminated both by leachate and by other first-third prohibited wastes, the other wastes must, to the extent technically feasible, be treated to the applicable treatment standards. Prohibited wastes intentionally mixed with leachate for the purpose of avoiding applicable treatment standards remain subject to all of the First Third standards." Order of April 24, 1989 in *Chemical Waste Management* v. *EPA*, No. 88-1581.

As explained at 54 FR 26602 (June 23, 1989), EPA views any mixing of prohibited First Third wastes with leachate that occurs after the date of the stay order to be intentional mixing for the purpose of avoiding a First Third rule treatment standard. Certainly, any such mixing that occurs now—over 18 months after adopting the First Third rule—could be avoided and should not insulate the First Third waste from meeting the treatment standards. EPA in fact intends to move jointly with the petitioners in the case to lift this portion of the stay order. Until the order is lifted, however, EPA reiterates that any First Third prohibited waste mixed with multi-source leachate after the date of the stay order remains subject to the First Third treatment standards.

A final issue relating to mixtures is the status of groundwater that is contaminated with multi-source leachate. As EPA stated at proposal, such groundwater/multi-source leachate mixture is a hazardous waste so long as the multi-source leachate is contained in the groundwater (54 FR 48462). (See *Chemical Waste Management* v. *EPA*, 869 F. 2d at 1539-40, upholding the contained-in principle as a reasonable construction of the mixture and derived-from rules.) Thus, so long as the multi-source leachate is contained in the multi-source leachate/groundwater mixture, the mixture ordinarily would be prohibited from land disposal until treated to meet the treatment standards applicable to multi-source leachate. (During the period of a national capacity variance, the multi-source leachate/groundwater mixture would have to be managed in surface impoundments that satisfy the minimum technology standards if the mixture is managed in an impoundment (see § 268.5(h)(2)).)

BDAT TREATMENT STANDARDS FOR MULTI-SOURCE LEACHATE

[Nonwastewaters]

Regulated organic constituents	Maximum for any single grab sample, total composition (mg/kg)
Acetone	160
Acenaphthalene	3.4
Acenaphthene	4.0
Acetophenone	9.7
2-Acetylaminofluorene	140
Acrylonitrile	84
Aldrin	0.066
Aniline	14
Anthracene	4.0

BDAT TREATMENT STANDARDS FOR MULTI-SOURCE LEACHATE—Continued

[Nonwastewaters]

Regulated organic constituents	Maximum for any single grab sample, total composition (mg/kg)
Aroclor 1016	0.92
Aroclor 1221	0.92
Aroclor 1232	0.92
Aroclor 1242	0.92
Aroclor 1248	0.92
Aroclor 1254	1.8
Aroclor 1260	1.8
alpha-BHC	0.066
beta-BHC	0.066
delta-BHC	0.066
gamma-BHC	0.066
Benzene	36
Benzo (a) anthracene	8.2
Benzo (b) fluoranthene	3.4
Benzo (k) fluoranthene	3.4
Benzo (g, h, i) perylene	1.5
Benzo (a) pyrene	8.2
Bromodichloromethane	15
Bromoform	15
Brommomethane (methyl bromide)	15
4-Bromophenyl phenyl ether	15
n-Butanol	2.6
Butyl benzyl phthalate	7.9
2-sec-Butyl-4,6-dinitrophenol	2.5
Carbon tetrachloride	5.6
Chlordane	0.13
p-Chloroaniline	16
Chlorobenzene	5.7
Chlorodibromomethane	16
Chloroethane	6.0
bis-(2-Chloroethoxy) methane	7.2
bis-(2-Chloroethyl) ether	7.2
Chloroform	5.6
bis-(2-Chloroisopropyl) ether	7.2
p-Chloro-m-cresol	14
Chloromethane	33
2-Chloronaphthalene	5.6
2-Chlorophenol	5.7
3-Chloropropene	28
Chrysene	8.2
o-Cresol	5.6
Cresol (m- and p- isomers)	3.2
1, 2-Dibromo-3-Chloropropane	15
1, 2-Dibromoethane (Ethylene dibromide)	15
Dibromomethane	15
2, 4-Dichlorophenoxyacetic acid (2, 4-D)	10
o,p'-DDD	0.087
p,p'-DDD	0.087
o,p'-DDE	0.087
p,p'-DDE	0.087
o,p'-DDT	0.087
p,p'-DDT	0.087
Dibenzo(a,h) anthracene	8.2
m-Dichlorobenzene	6.2
o-Dichlorobenzene	6.2
p-Dichlorobenzene	6.2
Dichlorodifluoromethane	7.2
1,1-Dichloroethane	7.2
1,2-Dichloroethane	7.2
1,1-Dichloroethylene	33
trans-1,2-Dichloroethylene	33
2,4-Dichlorophenol	14
2,6-Dichlorophenol	14
1,2-dichloropropane	18
cis-1,3-Dichloropropene	18
trans-1,3-Dichloropropene	18
Dieldrin	0.13
Diethyl phthalate	28
2,4-Dimethyl phenol	14
Dimethyl phthalate	28

BDAT Treatment Standards for Multi-Source Leachate—Continued

[Nonwastewaters]

Regulated organic constituents	Maximum for any single grab sample, total composition (mg/kg)
Di-n-butyl phthalate	28
1,4-Dinitrobenzene	2.3
4,6-Dinitrocresol	160
2,4-Dinitrophenol	160
2,4-Dinitrotoluene	140
2,6-Dinitrotoluene	28
Di-n-octyl phthalate	28
Di-n-propylnitrosoamine	14
1,4-Dioxane	170
Disulfoton	6.2
Endosulfan I	0.066
Endosulfan II	0.13
Endosulfan sulfate	0.13
Endrin	0.13
Endrin Aldehyde	0.13
Ethyl acetate	33
Ethyl benzene	6.0
Ethyl ether	160
bis-(2-Ethylhexyl) phthalate	28
Ethyl methacrylate	160
Famphur	15
Fluoranthene	8.2
Fluorene	4.0
Fluorotrichloromethane	33
Heptachlor	0.066
Heptachlor epoxide	0.066
Hexachlorobenzene	37
Hexachlorobutadiene	28
Hexachlorocyclopentadiene	4.8
Hexachlorodibenzo-furans	0.001
Hexachlorodibenzo-p-dioxins	0.001
Hexachloroethane	28
Hexachloropropene	28
Indeno (1,2,3,-c,d) pyrene	8.2
Iodomethane	65
Isobutanol	170
Isodrin	0.066
Isosafrole	2.6
Kepone	0.13
Methacrylonitrile	84
Methapyrilene	1.5
Methoxychlor	0.18
3-Methylcholanthrene	15
4,4-Methylene-Bis-(2-chloroaniline)	35
Methylene chloride	33
Methyl ethyl ketone	36
Methyl isobutyl ketone	33
Methyl methacrylate	160
Methyl Parathion	4.6
Naphthalene	3.1
p-Nitroaniline	28
Nitrobenzene	14
5-Nitro-o-toluidine	28
4-Nitrophenol	29
N-Nitrosodiethylamine	28
N-Nitroso-di-n-butylamine	17
N-Nitrosomethylethylamine	2.3
N-Nitrosomorpholine	2.3
N-Nitrosopiperidine	35
N-Nitrosopyrrolidine	35
Parathion	4.6
Pentachlorobenzene	37
Pentachlorodibenzo-furans	0.001
Pentachlorodibenzo-p-dioxins	0.001
Pentachloronitrobenzene	4.8
Pentachlorophenol	7.4
Phenacetin	16
Phenanthrene	3.1
Phenol	6.2
Phorate	4.6
Propanenitrile	360
Pronamide	1.5

BDAT Treatment Standards for Multi-Source Leachate—Continued

[Nonwastewaters]

Regulated organic constituents	Maximum for any single grab sample, total composition (mg/kg)
Pyrene	8.2
Pyridine	16
Safrole	22
Silvex (2,4,5-TP)	7.9
2,4,5-T	7.9
1,2,4,5-Tetrachlorobenzene	19
Tetrachlorodibenzo-furans	0.001
Tetrachlorodibenzo-p-dioxins	0.001
1,1,1,2-Tetrachloroethane	42
1,1,2,2-Tetrachloroethane	42
Tetrachloroethylene	5.6
2,3,4,6-Tetrachlorophenol	37
Toluene	28
Toxaphene	1.3
1,2,4-Trichlorobenzene	19
1,1,1-Trichloroethane	5.6
1,1,2-Trichloroethane	5.6
Trichloroethylene	5.6
2,4,5-Trichlorophenol	37
2,4,6-Trichlorophenol	37
1,2,3-Trichloropropane	28
1,1,2-Trichloro-1,2,2-trifluoroethane	28
Vinyl chloride	33
Xylene(s)	28
Cyanides (Total)	1.8
Antimony	[1] 0.23
Arsenic	[1] 5.0 (EP)
Barium	[1] 52
Cadmium	[1] 0.066
Chromium (Total)	[1] 5.2
Lead	[1] 0.51
Mercury	[1] 0.025
Nickel	[1] 0.32
Selenium	[1] 5.7
Silver	[1] 0.072

[1] Maximum for any single grab sample; TCLP (mg/l).

BDAT Treatment Standards for Multi-Source Leachate

[Wastewaters]

Regulated organic and inorganic constituents	Maximum for any 24 hr. composite, total composition (mg/l)
Acetone	0.28
Acenaphthalene	.059
Acenaphthene	.059
Acetonitrile	.17
Acetophenone	.010
2-Acetylaminofluorene	.059
Acrylonitrile	.24
Aldrin	.021
4-Aminobiphenyl	.13
Aniline	.81
Anthracene	.059
Aroclor 1016	.013
Aroclor 1221	.014
Aroclor 1232	.013
Aroclor 1242	.017
Aroclor 1248	.013
Aroclor 1254	.014
Aroclor 1260	.014
alpha-BHC	.00014
beta-BHC	.00014
delta-BHC	.023

BDAT Treatment Standards for Multi-Source Leachate—Continued

[Wastewaters]

Regulated organic and inorganic constituents	Maximum for any 24 hr. composite, total composition (mg/l)
gamma-BHC	.0017
Benzene	.14
Benz (a) anthracene	.059
Benzo (a) pyrene	.061
Benzo (b) fluoranthene	.055
Benzo (g,h,i) perylene	.0055
Benzo (k) fluoranthene	.059
Bromodichloromethane	.35
Bromomethane	.11
4-Bromophenyl phenyl ether	.055
n-Butyl alcohol	5.6
Butyl benzyl phthalate	.017
2-sec-Butyl-4,6-dinitrophenol	.066
Carbon tetrachloride	.057
Carbon disulfide	.014
Chlordane	.0033
p-Chloroaniline	.46
Chlorobenzene	.057
Chlorobenzilate	.10
Chlorodibromomethane	.057
Chloroethane	.27
bis-(2-Chloroethoxy) methane	.036
bis-(2-Chloroethyl) ether	.033
2-Chloroethyl vinyl ether	.057
Chloroform	.046
bis-(2-Chloroisopropyl) ether	.055
p-Chloro-m-cresol	.018
Chloromethane (methyl chloride)	.19
2-Chloronaphthalene	.055
2-Chlorophenol	.044
3-Chloropropene	.036
Chrysene	.059
o-Cresol	.11
Cresol (m- and p- isomers)	.77
Cyclohexanone	.36
1,2-Dibromo-3-chloropropane	.11
1,2-Dibromoethane	.028
Dibromomethane	.11
2,4-Dichlorophenoxyacetic acid	.72
o,p'-DDD	.023
p,p'-DDD	.023
o,p'-DDE	.031
p,p'-DDE	.031
o,p'-DDT	.0039
p,p'-DDT	.0039
Dibenzo (a,h) anthracene	.055
m-Dichlorobenzene	.036
o-Dichlorobenzene	.088
p-Dichlorobenzene	.090
Dichlorodifluoromethane	.23
1,1-Dichloroethane	.059
1,2-Dichloroethane	.21
1,1-Dichloroethylene	.025
trans-1,2-Dichloroethene	.054
2,4-Dichlorophenol	.044
2,6-Dichlorophenol	.044
1,2-Diochloropropane	.85
cis-1,3-Dichloropropene	.036
trans-1,3-Dichloropropene	.036
Dieldrin	.017
Diethyl phthalate	.20
p-Dimethylaminoazobenzene	.13
2,4-Dimethyl phenol	.036
Dimethyl phthalate	.047
Di-n-butyl phthalate	.057
1,4-Dinitrobenzene	.32
4,6-Dinitrocresol	.28
2,4-Dinitrophenol	.12
2,4-Dinitrotoluene	.32
2,6-Dinitrotoluene	.55
Di-n-octyl phthalate	.017
Di-n-propylnitrosoamine	.40

BDAT TREATMENT STANDARDS FOR MULTI-SOURCE LEACHATE—Continued

[Wastewaters]

Regulated organic and inorganic constituents	Maximum for any 24 hr. composite, total composition (mg/l)
1,2-Diphenyl hydrazine	.087
1,4-Dioxane	.12
Disulfoton	.017
Endosulfan I	.023
Endosulfan II	.029
Endosulfan sulfate	.029
Endrin	.0028
Endrin aldehyde	.025
Ethyl acetate	.34
Ethyl benzene	.057
Ethyl cyanide	.24
Ethyl ether	.12
bis-(2-Ethylhexyl) phthalate	.28
Ethyl methacrylate	.14
Ethylene oxide	.12
Famphur	.017
Fluoranthene	.068
Fluorene	.059
Heptachlor	.0012
Heptachlor epoxide	.016
Hexachlorobenzene	.055
Hexachlorobutadiene	.055
Hexachlorocyclopentadiene	.057
Hexachlorodibenzo-furans	.000063
Hexachlorodibenzo-p-dioxins	.000063
Hexachloroethane	.055
Hexachloropropene	.035
Indeno (1,2,3,-c,d) pyrene	.0055
Iodomethane	.19
Isobutyl alcohol	5.6
Isodrin	.021
Isosafrole	.081
Kepone	.0011
Methacrylonitrile	.24
Methapyrilene	.081
Methoxychlor	.25
3-Methylchloanthrene	.0055
4,4-Methylene-bis-(2-chloroaniline)	.50
Methylene chloride	.089
Methyl ethyl ketone	.28
Methyl isobutyl ketone	.14
Methyl methacrylate	.14
Methyl methansulfonate	.018
Methyl Parathion	.014
Naphthalene	.059
2-Naphthylamine	.52
p-Nitroaniline	.028
Nitrobenzene	.068
5-Nitro-o-toluidine	.32
4-Nitrophenol	.12
N-Nitrosodiethylamine	.40
N-Nitroso-di-n-butylamine	.40
N-Nitrosomethylethylamine	.40
N-Nitrosomorpholine	.40
N-Nitrosopiperidine	.013
N-Nitrosopyrrolidine	.013
Parathion	.017
Pentachlorobenzene	.055
Pentachlorodibenzo-furans	.000035
Pentachlorodibenzo-p-dioxins	.000063
Pentachloronitrobenzene	.055
Pentachlorophenol	.089
Phenacetin	.081
Phenanthrene	.059
Phenol	.039
Phorate	.021
Pronamide	.093
Pyrene	.067
Pyridine	.014
Safrole	.081
Silvex (2,4,5-TP)	72
2,4,5-T	72

BDAT TREATMENT STANDARDS FOR MULTI-SOURCE LEACHATE—Continued

[Wastewaters]

Regulated organic and inorganic constituents	Maximum for any 24 hr. composite, total composition (mg/l)
1,2,4,5-Tetrachlorobenzene	.055
Tetrachlorodibenzo-furans	.000063
Tetrachlorodibenzo-p-dioxins	.000063
2,3,7,8-Tetrachlorodibenzo-p-dioxin	.000063
1,1,1,2-Tetrachloroethane	.057
1,1,2,2-Tetrachloroethane	.057
Tetrachloroethene	.056
2,3,4,6-Tetrachlorophenol	.030
Toluene	.080
Toxaphene	.0095
Tribromomethane (bromoform)	.63
1,2,4-Trichlorobenzene	.055
1,1,1-Trichloroethane	.054
1,1,2-Trichloroethane	.054
Trichloroethene	.054
Trichloromonofluoromethane	.020
2,4,5-Trichlorophenol	.18
2,4,6-Trichlorophenol	.035
1,2,3-Trichloropropane	.85
1,1,2-Trichloro-1,2,2-trifluoroethane	.057
Vinyl chloride	.27
Xylene(s)	.32
Fluoride	35
Sulfide	14
Antimony	1.9
Arsenic	5.0
Barium	1.2
Beryllium	.82
Cadmium	.20
Chromium (Total)	.37
Copper	1.3
Lead	.28
Mercury	.15
Nickel	.55
Selenium	.82
Silver	.29
Vanadium	.042
Zinc	1.0

7. Applicability of Treatment Standards to Soil and Debris

Soil and debris that are contaminated with prohibited wastes are subject to the land disposal restrictions and must meet the treatment standard for the contaminating waste prior to land disposal. The Agency realizes, however, that there are certain problems associated with regulating hazardous wastes in soil and debris matrices. It may be difficult to obtain a representative sample of the waste in order to determine the level of contaminant concentrations in soil and debris. Additionally, there are a wide variety of soil types, and wastes that may be classified as debris that may range in size from clay-sized particles to large contaminated tanks and buildings. Because of such problems, the Agency is preparing a separate rule-making that will establish treatability groups and treatment standards for contaminated soil and debris. Until contaminated soil and debris can be better organized into treatability groups, however, promulgated treatment standards apply. (The Agency is establishing certain debris subcategories in this final rule. See the discussion of treatment standards for certain characteristic metal wastes in section III.A.3.a.)

If the contaminated soil and debris cannot be treated to meet the promulgated treatment standards, alternative treatment standards can be established under a site-specific variance from the treatment standards (see 53 FR 31221, August 17, 1988) or a full-scale variance (40 CFR 268.44). Categorizing such contaminated soil and debris according to type, volume, form, and contaminant concentration poses several problems best resolved on a site-specific basis. In order to be granted a site-specific variance from the treatment standard, the petitioner must demonstrate to the Agency that because the physical (or chemical) properties of the waste differs significantly from the waste analyzed in developing the treatment standard, the waste cannot be treated to specified levels or by the specified methods (see 40 CFR 268.44).

At proposal, EPA solicited comment on the appropriate treatment standard for scrap metal destined for land disposal that is unavoidably contaminated with a listed hazardous waste (54 FR 48469). The problem potentially arises because scrap metal can itself contain the same metallic constitutents present in a listed waste. The Agency proposed that such scrap metal would not have to meet the treatment standard for the listed hazardous waste if it was unavoidably contaminated and the listed waste had been removed by rinsing or other demonstrated decontamination techniques. The Agency also noted the imprecision of these terms and the difficulties in developing an implementable approach. *Id.*

Most commenters supported the Agency's proposal, and some commentes urged the Agency to extend the same concept to other types of debris mixtures. Commenters were not able, however, to find satisfactory answers for the problems that EPA raised at proposal. It also appears that there are only isolated instances of scrap metal destined for land disposal being contaminated unavoidably with listed prohibited hazardous wastes. EPA consequently believes that the best way to deal with this situation at the present time is on an individualized basis through the § 268.44 treatability variance rather than in a general rule. (The Agency believes that one approacn for variance applicants to consider

would be a demonstration that all of the BDAT constitutents not common to both the scrap metal and the listed prohibited waste meet the treatment standards. In addition, it may be possible to remove common constituents to the level found in unadulterated scrap metal. In this way, the applicant could show compliance with as much of the treatment standard for the listed waste as is readily demonstrable.) As the Agency studies the whole issue of treatment standards for debris further, it may prove that such situations can be dealt with by rule, rather than on a case-by-case basis. At present, however, EPA believes that an individualized approach is preferable.

8. Radioactive Mixed Waste

Radioactive mixed wastes are those wastes that satisfy the definition of radioactive waste subject to the Atomic Energy Act (AEA) that also contain waste that is either listed as a hazardous waste in subpart D of 40 CFR part 261, or that exhibits any of the hazardous waste characteristics identified in subpart C of 40 CFR part 261. On July 3, 1986 (51 FR 4504), EPA determined that the hazardous portions of mixed wastes are subject to the RCRA regulations. This created a dual regulatory framework for mixed waste because the hazardous component is regulated under RCRA, and the radioactive component is regulated under the AEA.

Statutorily and administratively, management of the radioactive component of mixed wastes differs from that of the RCRA hazardous component. Although EPA may develop ambient health and environmental standards for the RCRA hazardous component, the specific standards for radioactive material management developed under the AEA are administered by the Department of Energy (DOE) for government owned facilities, and by the Nuclear Regulatory Commission (NRC) for commercially owned facilities.

Since the hazardous portions of the mixed waste are subject to RCRA, the land disposal restrictions apply to such waste. This means that the RCRA hazardous portion of all mixed waste must meet the appropriate treatment standards for all applicable waste codes before land disposal.

There are a number of potential problems presented by applying the land disposal restrictions to mixed waste relating to technical achievability of all of the proposed standards, as well as to whether treatment standards can be achieved consistently with requirements imposed pursuant to the AEA. These problems may be resolved by establishing specific treatment standards for certain mixed waste, as the Agency has done in this final rule. In addition, site-specific variances from the treatment standard (40 CFR 268.44) may be used to resolve such problems. If the treatment technologies determined to represent BDAT (and used to establish the treatment standards) are "inappropriate" due to the radioactive hazard of a mixed waste (i.e., requiring a different technology design), a demonstration may be made to this effect in a petition to the Agency for a site-specific variance from the promulgated treatment standard. If such a variance is granted, alternative treatment standards would be established (for the mixed waste at the site) that must be met prior to land disposal.

a. Characterization and Industries Affected

Based on information provided by generators of mixed wastes, the majority of mixed wastes can be divided into three categories based on the radioactive component of the waste: (1) Low-level wastes, (2) transuranic (TRU) wastes, and (3) high-level wastes. Low-level wastes include radioactive waste that is not classified as spent fuel from commercial nuclear power plants, or defense high-level radioactive waste from producing weapons. TRU wastes are those wastes containing elements with atomic numbers greater than 92, the atomic number for uranium. These wastes generally pose greater radioactivity hazards than the low-level wastes because they contain long-lived alpha radiation emitters. High-level radioactive wastes are defined as spent fuel from commercial nuclear power plants, and defense high-level radioactive waste from the production of weapons.

Mixed low-level wastes may be generated in several ways. For example, medical diagnostic procedures use scintillation fluids that contain small amounts of radioactivity in toxic organic solvents (e.g., xylene and toluene). These solvents generally pose a greater chemical hazard than does the low-level radioactivity. The principal generators of low-level mixed wastes are nuclear power plants, DOE, academic, and medical institutions.

One commenter submitted a list of substances generated at commercial nuclear power plants that may be classified as low-level mixed wastes. This included a wide variety of liquid organic wastes such as spent solvents containing suspended or dissolved radionuclides, scintillation cocktails, spent freon used for cleaning protective garments, acetone or solvents used for cleaning pipes or other equipment, and still bottoms from the distillation of freon. Also, the list included a wide variety of solid materials such as spent ion-exchange resins (contaminated with various metals), filters used in reclaiming freon, adsorbents, residues from the cleanup of spills, lead shields, lead-lined containers, welding rods, and batteries.

Military weapons production involves the generation of large amounts of wastes that can fall into the low-level and TRU categories of mixed waste. These wastes are similar in form, but TRU waste is considered by government regulators to be more dangerous because of the alpha radiation emitters.

High-level mixed wastes are extremely dangerous to handle due to their high level of radioactivity. The DOE is responsible for the storage and disposal of all the nation's high-level mixed wastes. High-level wastes are defined as the waste resulting from the reprocessing of irradiated fuel rods from commercial and military nuclear reactors. This reprocessing involves the handling of materials that are extremely hot both thermally and radiologically. One of the reprocessing steps involves dissolving the fuel rods in a nitric acid bath so that plutonium-239 and tritium can be recovered. It is the high-level waste generated from this reprocessing that is considered mixed waste and which requires treatment. DOE has indicated that this high-level waste is EP-toxic for several metals, including lead (D008), silver (D011), chromium (D007), barium (D005), and mercury (D009), and may also exhibit the characteristic of corrosivity (D002).

b. Applicable Technologies

The Agency believes that for treatment of metals in low-level mixed wastes and for some TRU mixed wastes containing low radioactive components, chemical precipitation will remove the metals in wastewaters, and stabilization technologies will reduce the leachability of the metal constituents in nonwastewater matrices. These are the same technologies that are applicable to nonradioactive wastes containing metals.

DOE submitted data demonstrating the applicability of stabilization as a treatment technology for the low-level waste fractions that are separated from the high-level waste generated during the reprocessing of fuel rods. As used by one particular facility, a stabilization process called grout stabilization involves blending commercially produced cement-based reagents with

the liquid low-level waste fraction. The material sets up as a solid mass, immobilizing the waste. The performance data indicate that stabilization provides immobilization of the characteristic metal constituents and radioactive contaminants for this low-level radioactive waste, and that it is possible to stabilize the RCRA hazardous portions to meet the treatment levels for the characteristic metals.

For organic low-level mixed wastes, the Agency believes that incineration is an applicable technology for organic compounds in both wastewater and nonwastewater matrices, and that technologies such as carbon adsorption can achieve removal of organics in wastewaters where incineration is not practical. DOE has submitted information indicating that plans are in place to begin incineration of a D001 ignitable liquid mixed waste containing benzene. Incineration is also an applicable technology for D001 Ignitable Liquids Subcategory nonradioactive wastes. Therefore, this particular mixed waste, if incinerated, would meet the treatment standard for D001 Ignitable Liquids Subcategory.

For TRU mixed wastes with considerable radioactive components, and for high-level wastes, EPA believes that vitrification is an applicable technology for treatment of both organic and inorganic constituents. DOE provided information to support that vitrification is an applicable technology for their high-level wastes generated from the reprocessing of fuel rods. Treatment can be accomplished by using either direct vitrification or a more complex treatment process which includes a series of chemical steps that separate the low-level radioactive waste fractions from the high-level radioactive waste. The high-level radioactive portion is then vitrified. When using separation technologies such as precipitation followed by settling or filtration, the bulk of the radioactivity can be incorporated into a high-level liquid waste containing up to 99 percent of the radioactivity of the original irradiated fuel rods. By separating high-level and low-level mixed wastes, the amount of high-level waste that may require vitrification treatment can be reduced.

DOE submitted specific data on how vitrification will be used to treat high-level mixed waste. As used in the facility design, the vitrification process will incorporate the high-level mixed waste into a glass matrix, achieving a reduction in the mobility of its RCRA hazardous and radioactive constituents. The waste will enter the vitrification system as a slurry (i.e., a blend of solid particles in a liquid base). The mixture will be pumped into a glass melter and heated so that the water is evaporated and the solid glass and waste particles melt and blend. After the mixture has been converted into molten glass, it will be poured into protective stainless steel canisters, where it will harden to form borosilicate glass. The canisters will then be capped and decontaminated and a second cap will be welded into place, forming an additional seal.

c. Determination of BDAT for Certain Mixed Wastes

In many cases, current practice or planned treatment will achieve the promulgated treatment standards for the RCRA hazardous wastes. For example, DOE generates radioactive zirconium fines that are pyrophoric under 40 CFR 261.21(a)(2) (i.e., that cause fire through friction). Consequently, the RCRA hazardous portion of this mixed waste is considered a characteristic ignitable waste included under the D001 Reactive Ignitable Subcategory by EPA. The Agency is promulgating "Deactivation as a Method of Treatment" as the treatment standard for D001 Ignitable Reactives Subcategory. The DOE submitted data which indicate that this waste can be stabilized to remove the characteristic, thereby achieving the treatment standard.

(1) *Treatment Standards for Mixed Wastes Not Otherwise Subcategorized.* The Agency is reiterating that as of the effective date of today's rule, all promulgated treatment standards for RCRA listed and characteristic wastes apply to the RCRA hazardous portion of mixed radioactive (high-level, TRU, and low-level) wastes, unless EPA has specifically established a separate treatability group for a specific category of mixed waste. In other words, unless specifically noted in §§ 268.41, 268.42, or 268.43 of today's rule, the standards located in these sections apply to all mixed wastes. (All alternative standards that are specifically discussed later in this section of the preamble that apply only to specific mixed wastes are identified in § 268.42 Table 3 of today's rule.) All handling requirements for radioactive materials set forth by the Nuclear Regulatory Commission must also be met.

(2) *Treatment Standards for Specific High-Level Wastes.* For most characteristic metal wastes, the Agency has determined that conventional stabilization is BDAT, and has developed treatment standards using stabilization performance data. The Agency does not believe, however, that stabilization using cementitious binders is an appropriate treatment for high-level radioactive mixed wastes generated specifically during the reprocessing of fuel rods. Such mixed wastes exhibit the characteristic of toxicity for certain RCRA hazardous metals (lead, chromium, barium, mercury, and silver). While stabilization would reduce the leaching potential of the characteristic metals, it would not provide treatment of the high-level radioactive portion of the mixed waste.

The Agency provided notice in the proposed rule (54 FR 48492) that DOE was providing to the Agency treatment data for mixed waste. These data were received and placed in the docket for the proposed rule and were available during the comment period for notice and public comment. The Agency analyzed these data and performed a subsequent site visit to the vitrification unit to assess the treatment process. Based upon these data and the site visit, the Agency has concluded that vitrification will provide effective immobilization of the inorganic constituents (i.e., both radioactive and RCRA hazardous) in high-level mixed waste generated during the reprocessing of fuel rods. The Agency is hereby specifying that vitrification is BDAT for these wastes.

The Agency lacks, however, performance data upon which to base a concentration-based standard for this mixed waste. Additionally, the Agency believes that the potential hazards associated with exposure to radioactivity during analysis of this high-level mixed waste preclude setting a concentration-based treatment standard. For these reasons, the Agency is promulgating "Vitrification of High Level Radioactive Waste as a Method of Treatment" as the treatment standard for the high-level fraction of the mixed waste generated during the reprocessing of fuel rods exhibiting the characteristics of corrosivity (D002) and toxicity for metals (D004–D011). (See § 268.42 Table 1 in today's rule for a detailed description of the technology standard referred to by the five letter technology code in the parentheses.)

BDAT TREATMENT STANDARDS FOR D002, D004, D005, D006, D007, D008, D009, D010, AND D011

[Radioactive high-level wastes generated during the reprocessing of fuel rods subcategory]

Vitrification of high-level radioactive waste (HLVIT) as a method of treatment

(3) *Treatment Standards for D008 Radioactive Lead Solids.* The Agency proposed to develop a subcategory within the D008 wastes and to establish separate treatment standards for specific radioactive lead solids (54 FR 48439). These lead solids were proposed to include, but not be limited to, all forms of lead shielding, lead "pigs", and other elemental forms of lead. The proposed treatment standard for these wastes was "Surface Deactivation or Removal of Radioactive Lead Portions Followed by Encapsulation; or Direct Encapsulation as Methods of Treatment."

The Agency received comments requesting that the Agency clarify what would be included in "lead solids" for purposes of meeting this treatment standard. To clarify this point, today's treatment standard applies to all forms of radioactive mixed waste containing elemental lead (including discarded equipment containing elemental lead that served a personnel- or equipment-shielding purpose prior to becoming a RCRA hazardous waste). These lead solids do not include treatment residuals such as hydroxide sludges, other wastewater treatment residuals, or incinerator ash that can undergo conventional pozzolanic stabilization, nor do they include organo-lead materials that can be incinerated and then stabilized as ash.

One commenter challenged the Agency's proposed approach, stating that the proposed method that included "Surface Deactivation" was not based on a demonstrated, available technology. The Agency has information indicating that the lead surface of a shield can be decontaminated using a number of commercially available processes. The Agency agrees, however, that these processes have not been adequately investigated to determine which may be considered "demonstrated" or "best". The Agency, therefore, is dropping "Surface Deactivation" from the final treatment standard.

The Agency is today promulgating a treatment standard expressed as a required method of treatment for the radioactive lead solids treatability group: "Macroencapsulation as a Method of Treatment" (MACRO). See § 268.42 Table 1 in today's rule for a detailed description of the technology standard referred to by the five letter technology code in the parentheses.) Pretreatment practices such as surface decontamination are not precluded by this final rule. Following pretreatment, any nonradioactive lead is subject to the treatment standard for characteristic lead wastes, 5.0 mg/l.

For low-level radioactive wastes containing lead, conventional stabilization technologies generally should not be affected by the presence of radioactive versus nonradioactive lead. As a result, the Agency is not including mixed wastes such as wastewater treatment residues and incinerator ash containing radioactive lead in a separate treatability group, except for the purpose of determining availability of treatment capacity (i.e., stabilization processes for radioactive materials should employ special safety precautions due to the radioactivity).

BDAT TREATMENT STANDARDS FOR D008

[Radioactive Lead Solids [a] Subcategory]

Macroencapsulation (MACRO) of radioactive lead solids as a method of treatment

[a] These lead solids include 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 organo-lead materials that can be incinerated and then stabilized as ash.

(4) *Treatment Standards for Mixed Waste Containing Elemental Mercury.* Elemental mercury is typically found in vacuum pumps and related manometers. In the nuclear industry, this form of mercury has been contaminated with radioactive tritium (a radio-isotope of hydrogen). These wastes are identified as D009 or U151 mixed wastes.

The Agency proposed a treatment standard for radioactive wastes containing elementary mercury expressed as a method of treatment, "Amalgamation with Zinc as a Method of Treatment" (54 FR 48442–48443). A separate treatability group was established because the proposed treatment standard for nonradioactive wastes of this type was "Roasting or Retorting as a Method of Treatment", and the Agency had no information indicating that these processes could separate the mercury from the radioactive material (i.e., tritium). The Agency based its proposed treatment standard for radioactive wastes containing elemental mercury on data involving the application of elemental zinc powder dampened with dilute sulfuric acid (5–10%) to form a mercury amalgam.

The Agency is promulgating this treatment standard as proposed. The Agency is convinced that amalgamation provides significant reduction in the air emissions of mercury, as well as provides a change in mobility from liquid mercury to a paste-like solid, and potentially reduces leachability. In response to comments stating that in addition to zinc, other inorganic reagents such as copper, nickel, gold, and sulfur were effective in forming mercury amalgamations, the required method, "Amalgamation" (AMLGM), may be accomplished using any of these reagents. (See § 268.42 Table 1 in today's rule for a detailed description of the technology standard referred to by the five letter technology code in the parentheses.) Roasting, retorting, or other recovery processes are not precluded from use by this standard as long as all residuals from these recovery processes comply with the amalgamation treatment standard prior to land disposal.

BDAT TREATMENT STANDARDS FOR D009 AND U151

[Radioactive elemental mercury subcategory]

Amalgamation (AMLGM) as a method of treatment

(5) *Treatment Standards for Mercury-Containing Hydraulic Oil Contaminated with Radioactive Materials.* The Agency proposed a treatment standard of "Incineration as a Method of Treatment with Incinerator Residues Meeting 0.2 mg/l" for D009 hydraulic oil contaminated with radioactive materials (54 FR 48443). This treatment standard was based on EPA's determination that a technology applicable to nonradioactive mercury wastes that contain high levels of organics was incineration. No comments were received on the proposed treatment standard. Upon reexamination of the proposed standard, however, the Agency is dropping the requirements that the treatment residues meet a specified level. This is consistent with the general land disposal restrictions policy that treatment residues resulting from the use of a required method of treatment are not required to also meet a concentration-based standard (see section III.A.1.b). Today's final treatment standard for D009 hydraulic oil contaminated with radioactive materials is "Incineration as a Method of Treatment" (INCIN). (See § 268.42 table 1 in today's rule for a detailed description of the technology standard referred to by the five letter technology code in the parentheses.)

BDAT TREATMENT STANDARDS FOR D009 [Mercury-containing hydraulic oil contaminated with radioactive materials subcategory]
Incineration (INCIN) as a method of treatment

9. Alternate Treatment Standards for Lab Packs

a. Background

The Agency received several comments in response to the Second Third proposed rule (54 FR 1056, January 11, 1989) on the regulatory status of lab packs. The commenters stated that lab packs are typically used by industry to dispose of small quantities of commercial chemical products (U and P wastes) and residues from analytical samples. These lab packs may contain hundreds of restricted wastes, and the applicable treatment standards must be achieved for each waste code contained in the lab pack. The commenters stated that these requirements pose an administrative burden that is incommensurate with the amount of waste being land disposed. In the Second Third final rule (54 FR 26594), the Agency restated its position that all restricted wastes placed in lab packs and land disposed must comply with the land disposal restrictions. However, the Agency solicited comments, data and specific suggestions to support treatment options for lab packs. As a result, the Agency proposed alternate treatment standards in the Third Third proposed rule (54 FR 48372, November 22, 1989), which generators would have the option of utilizing in managing "organic" and "inorganic" lab packs. The Agency received numerous comments in response to the proposal, and is today promulgating the alternate treatment standards with some revisions.

b. Alternate Treatment Standards

Many commenters suggested that EPA expand the universe of waste allowed in organic and inorganic lab packs. The Agency agrees with some of the information and suggestions provided by the commenters, and is promulgating revisions to the alternate treatment standards for lab packs in response to these comments. In order to facilitate implementation of the lab pack standards, the Agency is expanding the proposed list of waste codes in appendix IV to part 268 to include certain inorganic and organometallic hazardous wastes. The revised appendix IV includes the following hazardous wastes:

(1) Inorganic;

(2) Organometallic;

(3) Organic;

(4) D003 reactives; and

(5) D002 corrosives.

The Agency is promulgating an alternate treatment standard of incineration as a specified method followed by a requirement to meet the treatment standards for the EP toxic metals included in appendix IV (*i.e.*, D004–D008, and D010–D011; mercury wastes may not be included in appendix IV lab packs). Such lab packs are hereafter referred to as appendix IV lab packs.

The Agency is also revising the proposed appendix V to part 268, which now identifies organic hazardous wastes that can be effectively destroyed by incineration. The Agency is promulgating an alternate standard of incineration for lab packs containing organic hazardous wastes identified in appendix V to part 268, hereafter referred to as appendix V labpacks.

Generators may commingle unregulated (nonhazardous) waste in both appendix IV and appendix V lab packs. Generators may also commingle hazardous wastes that already meet the treatment standards in the appropriate appendix IV or V lab pack.

The Agency believes that the alternate approach being promulgated in today's final rule is broader in scope than the proposed approach and provides substantial administrative relief. It simplifies the management system for these wastes because owners/operators will not be required to analyze the treatment residue for compliance with individual treatment standards, except for the EP toxic metal constituents of organometallic, inorganic, D002 corrosive, and D003 reactive wastes where the waste codes are identified in appendix IV. As explained below, these waste streams must continue to meet all applicable treatment standards for the EP toxic metal constituents.

Generators who wish to use the alternate treatment standards for lab packs must notify the treatment facility in writing of the EPA Hazardous Waste Number(s) for each hazardous waste contained therein. Generators must submit such notices with each shipment of waste. Appendix V organic lab packs treated by the specified technology may be disposed of in subtitle C facilities without further testing or analysis for compliance with part 268. (The Agency reiterates, however, that owners/operators are responsible for determining whether all treatment residuals exhibit one or more of the characteristics of hazardous waste before land disposal, either by waste analysis or knowledge of the waste.)

The Agency notes that the alternate treatment standard is not mandatory, and does not preempt the requirements for lab packs in 40 CFR 264.316 and 265.316. Generators may continue to ship regulated waste that meets all applicable treatment standards to land disposal facilities in accordance with the provisions of these sections. Generators of lab packs who wish to comply with the current implementation of the land disposal restrictions regulatory framework (*i.e.*, waste code carry through) as it applies to lab packs are free to do so. Lab packs containing hazardous wastes other than those specified in appendices IV and V are not eligible for the alternate treatment standards, and must meet the applicable treatment standard for each waste contained in the lab pack.

c. Agency Response To Major Comments

The Agency received numerous public comments on the proposed standards for lab packs. In general, commenters agreed with the proposed approach; however, they provided recommendations for further relief from the administrative and technical requirements for lab packs. The issues raised by commenters are addressed in the preamble and background document to today's final rule.

(1) *Inorganic and Organometallic Lab Packs.* The Agency proposed an alternate treatment standard of stabilization with Portland cement in a 20 percent binder-to-waste ratio (by weight) for lab packs containing certain EP toxic metals. As proposed, the alternate treatment standard was narrowly defined to include only barium, cadmium, trivalent chromium, lead, and silver; therefore, the alternate treatment stardards were applicable primarily to those EP toxic characteristic wastes. Several commenters suggested that the Agency allow disposal of all hazardous and unregulated organic waste amenable to stabilization in inorganic lab packs. Several commenters suggested that EPA establish an alternate treatment standard of incineration followed by stabilization for organometallic wastes (including F and K waste codes for which EPA has promulgated treatment standards for metal constituents). The commenters stated that the organic constituents in these wastes are effectively destroyed by incineration, and stabilization of the remaining ash effectively reduces metals' leachability. The Agency agrees with the commenters

who stated that the alternate standard for inorganic hazardous waste disposed of in lab packs should be expanded, asnd that the treatment train proposed by the commenters may effectively treat certain organometallic wastes. The Agency believes that a more effective approach to managing inorganic and organometallic wastes would allow commingling of these wastes in an "organometallic" or "appendix IV lab pack." The alternate treatment standard of incineration followed by treatment to achieve the treatment standards for the EP toxic metals included in appendix IV will effectively destroy the organics and immobilize the metal constituents. The Agency, therefore, is not promulgating the alternate treatment standard for "inorganic lab packs" as proposed, but rather is promulgating an alternate standard for "organometallic" or "appendix IV lab packs."

The Agency is departing from its proposed approach for inorganic hazardous waste based on concern with specifying stabilization as a treatment standard for metallic waste streams with varying treatability with no requirement for verifying that stabilization of the hazardous constituents was effective. The Agency is also concerned that the proposed standard would create risks to worker health and safety due to the need for removal of inorganic waste from inner containers prior to stabilization with Portland cement. Several commenters claimed that such practices result in unnecessary exposure of treatment personnel, and increase the risk of accidents and resulting environmental exposure. The Agency was unaware of these safety and environmental concerns, and does not wish to increase the risks associated with treatment of these wastes.

Several commenters suggested that the Agency allow corrosive (D002) and reactive (D003) wastes in organic lab packs, while others requested that they be allowed in inorganic or organometallic lab packs. The commenters stated that industry experience with these wastes indicates that they can be effectively treated by incineration, and that recovery is not a cost-effective or practical method of treating these wastes. The Agency agrees in part with the commenters. Although Agency data show that some corrosive wastes can be incinerated effectively (54 FR 48422), many of these wastes contain metal constituents that may require further treatment. The Agency is concerned that incineration of metal-bearing wastes without verification may not be protective of human health and the environment. (Where the Agency specifies a technology as the treatment standard, treatment using the specified technology satisfies the land disposal restriction requirements, and analysis of the treatment residues is not required for purposes of complying with part 268.) The Agency, therefore, is prohibiting D002 corrosive and D003 reactive wastes from appendix V lab packs. Rather, the Agency believes that the alternate treatment standard for Appendix IV organometallic lab packs, which requires incinceration and treatment to meet certain EP toxic metal treatment standards, is more appropriate for D002 and D003 wastes because it requires incineration of organic constituents that may interfere with stabilization and verification that treatment of metals has occurred. The Agency, therefore, is including these waste codes in appendix IV to part 268. Generators may dispose of D002 and D003 wastes in an appendix IV (organometallic) lab pack along with other wastes identified in appendix IV, provided that the compatibility standards in §§ 264.316 and 265.316 are met.

The Agency wishes to clarify that where an appendix IV lab pack contains listed hazardous waste with waste code-specific treatment standards for inorganic constituents that are also EP toxic metals (§ 261.24) (within the same lab pack), the waste must be treated, at a minimum, to meet the EP toxic metal treatment standard. For example, an appendix IV lab pack may contain analytical samples of F006 waste (wastewater treatment sludges from electroplating operations) which has waste code-specific treatment standards for cadmium, chromium, lead and silver. These constituents are also EP toxic metals. In comparing the F006 treatment standards with the EP toxic metal treatment standards for these constituents, the F006 treatment standards for cadmium, lead, and silver are lower than their respective EP toxic metal treatment standards, while the F006 treatment standard for chromium is higher. The applicable alternate treatment standards for all of the metal constituents in this hypothetical analytic sample, at a minimum, would be the treatment standards for the EP toxic metals.

The Agency further wishes to clarify that where lab packs are combined with other non-lab pack hazardous wastes prior to or during treatment (e.g., prior to incineration), §§ 268.41 and 268.43(b) require that the entire mixture must be treated to meet the most stringent treatment standards applicable to the wastes included in the mixture. For example, ash residue resulting from the incineration of a lab pack containing an EP toxic characteristic lead waste together with non-lab pack K001 nonwastewaters (bottom sediment sludge from the treatment of wastewaters from wood preserving processes that use creosote and/or pentachlorophenol), would have overlapping treatment standards for lead: 0.51 mg/l for the K001 nonwastewater, and 5.0 mg/l for the characteristic waste. In this case, the more stringent treatment standard would apply, based on the mixture of the K001 waste with the lab pack containing an EP toxic metal constituent.

(2) *Unregulated (Nonhazardous) Waste.* In the proposed rule, the Agency stated its concern with the effect of unregulated inorganic wastes on treatment of lab pack wastes. Specific data on the type and quantity of unregulated inorganics destined for disposal in "organic" and "inorganic" lab packs were not available; therefore, the Agency was reluctant to allow disposal of these wastes in lab packs where analysis of the treatment residuals was not required.

The Agency received several comments stating that unregulated waste such as glassware is typically disposed of and incinerated with hazardous waste generated by laboratories. The commenters also stated that protective clothing and gear, such as goggles, gloves, aprons, respirator cartridges, and pesticide products are also disposed of in lab packs. The commenters argued that these unregulated wastes should also be allowed in lab packs because their presence does not affect the performance of incineration of hazardous waste.

The Agency also received comments indicating that the excessive cost of lab pack disposal discourages commingling of hazardous and unregulated wastes. Thus, in most cases, disposal of unregulated waste in lab packs is limited to small quantities. The Agency believes that these small quantities can be effectively treated under the alternate treatment standard, and is revising its proposed approach to allow generators to dispose of unregulated waste in appendix IV lab packs.

(3) *Organic Lab Packs.* The Agency proposed to limit the applicability of the alternate treatment standard to organic wastes that have a treatment standard based on the performance of incineration or thermal destruction, or

where incineration only is specified as the treatment standard.

Some commenters stated that there is no sound basis for excluding waste codes that already meet the treatment standards from disposal in their respective lab packs. The Agency is not opposed to extending the alternate standards to such waste, but was unaware that generators disposed of treated waste (or waste that initially meets the treatment standard) in this manner. Numerous commenters have expressed a desire to continue this practice; therefore, the Agency is revising the language in 40 CFR 268.42(c)(1) so that prohibited waste that meets the applicable treatment standards is not precluded from disposal utilizing the alternate treatment standards, provided that each waste code(s) is listed in appendix IV or appendix V, and the waste is disposed of in the appropriate lab pack.

Several commenters stated that incineration (or deactivation by incineration) of small quantities of reactive U and P wastes in lab packs is proven to be safe and effective. The commenters further point to the fact that EPA proposed deactivation, incineration, or thermal treatment for several U and P waste codes that are potentially reactive wastes, but failed to include the applicable waste codes in appendix IV. The Agency agrees with the commenters that small quantities of reactive U and P waste codes as specified in the proposed rule (54 FR 48427–48428) can be safely packaged and incinerated in a lab pack provided that the requirements for incompatible waste in §§ 264.316 and 265.316 are met. The Agency is therefore amending appendices IV and V to include several additional U and P wastes codes. The Agency also is including California list PCBs and dioxin-containing waste (F020–F023, F026–F028) in the lab pack treatability group as proposed, but reiterates that treatment of these wastes requires more stringent performance standards than wastes included in part 268 appendices IV and V (i.e., dioxins must achieve a destruction and removal efficiency of 99.9999 percent and PCBs must meet the technical standard in 40 CFR 761.70). Where generators choose to commingle one or both of these wastes with organic lab pack wastes listed in appendices IV and V, the entire lab pack must be incinerated to meet the more stringent standard. The following examples are provided for clarification:

(a) A lab pack containing dioxin-containing waste, California list PCBs and appendix V waste must be incinerated according to the technical standards of 40 CFR 761.70 and the applicable requirements of parts 264, 265, and 266 (including all applicable performance standards for dioxin-containing waste).

(b) A lab pack that contains only dioxin-containing waste (F020–23 and F026–28) *or* a mixture of dioxin-containing waste and organic hazardous waste codes listed in appendix V to part 268 must be incinerated according to the provisions in part 264 or 265 subpart O (including the applicable performance standards for dioxin-containing waste).

According to the provisions of today's final rule, generators may utilize the alternate treatment standards if their lab packs contain those wastes summarized below:

(a) "Appendix IV organometallic lab packs" may contain the following hazardous waste identified in appendix IV:

(1) Organometallic;
(2) Inorganic;
(3) Organic;
(4) D002 corrosives; and
(5) D003 reactives.

(b) "Appendix V organic lab packs" may contain only those organic hazardous wastes identified in appendix V.

Lab packs which contain any hazardous waste other than wastes listed in Appendix V are not appendix V organic lab packs, and may not use the alternate treatment standard.

d. Other Requirements

EPA proposed that generators or owners/operators who dispose of lab packs according to the alternate treatment standard must also meet the requirements for lab packs specified in 40 CFR 264.316 and 265.316. Several commenters expressed concern with the provision that requires metal outer containers (§ 264.316(b)) and § 265.316(b)), and pointed out that the original intent of these regulations was to ensure adequate containment for lab pack wastes that were being land disposed with or without prior treatment. The commenters further stated that lab packs destined for incineration are generally put in fiber packs that meet the Department of Transportation (DOT) requirements (49 CFR 173.12) and are suitable for incineration. The commenters requested that the Agency allow the continued use of fiber packs that meet applicable DOT requirements. The Agency does not wish to disrupt the use of fiber packs, and is amending §§ 264.316(b) and 265.316(b) to allow their continued use.

The Agency is promulgating its proposed approach with regard to generator notification requirements, and is requiring generators to list each EPA Hazardous Waste Code on a notification form and identify the applicable lab pack categories. Several commenters stated that the notification provision as proposed is burdensome. The Agency believes, however, that notification is necessary in order for owners/operators to verify that they are accepting for treatment only those waste codes covered under their permit. The Agency reiterates that the provisions promulgated in today's final rule do not supersede permit requirements under the RCRA hazardous waste program.

Generators or owners/operators who intend to utilize the applicable alternate treatment standard for hazardous waste codes listed in appendix IV and appendix V to part 268 must comply with the notification, certification, and recordkeeping requirements of 40 CFR 268.7(a) (7) and (8). They must also comply with the provisions in sections (a)(1), (a)(5), (a)(6), (b)(2) and (c). The Agency is requiring generators utilizing the alternate treatment standards to state whether the lab pack is an appendix IV or appendix V lab pack, and certify that hazardous wastes included therein are listed in the applicable appendix. The Agency emphasizes that lab packs containing hazardous wastes other than those listed in appendix IV and appendix V to part 268 are excluded from the alternate treatment standards for lab packs.

III.B Capacity Determinations

1. Determination of Alternative Capacity and Effective Dates for Surface-Disposed Wastes. Between May 8, 1990, when this rule was signed, and the date of its publication in the **Federal Register**, EPA discovered and corrected several discrepancies between the capacity variances discussed in the preamble and those included in the regulatory language. For details on those corrections, please contact those listed in the additional information section at the beginning of the preamble.

a. Total Quantity of Land-Disposed Wastes. The capacity analyses for wastes for which EPA is today finalizing treatment standards were conducted using the National Survey of Hazardous Waste Treatment, Storage, Disposal, and Recycling Facilities (the TSDR Survey). EPA conducted the TSDR Survey during 1987 and early 1988 to obtain comprehensive data on the nation's capacity for managing hazardous waste and on the volumes of hazardous waste being disposed of in or on the land in 1986 (i.e., land disposal).

Survey data are part of the record for this final rule.

Other major sources of data include the National Survey of Hazardous Waste Generators, conducted by EPA during 1988 and 1989. This survey includes data on waste generation, waste characterization, and hazardous waste treatment capacity in units exempt from RCRA permitting. These data are also part of the record for this final rule.

For mixed RCRA/radioactive wastes, EPA used data supplied by the U.S. Department of Energy. Low-level radioactive waste survey data from individual states and State compacts were also used, as were data summaries in several overview reports on mixed radioactive waste.

The various land disposal methods used in 1986 and the quantities of waste they handled (excluding mixed radioactive wastes) are presented in Table III.B.1.(a). The data indicate about 5.7 billion gallons of the wastes for which standards are being finalized today were disposed of in or on the land. This estimate includes 77 million gallons that were stored in waste piles for short-term storage purposes. These stored wastes will eventually be treated, recycled, or permanently disposed of in other units. To avoid double counting, the volumes of wastes reported as being stored in waste piles have not been included in the volumes of wastes requiring alternative treatment.

EPA estimates that about 22 million gallons of treatment residuals from minimum technology impoundments or from impoundments that were replaced by a tank (e.g., standard cement, steel tanks) will require alternative treatment. EPA assumes that these wastes are now being sent off-site for treatment. Consequently, this amount is included as treatment capacity required in today's rule.

TABLE III.B.1.(a)—VOLUME OF WASTES BY LAND DISPOSAL METHOD FOR WHICH STANDARDS ARE BEING FINALIZED

[millions of gallons/year]

Land disposal method	Volume
Storage:	
Waste piles	77
Surface impoundments	2
Treatment:	
Waste piles	30
Surface impoundments	22
Disposal:	
Landfills	349
Land treatment	81
Surface impoundments	52
Underground injected	5,086
Total	5,701

In addition, 30 million gallons of wastes were treated in waste piles, 52 million gallons were disposed of in surface impoundments, 430 million gallons were disposed of in land treatment units or landfills, and 5.1 billion gallons were injected underground. All of these wastes will require alternative treatment capacity.

EPA notes, however, that the TSDR Survey may overstate demand for treatment capcity for wastewaters that were treated or disposed of in surface impoundments at the time of the survey (1987 and early 1988). This overstatement is due to the requirement that impoundments receiving most hazardous wastes must now be retrofitted to meet minimum technology requirements, or taken out of service, as a result of RCRA section 3005(j). If an impoundment continues to operate after being retrofitted, it becomes a section 3005(j)(11) impoundment, provided that the wastewaters are treated and residues are removed annually. Wastewaters that are not treated or disposed of in surface disposal units, or that are treated in section 3005(j)(11) impoundments, do not create any demand for alternative commercial treatment capacity.

EPA solicited comments on those wastewaters currently disposed of in surface units that require alternative commercial treatment capacity. One commenter mentioned that EPA did not include volumes associated with surface impoundments awaiting closure. No commenter provided information on the volumes associated with these impoundments. Based on EPA's data, approximately ten percent of the surface impoundments that have submitted closure plans are awaiting closure plan approvals. EPA believes that most of these impoundments removed liquid hazardous wastes on or about November 8, 1988. EPA believes that the remaining volume of wastewaters in surface disposal units awaiting closure is small. Consequently, EPA did not include in the capacity analysis additional volumes associated with surface impoundments awaiting closure. (This discussion does not apply to wastewaters destined for deepwell disposal.)

EPA also requested comments on the quantity of RCRA P and U waste codes currently being disposed of in deepwells. The TSDR Survey data include some large-volume waste streams containing P and U RCRA codes. However, P and U wastes by definition are discarded off-specification products or residues and are usually generated in small volumes. Facilities disposing of these large-volume waste streams in deepwells have indicated that small volumes of P and U wastes were mixed with large volumes of other wastes, but the facilities were not able to provide a specific volume for the deepwell-disposed P and U wastes. Since the facilities generally described the volume of P and U wastes deepwell-disposed as "very small," EPA has assumed for the analysis of alternative treatment capacity that the national volume of P and U wastes needing alternative capacity is less than 100,000 gallons. EPA also requested comments on the assumption that the volumes of P and U wastes being deepwell-disposed are less than 100,000 gallons.

EPA received several comments concerning deepwell-injected P and U wastes. One commenter submitted data indicating that their facility disposed of 20,456 gallons of U wastes by deepwell injection in 1989. However, this commenter has received a no-migration petition approval and no alternative capacity is needed. One commenter indicated that EPA's methodology for determining actual P and U volumes was flawed, resulting in artificially low estimates, and believed that the true volume of these wastes was large enough to warrant a national capacity variance (3.3 million gallons at the commenter's facility alone). EPA has reviewed these data and agrees that the P and U volume at the second commenter's facility is much larger than previously assigned under the P and U methodology of 100,000 gallons. However, this volume has been determined to belong to a stream that is not a hazardous waste under Section 261.3(a)(2)(iv). The large volume of the stream does not reflect the volume of P and U wastes in the stream—which resulted from *de minimis* losses—but rather the total wastewater volume. This volume, therefore, does not require alternative treatment capacity. Consequently, EPA is not changing its P and U waste methodology and is not granting a national capacity variance to these wastes.

The following sections provide a summary of the capacity analysis for the

final rule. The detailed analyses are presented in the background document, and all data are included in the public docket.

b. Required Alternative Capacity for Surface-Disposed Wastes. EPA assessed the requirements resulting from today's final rule for alternative treatment capacity for surface-disposed wastes. Using primarily the TSDR and Generator Survey data, EPA first characterized the volumes of wastes for which treatment standards are being established. Waste streams were characterized on the basis of land disposal method, waste code, physical and chemical form, and waste characterization data. Using this information, EPA placed the wastes in treatability groups associated with applicable treatment technologies. The waste volumes were then summed by treatability group to determine the amount and type of alternative treatment capacity that would be required when owners or operators comply with the land disposal restrictions being finalized today.

Based on this analysis, EPA estimates that today's rule could affect about 5.7 billion gallons of wastes that are land-disposed annually. This total includes 77 million gallons in short-term storage, and 79 million gallons that already meet treatment standards or that can be treated on-site. Consequently, only about 5.5 billion gallons will require treatment to meet standards EPA is promulgating in today's rule. Of this total, 515 million gallons were surface-disposed (i.e., excluding underground injection), and the remaining 5 billion gallons were underground injected. (See Section 2 for determinations of alternative capacity and effective dates for wastes injected underground.) EPA estimates that treatment of these surface-disposed and deepwell-injected wastes will generate approximately 82 million gallons of residuals requiring treatment before land disposal.

The volumes of surface-disposed wastes by waste codes that require commercial treatment and/or recycling capacity to meet the standards that EPA is promulgating today are presented in Table III.B.1.(b). This table does not include waste volumes that can be treated on-site by the generator, nor does it contain volumes of mixed radioactive wastes.

As explained in section III.A of this preamble, EPA is finalizing treatment standards expressed either as concentration limits based on the performance of the BDAT, or as a specific treatment technology. When a treatment standard is expressed as a concentration limit, a specific treatment method is not required to achieve that concentration level. However, the BDAT (and comparable technologies), as discussed in Section III.A., were used as the basis for determining available capacity. When the treatment standard is expressed as a specific technology (rather than a concentration limit), that technology must be used.

The TSDR Survey contains data on specific treatment processes at facilities. The data enable EPA to identify specific BDAT treatment (and comparable treatment) in its assessment of both off-site and on-site capacity. Therefore, EPA believes that the capacity identified as available for a specific treatment technology will be capable of meeting the BDAT standard, which has been developed such that a well-designed and well-operated BDAT treatment process should be capable of meeting it.

In the proposed rule, EPA established criteria for differentiating between a liquid and a solid waste because of the variance for D001 sludges and solids. EPA requested comments on the proposed criteria, and during the public comment period received two comments requesting clarification of the sludge/solid definition. EPA also received several comments identifying additional sludge/solid incineration capacity. Commenters identified new units at existing facilities and increased capacity resulting from trial burns conducted after the 1986 survey. Based on an analysis of this information, EPA has determined that there is adequate capacity to incinerate D001 sludge/solid wastes. Consequently, EPA is not granting D001 sludge/solids a variance, and the criteria proposed for differentiating between a liquid and a solid are no longer necessary.

TABLE III.B.1.(b)—REQUIRED ALTERNATIVE COMMERCIAL TREATMENT/RECYCLING CAPACITY FOR SURFACE-DISPOSED WASTES

[million gallons/year]

Waste code	Capacity required for surface-disposed wastes
First Third Code:	
F006	20.3
F019	12.6
K004	0.1
K017	<0.1
K021	<0.1
K031	0.6
K035	<0.1
K048	37.1
K049	31.7
K050	11.8
K051	78.1
K052	12.5
K073	<0.1

TABLE III.B.1.(b)—REQUIRED ALTERNATIVE COMMERCIAL TREATMENT/RECYCLING CAPACITY FOR SURFACE-DISPOSED WASTES—Continued

[million gallons/year]

Waste code	Capacity required for surface-disposed wastes
K084	0.2
K085	<0.1
K106	0.5
P001	<0.1
P004	<0.1
P005	<0.1
P010	<0.1
P011	<0.1
P012	<0.1
P015	<0.1
P018	<0.1
P020	<0.1
P037	<0.1
P048	<0.1
P050	<0.1
P058	<0.1
P059	<0.1
P069	<0.1
P070	<0.1
P081	<0.1
P087	<0.1
P092	<0.1
P105	<0.1
P108	<0.1
P115	<0.1
P120	<0.1
P123	<0.1
U007	<0.1
U009	<0.1
U010	<0.1
U012	<0.1
U019	<0.1
U022	<0.1
U029	<0.1
U031	<0.1
U036	<0.1
U037	<0.1
U043	<0.1
U044	<0.1
U050	<0.1
U051	0.1
U061	<0.1
U066	<0.1
U067	<0.1
U077	<0.1
U078	<0.1
U103	<0.1
U105	<0.1
U108	<0.1
U122	<0.1
U129	<0.1
U133	<0.1
U134	<0.1
U151	<0.1
U154	<0.1
U158	0.3
U159	<0.1
U177	<0.1
U180	<0.1
U185	<0.1
U188	0.3
U192	<0.1
U209	<0.1
U210	<0.1
U211	<0.1
U219	<0.1
U220	0.1
U226	<0.1
U227	2.7
U228	<0.1

TABLE III.B.1.(b)—REQUIRED ALTERNATIVE COMMERCIAL TREATMENT/RECYCLING CAPACITY FOR SURFACE-DISPOSED WASTES—Continued

[million gallons/year]

Waste code	Capacity required for surface-disposed wastes
U237	<0.1
U238	<0.1
U248	<0.1
U249	<0.1
Second Third Code:	
F024	<0.1
K105	<0.1
P002	<0.1
P003	<0.1
P014	<0.1
P066	<0.1
P067	<0.1
U002	<0.1
U003	<0.1
U005	<0.1
U008	<0.1
U014	<0.1
U021	<0.1
U032	<0.1
U047	<0.1
U057	<0.1
U070	<0.1
U073	<0.1
U080	2.7
U083	<0.1
U092	<0.1
U093	<0.1
U101	<0.1
U106	<0.1
U109	<0.1
U114	<0.1
U116	<0.1
U119	<0.1
U127	<0.1
U131	0.1
U140	<0.1
U142	<0.1
U144	<0.1
U146	<0.1
U147	<0.1
U149	<0.1
U161	<0.1
U162	<0.1
U165	<0.1
U169	<0.1
U170	<0.1
U196	<0.1
U208	<0.1
U213	<0.1
U214	<0.1
U217	<0.1
U218	<0.1
U239	0.2
U244	<0.1
Third Third Code:	
D001	19.6
D002	25.6
D003	9.2
D004	12.8
D005	16.4
D006	16.3
D007	118.4
D008	73.0
D009	4.0
D010	2.0
D011	2.5
D012	0.5
D013	0.4
D014	1.9
D015	<0.1
D016	0 2

TABLE III.B.1.(b)—REQUIRED ALTERNATIVE COMMERCIAL TREATMENT/RECYCLING CAPACITY FOR SURFACE-DISPOSED WASTES—Continued

[million gallons/year]

Waste code	Capacity required for surface-disposed wastes
D017	0.4
F039 [1]	46.6
K002	0.2
K003	0.2
K005	0.1
K006	0.2
K069	<0.1
K083	<0.1
P006	<0.1
P022	<0.1
P024	<0.1
P028	<0.1
P031	<0.1
P047	<0.1
P051	<0.1
P064	<0.1
P073	<0.1
P075	<0.1
P077	<0.1
P088	<0.1
P093	<0.1
P119	<0.1
U001	<0.1
U004	<0.1
U006	<0.1
U017	<0.1
U030	<0.1
U039	<0.1
U048	<0.1
U052	<0.1
U055	0.2
U056	<0.1
U071	<0.1
U072	0.2
U075	<0.1
U076	<0.1
U079	<0.1
U081	<0.1
U082	<0.1
U112	<0.1
U117	<0.1
U118	<0.1
U120	<0.1
U121	<0.1
U123	<0.1
U125	<0.1
U126	<0.1
U148	<0.1
U156	<0.1
U167	<0.1
U181	<0.1
U182	<0.1
U201	<0.1
U202	<0.1
U204	<0.1
U225	<0.1
U234	<0.1
U240	<0.1
U247	<0.1

[1] Multi-source leachate.

c. Capacity Currently Available and Effective Dates. Table III.B.1.(c) presents an estimate for each treatment technology of the volumes of wastes that will require alternative treatment before land disposal to comply with the standards finalized today. The amount of capacity that is available at commercial facilities in each case is also presented. Available capacity was calculated using the TSDR Survey and other capacity data. Available capacity is equal to the specific treatment system's maximum capacity minus the amount used in 1986. In addition, the available capacity presented in this section was adjusted to account for wastes previously restricted from land disposal by subtracting the capacity required for land-disposed solvent wastes, First Third wastes, and Second Third wastes.

In general, Table III.B.1.(c) indicates that there is inadequate capacity for certain technologies: combustion of sludges and solids, mercury retorting, acid leaching followed by chemical precipitation, thermal recovery, and vitrification.

For combustion of sludges and solids, there is inadequate capacity for sludges and solids derived from treating multi-source leachate, for K048 through K052 nonwastewaters (temporarily), and soil and debris. (See section III.B.3 for a more detailed discussion.) However, there is adequate capacity for all other wastes needing combustion of sludges and solids. For mercury retorting, there is inadequate capacity for high mercury D009, K106, and U151 nonwastewaters. However there is adequate capacity for other wastes needing this technology. For acid leaching and chemical precipitation, there is insufficient capacity to treat low-mercury D009, K106, P065, P092, and U151 nonwastewaters. For thermal recovery, EPA has determined that there is insufficient capacity for P087 wastewaters and nonwastewaters. For vitrification, there is inadequate capacity for arsenic nonwastewaters.

It is important to note that some of the wastes, because of their actual physical form, cannot be treated to meet standards simply by using the technology identified as BDAT. These wastes must be treated through several steps, called a "treatment train." EPA assumes that the resultant residuals will also need to be treated using alternative technologies before land disposal; therefore, the total volumes reported were assigned to appropriate technologies.

The following sections discuss the results of the individual capacity analyses and effective dates for each waste code included in today's final rule. Table III.B.1.(d) summarizes all the surface-disposed wastes for which EPA is granting a two-year variance. The detailed basis for EPA's conclusions can be found in the capacity background document for this final rule.

TABLE III.B.1.(c)—AVAILABLE AND REQUIRED ALTERNATIVE COMMERCIAL TREATMENT (INCLUDING RECYCLING) CAPACITY FOR SURFACE-DISPOSED WASTES

[millions of gallons/yr. [1]

Technology	Available capacity	Required capacity	Variance
Acid leaching followed by chemical precipitation [2]	0	3	Yes
Alkaline chlorination	7	6	No
Alkaline chlorination followed by chemical precipitation	6	2	No
Biological treatment	47	<1	No
Biological treatment followed by chemical precipitation	14	<1	No
Chemical oxidation followed by chemical precipitation	28	7	No
Chemical oxidation followed by chromium reduction and chemical precipitation	2	2	No
Chemical precipitation	339	25	No
Chromium reduction followed by chemical precipitation	96	85	No
Combustion of liquids	237	16	No
Combustion of sludges/solids	41	[4] 213	Yes
Mercury retorting	<1	3	Yes
Neutralization	36	22	No
Secondary lead smelting	37	2	No
Stabilization	478	158	No
Thermal recovery [3]	0	<1	Yes
Thermal recovery of cadmium batteries	<1	<1	No
Vitrification	0	22	Yes

[1] This table does not include mixed radioactive wastes, which are receiving a national capacity variance for all applicable treatment technologies.
[2] EPA has insufficient data to differentiate between low and high mercury nonwastewaters. Consequently, EPA conducted a worst-case analysis and assigned all nonwastewater volumes to both the high concentration and low concentration technologies (i.e., mercury retorting and acid leaching followed by chemical precipitation, respectively). EPA had no data on commercial acid leaching and chemical precipitation capacity and believes there is insufficient capacity to treat these low mercury nonwastewaters.
[3] Excluding secondary smelting of lead wastes.
[4] For further clarification of this number, see the discussion on K048–K052.

TABLE III.B.1.(d)—SUMMARY OF NATIONAL CAPACITY VARIANCES FOR SURFACE-DISPOSED WASTES [1]

Required alternative treatment technology	Waste code/Physical form
Acid leaching and chemical precipitation.	D009 Low mercury nonwastewater.
	K106 Low mercury nonwastewater.
	P065 Low mercury nonwastewater.
	P092 Low mercury nonwastewater.
	U151 Low mercury nonwastewater.
Combustion of sludge/solids.	F039 [2] Nonwastewater.
	K048 [3] Nonwastewater.
	K049 [3] Nonwastewater.
	K050 [3] Nonwastewater.
	K051 [3] Nonwastewater.
	K052 [3] Nonwastewater.
Mercury retorting	D009 High mercury nonwastewater.
	K106 High mercury nonwastewater.
	P065 High mercury nonwastewater.
	P092 High mercury nonwastewater.
	U151 High mercury nonwastewater.
Secondary smelting storage area.	D008 Lead materials before secondary smelting.
Thermal recovery	P087 Nonwastewater/wastewater.
Vitrification	D004 Nonwastewater.
	K031 Nonwastewater.
	K084 Nonwastewater.
	K101 Nonwastewater.
	K102 Nonwastewater.
	P010 Nonwastewater.
	P011 Nonwastewater.
	P012 Nonwastewater.
	P036 Nonwastewater.
	P038 Nonwastewater.
	U136 Nonwastewater.

[1] EPA is granting these wastes a two-year national capacity variance, except for K048–K052 nonwastewaters. This table does not include mixed radioactive wastes, which are receiving a national capacity variance for all applicable treatment technologies.
[2] Multi-source leachate.
[3] For K048–K052 petroleum-refining nonwastewaters, EPA is granting only a 6 month variance.

(1) *Ignitable, Corrosive, Reactive, and EP Toxic Halogenated Pesticide Characteristic Wastes.* This group includes ignitable characteristic wastes (D001), corrosive characteristic wastes (D002), reactive characteristic wastes (D003), and EP toxic halogenated pesticides (D012, D013, D014, D015, D016, and D017).

(a) Ignitable Characteristic Wastes (D001). EPA has identified four subcategories for D001 wastes: ignitable liquids, ignitable reactives, oxidizers, and ignitable compressed gases. EPA has determined that the D001 ignitable liquids subcategory should be divided into three treatability groups: (1) D001 ignitable liquid nonwastewaters with a TOC content greater or equal to ten percent, (2) D001 ignitable liquid nonwastewaters with a TOC content greater than one percent but less than ten percent, and (3) D001 ignitable liquid wastewaters. EPA is promulgating deactivation as the method of treatment for ignitable liquids nonwastewaters with a TOC content less than ten percent. For ignitable liquids nonwastewaters with a TOC content greater than or equal to 10 percent, EPA is promulgating incineration, fuel substitution, or recovery as methods of treatment. EPA is promulgating deactivation as the method of treatment for D001 ignitable liquids wastewaters. For capacity analysis purposes, EPA assigned volumes of these wastes to incineration. Sufficient treatment capacity exists for the D001 ignitable liquids wastes destined for surface disposal; therefore, no capacity variance is being granted for them.

EPA requested comments on availability of capacity for incineration of D001 liquids mixed with sludges and solids. Several commenters stated that adequate capacity exists to treat D001 liquids mixed with sludges and solids, and therefore, that no capacity variance should be granted to these wastes. Based on the review of available sludges and solids treatment capacity

data for incineration and cement kilns, EPA has determined that adequate capacity exists to treat surface-disposed D001 liquids wastes. Therefore, EPA is not granting a national capacity variance for these wastes.

EPA is promulgating deactivation as the method of treatment for D001 ignitable reactives and oxidizers. EPA has determined that sufficient capacity exists for these wastes; therefore, EPA is not granting a national capacity variance for them.

For D001 ignitable compressed gases, EPA is promulgating deactivation as the method of treatment. EPA has determined that adequate capacity exists for these wastes; therefore, EPA is not granting a national capacity variance for them.

(b) Corrosive Characteristic Wastes (D002). EPA has identified three treatability groups for D002 wastes: acids, alkalines, and other corrosives. EPA is promulgating deactivation, which includes neutralization, as the method of treatment for the D002 acid and alkaline subcategories. In addition, recovery of acids or bases is included as an option for these standards. By definition, wastes in these subcategories are liquids; therefore based on the limited number of surface impoundments that meet minimum technology requirements and the ban on liquids in landfills, EPA believes that few, if any, of these wastes are surface-disposed. For the capacity analysis, EPA assigned all D002 wastes to neutralization. EPA has determined that sufficient neutralization capacity does exist for acid and alkaline D002 wastes that are surface-disposed; therefore, EPA is not granting a national capacity variance for them.

For the D002 other corrosives category, EPA is promulgating deactivation as the method of treatment. These wastes can be deactivated using chemical reagents or by other means. In addition, EPA believes that these wastes are generated in low volumes. Therefore, EPA is not granting a national capacity variance for them.

(c) Reactive Characteristic Wastes (D003). For D003 wastes, EPA has identified five treatability groups: reactive cyanides, explosives, water reactives, reactive sulfides, and other reactives. For D003 cyanides, EPA is promulgating concentration standards based on alkaline chlorination, wet-air oxidation, or electrolytic oxidation. Although reactive cyanides account for the majority of D003 generated wastes, EPA believes that most are already restricted from landfills by existing regulations (40 CFR Part 264.312, 265.312). EPA believes that sufficient capacity does exist for the volume of surface-disposed D003 cyanide reactive wastes; therefore, EPA is not granting a national capacity variance for them.

For D003 reactive sulfides, EPA is promulgating deactivation as the method of treatment, which includes chemical oxidation. EPA believes sufficient capacity does exist for the volume of surface-disposed D003 sulfide wastes; therefore, EPA is not granting a national capacity variance for them.

For D003 explosive wastes, EPA is promulgating deactivation as the method of treatment. Because most of these wastes are already restricted from land disposal by existing regulations and are commonly burned and/or detonated, EPA is not granting a national capacity variance for them.

For D003 water-reactive wastes, EPA is promulgating deactivation as the method of treatment. EPA believes that these wastes are generated sporadically and in low volumes and are not typically land-disposed. Therefore, EPA is not granting a national capacity variance for them.

For other reactive D003 wastes, EPA promulgating deactivation as the method of treatment. EPA believes these wastes could be incinerated or detonated openly and that there is adequate capacity for treating the small volumes that are surface-disposed. Therefore, EPA is not granting a national capacity variance for them.

(d) EP Toxic Halogenated Pesticide Wastes.

D012—Characteristic of EP Toxic for Endrin
D013—Characteristic of EP Toxic for Lindane
D014—Characteristic of EP Toxic for Methoxychlor
D015—Characteristic of EP Toxic for Toxaphene
D016—Characteristic of EP Toxic for 2,4–D
D017—Characteristic of EP Toxic for 2,4,5-TP

For these EP toxic halogenated pesticide nonwastewaters, EPA is promulgating concentration standards based on incineration. For D012 and D015 wastewaters, EPA is promulgating incineration or biological treatment as methods of treatment; for D013 wastewaters, EPA has set incineration or carbon adsorption as methods of treatment; for D014 wastewaters, EPA is promulgating incineration or wet-air oxidation as methods of treatment; for D016 and D017 wastewaters, EPA has set incineration or chemical oxidation as methods of treatment. EPA has also set biodegradation as an alternate method of treatment for D016 nonwastewaters. EPA has determined that sufficient treatment capacity exists for these wastes; therefore, EPA is not granting EP toxic pesticide wastewaters and nonwastewaters a national capacity variance.

(2) *Metal Wastes.* This group includes arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver, thallium, and vanadium wastes.

(a) Arsenic Wastes

D004—EP Toxic for arsenic
K031—By-product salts genrated in the production of MSMA and cacodylic acid
K084—Wastewater treatment sludges generated during the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds
K101—Distillation tar residues from the distillation of aniline-based compounds in the production of verterinary pharmaceuticals from arsenic or organo-arsenic compounds
K102—Residues from the use of activated carbon for decolorization in the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds
P010—Arsenic acid
P011—Arsenic (V) oxide
P012—Arsenic (III) oxide
P036—Dichlorophenylarsine
P038—Diethylarsine
U136—Cacodylic acid

For arsenic nonwastewaters, EPA is promulgating concentration standards based on vitrification. EPA has determined that for some arsenic nonwastewaters the standards can be met with chemical or thermal oxidation to the arsenate form followed by chemical precipitation with iron salts followed by arsenic stabilization of the precipitate. This technology may be inappropriate for all arsenic nonwastewaters because organics are known to interfere with the stabilization process. EPA believes vitrification will work for all forms of arsenic nonwastewaters, because high temperatures are expected to destroy the organo-metallic bonds, and therefore, its performance is not limited by the presence of organics. Thus, EPA has assigned arsenic nonwastewaters to vitrification for the capacity analysis. The TSDR Survey indicates that no commercial vitrification capacity exists. EPA requested information on commercial vitrification capacity, but received no comments demonstrating that this type of capacity exists. Therfore, EPA is granting a two-year capacity variance to the surface-disposed arsenic nonwastewaters listed above.

For arsenic wastewaters, EPA is promulgating concentration standards based on chemical precipitation. The TSDR Survey and other capacity data indicate that adequate chemical precipitation capacity exists: therefore,

EPA is not granting arsenic wastewaters a capacity variance.

(b) Barium Wastes. For D005 and P013 wastewaters, EPA is promulgating concentration standards based on chemical precipitation; for D005 and P013 (except as indicated below) nonwastewaters, EPA is promulgating concentration standards based on stabilization.

For P013 nonwastewaters with high levels of organics, EPA is requiring that these wastes be incinerated prior to stabilization. Sufficient capacity exists to treat surface-disposed D005 and P013 wastes. Therefore, EPA is not granting a national capacity variance for them.

(c) Cadmium Wastes. For D006 wastes, EPA is promulgating treatment standards for three categories: wastewaters, nonwastewaters, and cadmium batteries.

For D006 wastewaters, EPA is promulgating concentration standards based on chemical precipitation. For D006 nonwastewaters, EPA is promulgating concentration standards based on stabilization or metal recovery. EPA believes that sufficient capacity exists to treat surface-disposed cadmium nonwastewaters and wastewaters. Therefore, EPA is not granting a national capacity variance for them.

For D006 cadmium batteries, EPA is promulgating thermal recovery as the method of treatment. In the proposed rule, EPA proposed granting D006 cadmium batteries a national capacity variance due to a lack of identified recovery capacity. During the public comment period, two commenters identified available commercial cadmium battery recovery capacity (these comments were available for reply comments). EPA contacted these commenters to verify their capacity. Based on these contacts, EPA received additional information and determined that adequate capacity for treating surface-disposed cadmium batteries exists. Therefore, EPA is not granting D006 cadmium batteries a national capacity variance.

(d) Chromium Wastes. For D007 chromium and U032 (calcium chromate) wastewaters, EPA is promulgating concentration standards based on chromium reduction followed by chemical precipitation; for D007 and U032 nonwastewaters, EPA is promulgating concentration standards based on chromium reduction followed by stabilization. EPA believes sufficient treatment capacity exists for the volume of these wastes. Therefore, EPA is not granting a national capacity variance for them.

(e) Lead Wastes.

D008—EP toxic for lead
P110—Tetraethyl lead
U144—Lead acetate
U145—Lead phosphate
U146—Lead subacetate
K069—Emission control dust/sludge from secondary lead smelting
K100—Waste leaching solution from acid leaching of emission control dust/sludge from secondary lead smelting

For D008 wastes, EPA is promulgating standards for three categories: nonwastewaters, wastewaters, and lead-acid batteries. For D008 nonwastewater lead wastes, EPA is promulgating concentration standards based on stabilization, except where the waste contains significant concentrations of organics. In this case, these wastes may need to be incinerated prior to stabilization. For D008 wastewaters, EPA is promulgating concentration standards based on chemical precipitation. EPA believes sufficient capacity exists for surface-disposed D008 wastewaters and nonwastewaters. Therefore, EPA is not granting a national capacity variance for D008 wastewaters and nonwastewaters, with the exceptions noted below.

EPA is promulgating thermal recovery as the method of treatment for lead-acid batteries. Secondary lead smelters have stated that they store these wastes in piles prior to recovery. EPA has indicated in a previous rulemaking that the shells surrounding lead-acid batteries are considered to be storage containers (see 47 FR 12318 and 40 CFR 264.314(f)(3)). Therefore, to the extent that lead-acid battery storage meets all the requirements of the LDR storage prohibitions at 40 CFR 268.50, such storage is permissible.

In the proposed rule, EPA solicited comments on the management of other D008 lead material at secondary smelters. EPA also indicated that storage of lead materials in waste piles prior to smelting is a form of land disposal, and as such these staging areas are subject to the statutory prohibitions. During the public comment period, EPA received several comments from the secondary lead smelting industry regarding the storage of battery parts prior to smelting. Several commenters expressed concern that EPA's determination that staging piles are a form of land-disposal could force them to close or operate out of compliance while staging piles are replaced by tanks (assuming tank storage is viable). As a result of these comments, EPA contacted several secondary smelters to asses the potential capacity impact of required staging area reconstruction. Because of the large volume of batteries currently processed at smelting facilities whose continued storage operation remains in question, EPA is granting a two-year national capacity variance to allow storage of the batteries preceding smelting. EPA is also reconsidering whether certain forms of battery parts storage meet the meaning of "land disposal" under section 3004(k). In particular, if battery parts (or other wastes) are stored in 3-sided tank-like devices on concrete inside buildings (the present storage method of some secondary lead smelters) the Agency is not certain that the language and policies underlying section 3004(k) warrant designating such practice as "land disposal." Given the two-year national capacity variance in this rule, however, the Agency need not make a final decision on this point in this rulemaking.

For P110, U144, U145, and U146 wastes, EPA is promulgating concentration standards based on chemical oxidation followed by chemical precipitation for wastewaters, and stabilization for nonwastewaters. P110, U144, U145, and U146 nonwastewaters containing significant concentrations of organics may require incineration prior to stabilization. EPA believes sufficient capacity exists for the small volume of these wastes that are surface-disposed; therefore, EPA is not granting a national capacity variance for them.

EPA is revoking the no land disposal standard based on recycling standard promulgated in the First Third rule for the non-calcium sulfate subcategory for K069 nonwastewaters. For K069 calcium sulfate nonwastewaters, EPA is promulgating concentration standards based on stabilization. For K069 non-calcium sulfate nonwastewaters, EPA is promulgating recycling as the method of treatment. For K069 wastewaters, EPA is promulgating concentration standards based on chemical precipitation. EPA believes adequate capacity exists to treat the volume of surface-disposed K069 wastewaters and nonwastewaters; therefore, EPA is not granting a capacity variance for them.

For K100 nonwastewaters, EPA is revoking the no land disposal standard based on the "no generation standards" promulgated in the First Third rule. Today, EPA is promulgating concentration standards based on stabilization for the nonwastewaters and chemical precipitation for the wastewaters. EPA believes adequate capacity exists to treat the volume of surface-disposed K100 wastes. Therefore, EPA is not granting a capacity variance for them.

(f) Mercury Wastes.

D009—EP toxic for mercury
K071—Brine purification muds from the mercury cell process in chlorine production, where separately repurified brine is not used
K106—Wastewater treatment sludges from the mercury cell process in chlorine production
P065—Mercury fulminate
P092—Phenylmercuric acetate
U151—Mercury

For D009, K106, and U151 wastewaters, EPA is promulgating concentration standards based on chemical precipitation. For P065 and P092 wastewaters, EPA is promulgating concentration standards based on chemical oxidation followed by chemical precipitation. K071 wastewater standards were promulgated in the First Third rule and remain unchanged. It should be noted that mercury-bearing wastewaters containing hexavalent chromium may require chromium reduction prior to treatment of the mercury. Likewise, wastewaters containing organics may require chemical oxidation prior to treatment of the mercury.

For mercury nonwastewaters, EPA is establishing low mercury and high mercury subcategories. For the high mercury subcategory (greater than or equal to 260 mg/kg), EPA is promulgating roasting or retorting as methods of treatment for D009, K106, and U151 nonwastewaters. For the high mercury subcategory of P065 and P092 nonwastewaters, EPA is promulgating incineration followed by roasting or retorting as the method of treatment. For the low mercury subcategory of D009, K106, P065, P092, and U151 nonwastewaters, EPA is promulgating concentration standards based on acid leaching and chemical precipitation.

Treatment standards for K071 nonwastewaters were originally promulgated in the First Third rule. In the proposed Third Third rule, EPA proposed to revise the standards for K071 nonwastewaters with a high mercury content. For this high mercury subcategory, EPA proposed roasting or retorting as methods of treatment. For the final rule, EPA is not adopting the proposed revisions to K071 wastes, and the promulgated First Third BDAT remains unchanged.

EPA believes sufficient capacity exists to treat the volume of all surface-disposed mercury wastewaters. Therefore, EPA is not granting a national capacity variance for them. Because current data do not provide sufficient information on the volume of nonwastewaters that contain high and low concentrations of mercury, EPA conducted a worst-case analysis and assigned all volumes of surface disposed mercury nonwastewaters to both mercury retorting and acid leaching followed by chemical precipitation. EPA has identified a small amount of commercial mercury retorting capacity (16,000 gallons). There is insufficient mercury retorting capacity for D009, K106, and U151 nonwastewaters. Due to the sporadic generation rate of P wastes from year to year and the small amount of available commercial mercury retorting capacity, EPA is granting all high mercury nonwastewaters a two-year national capacity variance. EPA has also determined that there is insufficient commercial capacity for acid leaching followed by chemical precipitation; therefore, EPA is granting low mercury D009, K106, P065, P092, and U151 nonwastewaters a national capacity variance.

(g) Selenium wastes.

D010—EP Toxic for selenium
P103—Selenourea
P114—Thallium selenite
U204—Selenious acid
U205—Selenium disulfide

For selenium nonwastewaters, EPA is promulgating concentration standards based on stabilization. EPA has also determined that vitrification or recovery may be used to reach the standards. The TSDR Survey and other capacity data indicate that adequate stabilization capacity exists. Therefore, EPA is not granting selenium nonwastewaters a national capacity variance.

For selenium wastewaters, EPA is promulgating concentration standards based on chemical precipitation. The TSDR Survey and other capacity data indicate that adequate chemical precipitation capacity exists; therefore, EPA is not granting selenium wastewaters a national capacity variance.

(h) Silver Wastes.

D011—EP toxic for silver
P099—Potassium silver cyanide
P104—Silver cyanide

Treatment standards for P099 and P104 nonwastewaters were promulgated in the Second Third final rule. For P099 and P104 wastewaters, EPA is promulgating concentration standards based on chemical precipitation. For D011, EPA is promulgating concentration standards based on chemical precipitation for wastewaters, and recovery or stabilization for nonwastewaters. EPA believes adequate capacity exists to treat surface-disposed D011, P099, and P104 wastewaters and D011 nonwastewaters. Therefore, EPA is not granting a capacity variance for them.

(i) Thallium Wastes.

P113—Thallic oxide
P114—Thallium selenite
P115—Thallium (I) sulfate
U214—Thallium (I) acetate
U215—Thallium (I) carbonate
U216—Thallium (I) chloride
U217—Thallium (I) nitrate

For P113, P115, U214, U215, U216, and U217, EPA is promulgating thermal recovery or stabilization as methods of treatment for nonwastewaters, and concentration standards based on chemical precipitation for wastewaters. For P114, EPA is promulgating concentration standards based on stabilization, vitrification, recovery for nonwastewaters, and chemical precipitation for wastewaters. Based on the TSDR Survey and other capacity data, adequate capacity exists for surface-disposed thallium wastewaters and nonwastewaters. Therefore, EPA is not granting a national capacity variance for them.

(j) Vanadium Wastes.

P119—Ammonium vanadate
P120—Vanadium pentoxide

For P119 and P120, EPA is promulgating stabilization as the method of treatment for nonwastewaters, and concentration standards based on chemical precipitation for wastewaters. Because adequate capacity exists for chemical precipitation and stabilization, EPA is not granting P119 and P120 wastewaters and nonwastewaters a national capacity variance.

(3) *Treatment Standards for Remaining F and K Wastes and U051.* These groups include certain F002 and F005 wastes; F006 wastewaters and F019; F024; F025; K001 and U051; wastes from pigment production (K002 through K008); K011, K013, K014; K015; K017 and K073; K021; K022; K025, K026, K035, and K083; K028, K029, K095, and K096; K032, K033, K034, K041, K097, and K098 wastes; K036 and K037; K042, K085, and K105 wastes; K044, K045, K046, K047; K048 through K052; K060; K061 wastewaters; and K086.

(a) Additional Treatment Standards for F002 and F005 Wastes. Treatment standards for F002 and F005 were promulgated in the Solvents and Dioxins rule. Today, EPA is revising the treatment standards for F002 and F005 to account for four newly listed F002 and F005 constituents. Wastewater concentration standards for F002 containing 1,1,2-Trichloroethane and F005 containing benzene are based on: biological treatment, or steam stripping, or carbon adsorption, or liquid

extraction. For nonwastewaters, concentration standards for these two solvents are based on incineration. For F005 containing 2-Ethoxyethanol, EPA is promulgating incineration as the method of treatment for nonwastewaters, and incineration or biodegradation as methods of treatment for wastewaters. For F005 wastewaters containing 2-nitropropane, EPA is promulgating incinceration, or wet-air oxidation followed by carbon adsorption, or chemical oxidation followed by carbon adsorption as methods of treatment. For F005 nonwastewaters containing 2-nitropropane, EPA is requiring incineration as the method of treatment. EPA believes that adequate treatment capacity exists for these wastes; therefore, EPA is not granting a national capacity variance for them.

(b) F006 and F019 Wastes. For F006 wastewaters, EPA is promulgating concentration standards based on alkaline chlorination for cyanides and chromium reduction followed by chemical precipitation for metals. EPA believes that adequate capacity exists for the volume of surface-disposed F006 wastewaters. Therefore, EPA is not granting a national capacity variance for them.

EPA is promulgating concentration standards for F019 wastewaters based on alkaline chlorination for cyanides and chromium reduction followed by chemical precipitation for chromium. In the proposed rule, EPA proposed treatment standards for amenable and total cyanide in F019 nonwastewaters based on wet-air oxidation. Due to insufficient wet-air oxidation capacity, EPA proposed a national capacity variance for these wastes. In the final rule, EPA is promulgating F019 nonwastewater concentration standards based on alkaline chlorination for cyanides and stabilization for chromium. Because sufficient treatment capacity exists to treat the F019 wastewaters and nonwastewaters, EPA is not granting a national capacity variance for them.

(c) F024 Wastes. EPA promulgated concentration standards for F024 wastewaters and nonwastewaters in the Second Third rule based on rotary kiln incineration for the organic constituents in nonwastewaters, and rotary kiln incineration for organic constituents followed by chemical precipitation for metal constituents in wastewaters. Today, EPA is revising certain of these standards and is promulgating concentration standards based on stabilization for metal constituents in F024 nonwastewaters. EPA is providing the option of incineration as a treatment method for this waste in order to remove obstacles to acceptance, previously created by the explicit standard for dioxins and furans. Several commenters responded to EPA's request for information, indicating that the treatment facilities were not accepting the wastes due to the dioxin and furan standard. Today's revisions to the treatment standards are expected to ensure that sufficient capacity is available to treat F024, and that all F024 wastes containing dioxins and furans will be incinerated, thereby ensuring effective treatment of these constituents. EPA has determined that adequate capacity exists to treat these wastewaters and nonwastewaters; therefore, EPA is not granting a national capacity variance for them.

(d) F025 Wastes. On December 11, 1989 (54 FR 50968), EPA amended the listing for F025 waste (condensed light ends, spent filters and filter aids, and spent desiccant wastes from the production of certain chlorinated aliphatics). The listing becomes effective on June 11, 1990. Most generators already treat F025 as if it were hazardous, and some facilities commingle F024 and F025. Today, EPA is promulgating concentration standards for all categories of F025 wastewaters and nonwastewaters based on incineration. EPA has determined that no alternative treatment capacity is needed for F025 wastes. Therefore, EPA is not granting these wastes a national capacity variance, restricting land disposal on August 8, 1990.

(e) K001 and U051 Wastes. EPA is promulgating revisions to the concentration-based treatment standards for K001 organics due to a mathematical error that was made in the calculation of the original standards in the First Third rule. Since the treatment standards for U051 wastewaters and nonwastewaters are based on a transfer of the performance of K001, the concentration-based standards for U051 also reflect this change. For the organics in K001 and U051 wastewaters and nonwastewaters, EPA is promulgating concentration standards based on incineration. EPA is also finalizing concentration standards for lead in K001 and U051 based on stabilization for nonwastewaters and chemical precipitation for wastewaters. Sufficient capacity exists for treatment of both of these wastes; therefore, EPA is not granting a national capacity variance for them.

(f) Wastes from Inorganic Pigment Production (K002, K003, K004, K005, K006, K007, and K008). EPA is amending the no land disposal standard previously promulgated for K004, K005, K007, and K008 nonwastewaters. EPA is promulgating concentration standards based on chromium reduction followed by chemical precipitation for K002, K003, K004, K006, and K008 wastewaters, and alkaline chlorination followed by chromium reduction followed by chemical precipitation for K005 and K007 wastewaters. For nonwastewater forms of these wastes, EPA is promulgating concentration standards based on stabilization. EPA believes that sufficient capacity exists for surface-disposed K002, K003, K004, K005, K006, K007, and K008 wastewaters and nonwastewaters. Therefore, EPA is not granting a capacity variance for them.

(g) K011, K013, and K014 Wastes. Treatment standards for the surface disposal of nonwastewater forms of K011, K013, and K014 were promulgated in the Second Third final rule. For K011, K013, and K014 wastewaters, EPA is promulgating concentration standards based on wet-air oxidation. The TSDR Survey indicates that sufficient capacity exists for the volume of surface-disposed K011, K013, and K014 wastewaters. Therefore, EPA is not granting a national capacity variance for them.

(h) K015 Wastes. EPA is revoking the no land disposal based on no generation standard previously promulgated for K015 (benzyl chloride distillation wastes) nonwastewaters because of the reported generation of ash containing this waste. Consequently, for K015 nonwastewaters, EPA is promulgating concentration standards for five organic and two metal constituents based on incineration followed by stabilization. Sufficient capacity exists to treat this waste; therefore, EPA is not granting a national capacity variance for K015 nonwastewaters.

(i) K017 and K073 Wastes.

K017—Heavy ends (still bottoms) from the purification column in the production of epichlorohydrin

K073—Chlorinated hydrocarbon waste from the purification step of the diaphragm cell process using graphite anodes in chlorine production

In today's rule, EPA is promulgating final treatment standards for K017 and K073 wastewaters and nonwastewaters. Concentration standards for the wastewater and nonwastewater forms of these wastes are based on incineration. Sufficient capacity exists to treat these wastes. Therefore, EPA is not granting a national capacity variance for K017 and K073 wastes.

(j) K021 Wastes.

K021—Aqueous spent antimony catalyst from fluoromethane production

Concentration standards are being promulgated today for wastewater and nonwastewater forms of K021 based on incineration. EPA is also promulgating concentration standards for antimony nonwastewaters based on stabilization and antimony wastewaters based on chemical precipitation. Sufficient capacity exists to treat these wastes. Therefore, EPA is not granting K021 wastes a national capacity variance.

(k) K022, K025, K026, K035, and K083 Wastes. EPA is promulgating treatment standards for K022 wastewaters and all forms of K025, K026, K035, and K083 wastes. Treatment standards being promulgated today for K025 and K083 would replace current treatment standards of "No Land Disposal Based on No Generation" that were promulgated in prior rules.

For organics contained in K022, K035, and K083 wastewaters, EPA is promulgating concentration standards based on: biological treatment, or steam stripping, or carbon adsorption, or liquid extraction. Concentration standards promulgated for metals in K022 and K083 wastewaters are based on chemical precipitation. For organics in K035 and K083 nonwastewaters, EPA is promulgating concentration standards based on incineration. For metals in K083 nonwastewaters, EPA is promulgating concentration standards based on stabilization of incinerator ashes.

For K025 and K026, EPA is promulgating incineration as the method of treatment for wastewaters and nonwastewaters. In addition, EPA is also promulgating liquid-liquid extraction followed by steam stripping followed by carbon adsorption as an alternative method of treatment for K025 wastewaters.

EPA has determined that adequate capacity exists for K022 wastewaters, and the wastewater and nonwastewater forms of K025, K026, K035, and K083. Therefore, EPA is not granting a national capacity variance for these wastes.

(l) K028, K029, K095, and K096 Wastes.

K028—Spent catalyst from hydrochlorinator reactor in the production of 1,1,1-trichloroethane
K029—Waste from the product steam stripper in the production of 1,1,1-trichloroethane
K095—Distillation bottoms from the production of 1,1,1-trichloroethane
K096—Heavy ends from the heavy ends column from the production of 1,1,1-trichlorethane

Treatment standards based on incineration were promulgated for K028 wastewaters and nonwastewaters and the nonwastewaters forms of K029, K095, and K096 in the Second Third rule. Today, EPA is promulgating concentration standards for organics in K029, K095 and K096 wastewaters based on incineration. EPA is also promulgating concentration standards for metal constituents in K028 nonwastewaters based on stabilization. Sufficient capacity exists to treat these wastes. Therefore, EPA is not granting a national capacity variance for K028, K029, K095 and K096.

(m) K032, K033, K034, K041, K097, and K098 Wastes.

K032—Wastewater treatment sludge from the production of chlordane
K033—Wastewater treatment scrubber water from the chlorination of cyclopentadiene in the production of chlordane
K034—Filter solids from filtration of hexachlorocyclopentadiene in the production of chlordane
K041—Wastewater treatment sludge from the production of toxaphene
K097—Vacuum stripper discharge from the chlordane chlorinator in the production of chlordane
K098—Untreated process wastewater from the production of toxaphene

For K032, K033, K034, K041, K097, and K098 wastewaters and nonwastewaters, EPA is promulgating concentration standards based on incineration. Sufficient capacity exists for treatment of these wastes; therefore, EPA is not granting a national capacity variance for them.

(n) K036 and K037 Wastes. EPA promulgated a treatment standard of "no land disposal based on no generation" for K036 nonwastewaters in the First Third rule. EPA also promulgated concentration standards based on incineration for K037 wastewaters and nonwastewaters in the First Third rule. Today, EPA is revising these treatment standards for the nonwastewater form of K036 (still bottoms from toluene reclamation distillation in the production of disulfoton) and the wastewater form of K037 (wastewater treatment sludges from the production of disulfoton). Today, EPA is promulgating concentration standards for K036 nonwastewaters based on incineration. EPA believes that adequate capacity exists for these surface-disposed K036 nonwastewaters. Therefore, EPA is not granting a national capacity variance for them.

For K037 wastewaters, EPA is revising the concentration standard from one based on rotary kiln incineration to one based on biological treatment. EPA believes that adequate capacity exists for surface-disposed K037 wastewaters; therefore, EPA is not granting a national capacity variance for them.

(o) K042, K085, and K105 Wastes.

K042—Heavy ends or distillation residues from the distillation of tetrachlorobenzene in the production of 2,4,5-T
K085—Distillation of fractionation column bottoms from the production of chlorobenzenes
K105—Separated aqueous stream from the reactor product washing step in the production of chlorobenzenes

For K042, K085, and K105 wastewaters and nonwastewaters, EPA is promulgating concentration standards based on incineration. Sufficient capacity exists for treatment of these wastes; therefore, EPA is not granting a national capacity variance for them.

(p) K044, K045, K046, K047 Wastes. For K044, K045, and K047, EPA is revoking the "no land disposal" standard promulgated in the First Third rule. EPA is promulgating deactivation as the method of treatment for wastewaters and nonwastewaters. EPA has determined adequate capacity exists to treat these wastes; therefore, EPA is not granting a national capacity variance for them.

Today, EPA is promulgating concentration standards for K046 reactive nonwastewaters based on deactivation followed by stabilization. For K046 reactive wastewaters, EPA is promulgating concentration standards based on deactivation and chemical precipitation. Deactivation includes chemical reduction or detonation. In the First Third rule, EPA promulgated treatment standards based on stabilization for K046 nonreactive nonwastewaters. For K046 nonreactive wastewaters, EPA is promulgating concentration standards based on deactivation followed by chemical precipitation. EPA has determined that adequate capacity exists for these wastes. Therefore, EPA is not granting them a national capacity variance.

(q) Petroleum Refining Wastes (K048–K052). EPA is promulgating treatment standards for organic constituents and cyanides in K048–K052 based on data from incineration, solvent extraction. For the metals in K048–K052, EPA is promulgating treatment standards based on stabilization and chemical precipitation. EPA is not revising the promulgated BDAT treatment standards for organic or metal constituents in K048–K052 wastewaters, nor for cyanide in nonwastewaters. In addition, today's rule deletes the treatment standards proposed for arsenic and selenium in nonwastewater forms of K048–K052 based on stabilization. Today's rule also promulgates revised treatment

standards for nickel and total chromium in nonwastewater forms of K048–K052 based on stabilization.

The TSDR Survey indicates that 642,000 tons of K048–K052 will require treatment capacity (i.e., will be displaced from land disposal and will require treatment). EPA recognizes, however, that this information is dated, and to this end undertook to obtain as current an assessment of demand for treatment capacity as possible.

Based on informal contact with the petroleum industry trade association, it appears that the industry may be able to manage approximately three quarters of these wastes on-site after August 1990, in ways not involving land disposal (primarily in-house incineration, use as fuel, or use in coking). (This figure is based on an informal survey of 93 API member companies and assumes that none of the pending no migration petitions for land treatment units will be granted. However, this estimate does not account for the uncertainty and timing of constructing and obtaining permits for on-site disposal/treatment facilities.) Therefore, assuming best case (i.e., on-site capacity is available), this results in approximately 161,000 tons per year of wastes that will require alternative treatment capacity.

EPA estimated that 100,000 tons of capacity for treatment of K048–K052 wastes existed in the form of solids incineration capacity and fuel substitution capacity (these wastes are suitable for use as alternative fuels in industrial furnaces provided that they are dewatered first). There is very little commercial solvent extraction capacity presently on-line. (EPA knows of some small volume mobile solvent extraction units being utilized in California, but these units provide limited volumetric treatment capacity.) Thus, based on these data, there would be a capacity shortfall of approximately 60,000 tons as of May 8.[5]

However, EPA is aware of one large commercial incinerator which could come on line after May 8 that could provide additional substantial volumes of capacity (60,000 tons of new annual capacity in addition to the 100,000 tons of existing capacity) for K048–K052 wastes. This facility is presently seeking a no-migration variance from EPA regarding disposal of scrubber water into a deep injection well. If the petition is granted, this facility would provide sufficient capacity to accommodate treatment demand posed by petroleum wastes. A final decision on the no-migration petition is expected within the next six weeks. (There could still be short-term logistic difficulties associated with getting wastes to the facility and the facility coming on-line that could prevent immediate utilization of this capacity, however.)

EPA also recently became aware (within the last two weeks) of additional solids incineration capacity which is presently available that would provide significant additional treatment capacity for petroleum wastes. This technology, however, requires that wastes undergo a specialized dewatering pretreatment step. The treatment company presently has two mobile dewatering pretreatment units and (according to its estimates) can add two additional dewatering units every three months. This limited amount of pretreatment equipment (there are approximately 190 petroleum facilities to be serviced) could create a temporary treatment bottleneck to use the incineration capacity. (This information appears to have been presented to the petroleum industry by the treatment company late in 1989, so that EPA does not see notice and comment problems vis-a-vis the petroleum industry in relying on the information in this rulemaking.)

Based on this information, EPA has decided to grant a six-month national capacity variance for these wastes, lasting until November 7, 1990. (This effectively extends the industry's prohibition compliance date three months from the date established in the first third rulemaking). EPA believes that by this date, there will be adequate pretreatment capacity as well as incineration and fuel substitution capacity to satisfy demand. There also may be solvent extraction capacity available by that date, although there are sharply conflicting estimates in the record of how quickly solvent extraction capacity can be brought on-line. EPA would be unjustified, however, in extending the national capacity variance until solvent extraction capacity is available. See S. Rep. No. 284, 98th Cong. 1st Sess. 19 ("It is not intended that a generating industry * * * could be allowed to continue to have its wastes disposed of in an otherwise prohibited manner solely by binding itself to using a facility which has not been constructed. Thus, when an 'alternate technology' facility is operating at less than maximum capacity, the Administrator should determine that alternative capacity is available * * *"). Thus, EPA's decision today is based on its best estimates of when treatment capacity of any type will be available to accommodate these wastes.

EPA recognizes that these data are not the most precise, in some cases. In addition, EPA is concerned with using data that it obtains at the very end of the rulemaking in making such decisions (albeit these data tend to corroborate other existing information regarding amounts of solids combustion capacity coming on-line). Therefore, based on further information provided to EPA, EPA may amend the capacity extension in today's rule (through use of appropriate rulemaking procedures).

(r) K060 Wastes. Today EPA is revoking the "no land disposal" based on a no generation standard promulgated for K060 nonwastewaters in the First Third rule. Instead, for K060 nonwastewaters, EPA is also promulgating concentration standards based on incineration. EPA is establishing concentration standards for K060 wastewaters based on biological treatment. EPA believes that adequate capacity exists for the volume of surface-disposed K060 wastewaters and nonwastewaters requiring treatment. Therefore, EPA is not granting a national capacity variance for them.

(s) K061 Wastes. Today, EPA is promulgating concentration standards based on chemical reduction followed by chemical precipitation for K061 wastewaters. EPA believes adequate capacity exists for the volume of surface-disposed K061 wastewaters. Therefore, EPA is not granting a variance for them.

(t) Revisions to K086 Wastes. EPA promulgated concentration standards for K086 solvent washes in the First Third rule based on incineration and stabilization of ash for nonwastewaters, and incineration and chromium reduction followed by chemical precipitation for wastewaters. EPA is promulgating revised concentration standards for all K086 wastewater forms of these wastes based on biological treatment or wet-air oxidation followed by carbon adsorption or chemical oxidation followed by carbon adsorption for organics, chromium reduction followed by chemical precipitation for metals, and alkaline chlorination for cyanides. For nonwastewaters, EPA is promulgating concentration standards based on incineration for organics, followed by stabilization for metals. As a "worst-

[5] It was on the basis of this analysis that EPA senior management tentatively concluded that a one-year national capacity extension might be warranted, which draft determination was communicated to all interested parties by letter late in April, a copy of which is available in the docket. This was not a final EPA decision, however, and EPA continued to monitor the situation. The determianton in the final rule reflects more information than was available to EPA at the time of its tentative determination.

case" analysis, EPA included in the capacity analysis conducted for First Third wastes all of the K086 wastes identified in the TSDR Survey. Consequently, no additional capacity will be required by today's rule, and no capacity variance is being granted for K086 wastes.

(4) *Treatment Standards for U and P Wastes.* Today's rule promulgates treatment standards and capacity determinations for wastewater and nonwastewater forms of U and P wastes (as defined in 40 CFR 261.33 (e) and (f)). Treatment standards and capacity determinations for other U and P wastes that are listed specifically as metal salts or organo-metallics are discussed in previous sections of today's rule. This section also includes a discussion of U and P wastes that have been identified as potentially reactive, primarily as gases, or as cyanogens.

In the proposed rule, EPA grouped all of the U and P wastes into various treatability groups based on (1) similarities in elemental composition (e.g., carbon, halogens, and metals); and (2) the presence of key functional groups (e.g., phenolics, esters, and amines) within the structure of the individual chemical represented. EPA has also accounted for physical and chemical factors that are known to affect the selection of treatment alternatives and to affect the performance of the treatment, such as volatility and solubility, when developing these treatability groups.

While EPA presented the proposed treatment standards and capacity determinations for U and P wastes according to these treatability groups, the promulgated treatment standards and capacity determinations are presented as follows: (a) Concentration-based standards for wastewaters; (b) concentration-based standards for nonwastewaters; (c) technology-based standards for wastewaters; and (d) technology-based standards for nonwastewaters.

(a) Concentration-Based Standards for Specific Organic U and P Wastewaters. EPA is promulgating concentration-based standards for those specific constituents for which the U or P waste is listed. For various reasons, EPA is regulating additional constituents for several U and P wastes.

U and P Wastewaters with Concentration Standards Based on Biological Treatment or Wet-Air Oxidation Followed by Carbon Adsorption

P004, P020, P022, P024, P037, P047 (4,6-Dinitrocresol), P048, P050, P051, P059, P060, P077, P082, P101, P123, U002, U003, U004, U005, U009, U012, U018, U019, U022, U024, U025, U027, U029, U030, U031, U036, U037, U038, U039, U043, U044, U045, U047, U048, U050, U051, U052, U057, U060, U061, U063, U066, U067, U068, U070, U071, U072, U075, U076, U077, U078, U079, U080, U081, U082, U083, U084, U101, U105, U106, U108, U111, U112, U117, U118, U120, U121, U127, U128, U129, U131, U137, U138, U140, U141, U142, U152, U155, U157, U158, U159, U161, U162, U165, U168, U169, U170, U172, U174, U179, U180, U181, U183, U185, U187, U188, U192, U196, U203, U207, U208, U209, U210, U211, U220, U225, U226, U227, U228, U229, U240, (2,4-D acetic acid), U243, and U247

For these U and P wastewaters, EPA is promulgating concentration standards based on biological treatment, or wet air oxidation followed by carbon adsorption. EPA has identified sufficient capacity for treatment of these wastewaters; therefore, EPA is not granting a national capacity variance for them.

(b) Concentration-Based Standards for Specific Organic U and P Nonwastewaters. EPA is promulgating nonwastewater concentration-based standards for the following U and P wastes, as proposed.

U and P Nonwastewaters with Concentration Standards Based on Incineration

P004, P020, P024, P037, P047, P048, P050, P051, P059, P060, P077, P101, P123, U002, U004, U005, U009, U012, U018, U019, U022, U024, U025, U027, U029, U030, U031, U036, U037, U039, U043, U044, U045, U047, U048, U050, U051, U052, U060, U061, U063, U066, U067, U068, U070, U071, U072, U075, U076, U077, U078, U079, U080, U081, U082, U083, U084, U101, U105, U106, U108, U111, U112, U117, U118, U120, U121, U127, U128, U129, U131, U137, U138, U140, U141, U142, U152, U155, U157, U158, U159, U161, U162, U165, U169, U170, U172, U174, U179, U180, U181, U183, U185, U187, U188, U192, U196, U203, U207, U208, U209, U210, U211, U220, U225, U226, U227, U228, U239, U240 (2,4-D acetic acid), U243, and U247

For all of these specific organic U and P nonwastewaters, EPA has identified sufficient incineration capacity to treat these nonwastewaters; therefore, EPA is not granting a national capacity variance for them.

(c) Technology-Based Standards for Specific Organic U and P Wastewaters. EPA is promulgating technology-based treatment standards (i.e., methods of treatment) rather than concentration-based constituent specific standards for these wastes. EPA is promulgating wet-air oxidation followed by carbon adsorption or chemical oxidation followed by carbon adsorption or incineration as methods of treatment. Organic U and P wastes technology-based standards are indicated below:

U and P Wastewaters With (Wet-Air Oxidation, or Chemical Oxidation), Followed By Carbon Adsorption; or Incineration as Methods of Treatment

P001, P002, P003, P005, P007, P008, P014, P016, P017, P018, P023, P026, P027, P028, P034, P042, P045, P046, P047 (4,6-dinitrocresol salts), P049, P054, P057, P058, P064, P066 P067, P069, P070, P072, P075, P084, P088, P093, P095, P102, P108, P116, P118, U001, U006, U007, U008, U010, U011, U014, U015, U016, U017, U020, U021, U026, U033, U034, U035, U041, U042, U046, U049, U053, U055, U056, U059, U062, U064, U073, U074, U085, U089, U090, U091, U092, U093, U094, U095, U097, U110, U113, U114, U116, U119, U122, U123, U124, U125, U126, U130, U132, U143, U147, U148, U149, U150, U153, U154, U156, U163, U164, U166, U167, U171, U173, U176, U177, U178, U182, U184, U186, U191, U193, U194, U197, U200, U201, U202, U206, U213, U218, U219, U222, U234, U236, U237, U238, U240 (2,4-D salts and esters), U244, and U248.

EPA has identified sufficient capacity for these organic U and P wastewaters. Therefore, EPA is not granting a national capacity variance for them.

(d) Technology-Based Standards for Specific Organic U and P Nonwastewaters. EPA is promulgating the proposed technology-based standards for the following organic U and P wastes.

U and P Nonwastewaters With Incineration as the Method of Treatment

P002, P007, P008, P014, P016, P017, P018, P022, P023, P026, P027, P028, P034, P042, P045, P046, P047 (4,6-dinitrocresol salts), P049, P054, P057, P058, P064, P066, P067, P069, P070, P072, P075, P082, P084, P093, P095, P108, P116, P118, U003, U006, U007, U010, U011, U014, U015, U017, U020, U021, U026, U033, U034, U035, U038, U041, U042, U046, U049, U057, U059, U062, U073, U074, U091, U092, U093, U095, U097, U110, U114, U116, U119, U130, U132, U143, U148, U149, U150, U153, U156, U163, U164, U167, U168, U171, U173, U176, U177, U178, U184, U191, U193, U194, U200, U202, U206, U218, U219, U222, U234, U236, U237, U238, U240 (Salts and esters), U244

Incineration or Fuel Substitution as Methods of Treatment

P001, P003, P005, P088, P102, U001, U008, U016, U053, U055, U056, U064, U085, U089, U090, U094, U113, U122, U123, U124, U125, U126, U147, U154, U166, U182, U186, U197, U201, U213, U248

EPA has identified sufficient capacity for all of these U and P nonwastewaters. Therefore, EPA is not granting a national capacity variance for them.

(5) *Potentially Reactive P and U Wastes.* This subgroup includes the following waste codes:

P006—Aluminum phosphide
P009—Ammonium picrate

P015—Beryllium dust
P056—Fluorine
P068—Methyl hydrazine
P073—Nickel carbonyl
P081—Nitroglycerin
P087—Osmium tetroxide
P096—Phosphine
P105—Sodium azide
P112—Tetranitromethane
P122—Zinc phosphide (<10%)
U023—Benzotrichloride
U086—N,N-Diethylhydrazine
U096—a,a-Dimethyl benzyl hydroperoxide
U098—1,1-Dimethylhydrazine
U099—1,2-Dimethylhydrazine
U103—Dimethyl sulfate
U109—1,2-Diphenylhydrazine
U133—Hydrazine
U134—Hydrofluoric acid
U135—Hydrogen sulfide
U160—Methyl ethyl ketone peroxide
U189—Phosphorus sulfide
U249—Zinc phosphide (<10%)

These wastes either are highly reactive or explosive or are polymers that also tend to be highly reactive. For the purpose of BDAT determinations, EPA has identified four subcategories: incinerable reactive organics and hydrazine derivatives (P009, P068, P081, P105, P112, U023, U086, U096, U098, U099, U103, U109, U133, and U160); incinerable inorganics (P006, P096, P122, U135, U189, and U249); fluorine compounds (P056 and U134); and recoverable metallic compounds (P015, P073, and P087). For incinerable reactive organics and hydrazine derivatives, EPA is promulgating incineration, fuel substitution, chemical oxidation, or chemical reduction as methods of treatment for nonwastewaters, and incineration, chemical oxidation, chemical reduction, carbon adsorption, or biodegradation as methods of treatment for wastewaters. Because EPA has determined that sufficient treatment capacity exists for the small volume of surface-disposed incinerable reactive organic hydrazine derivates (P009, P068, P081, P105, P112, U023, U086, U096, U098, U099, U103, U109, U133, U160, and U186), EPA is not granting a national capacity variance for them.

For all incinerable inorganic nonwastewaters, EPA is promulgating incineration, chemical oxidation, or chemical reduction as methods of treatment. For wastewaters, EPA is promulgating incineration, chemical oxidation, or chemical reduction as methods of treatment. EPA has determined that sufficient treatment capacity exists for the small volume of surface-disposed incinerable inorganic wastes; therefore, EPA is not granting a national capacity variance for them.

For fluorine compounds nonwastewaters, EPA is promulgating adsorption followed by neutralization as the method of treatment for P056 nonwastewaters, and neutralization or adsorption, followed by neutralization as methods of treatment for U134 nonwastewaters. For P056 and U134 wastewaters, EPA is promulgating concentration standards based on chemical precipitation. EPA believes that adequate treatment capacity exists for these wastes; therefore, EPA is not granting a capacity variance for them.

In the proposed rule, EPA proposed recovery as the method of treatment for P015 wastes. During the comment period, EPA received one comment concerning P015 beryllium recovery, and EPA verified that beryllium recovery capacity does exist. Because EPA has determined that sufficient capacity exists for P015 wastes, EPA is not granting a variance for these wastes. For P073 wastewaters, EPA is promulgating concentration standards based on incineration or chemical oxidation; for P073 nonwastewaters, EPA is promulgating concentration standards based on stabilization. EPA has determined that there is enough capacity available to treat P073 wastewaters and nonwastewaters; therefore, EPA is not granting a capacity variance for them. For P087 wastewaters and nonwastewaters, EPA is promulgating recovery as the method of treatment. EPA has determined that there is not sufficient treatment capacity for P087 wastewaters and nonwastewaters, and is granting these wastes a national capacity variance.

(6) *Gases.* This treatability group includes the following groups: P076 (Nitric oxide), P078 (Nitrogen dioxide), and U115 (Ethylene oxide). For P076 and P078 wastewaters and nonwastewaters, EPA is promulgating venting into a reducing medium as the method of treatment. For U115, EPA is promulgating thermal or chemical oxidation as methods of treatment for nonwastewaters, and incineration, or chemical oxidation followed by carbon adsorption, or wet-air oxidation followed by carbon adsorption as methods of treatment for wastewaters. Because no volumes of P076, P078, and U115 were reported as surface disposed in the TSDR survey, EPA is not granting a national capacity variance for them.

(7) *U and P Cyanogens.* For the U and P wastes containing cyanide, P031 (Cyanogen), P033 (Cyanogen chloride), and U246 (Cyanogen bromide), EPA is promulgating incineration, chemical oxidation, or wet-air oxidation as methods of treatment for both wastewaters and nonwastewaters. EPA has determined that sufficient capacity exists to treat these wastes; therefore, EPA is not granting a national capacity variance for them.

(8) *Capacity Determination for Multi-Source Leachate.* (a) Definition and Applicability. EPA defines multi-source leachate as leachate that is derived from the treatment, storage, disposal, or recycling of more than one listed hazardous waste. Under today's final rule, such leachate will be restricted from land disposal. Residues from treating such leachate, as well as residues such as soil and groundwater that are contaminated by such leachate, are also restricted from land disposal under this rule. Leachate derived from a single source must meet the standard developed for the waste code from which it is derived; therefore, such leachate is not subject to the standards developed for multi-source leachate.

(b) *Previous Treatment Standards.* EPA imposed land disposal prohibitions on multi-source leachate in the Solvents and Dioxins, California list, and First Third rulemakings. In the First Third rule, multi-source leachate would have to be treated to satisfy all the standards applicable to the original wastes from which the leachate is derived (see 53 FR 31146–150 (August 17, 1988)). EPA revisited the issue of treatability of multi-source leachate to address concerns raised by the hazardous waste management industry, and rescheduled promulgation of a land disposal restriction for multi-source leachate to the Third Third rule in order to fully study the most appropriate section 3004(m) treatment standards for multi-source leachate and to reevaluate the issue of available treatment capacity (see 54 FR 8264 (January 27, 1989)).

(c) Final Treatment Standards. In today's rule, EPA is promulgating one set of wastewater and one set of nonwastewater treatment standards for multi-source leachate; these standards would apply to residuals derived from the storage, treatment, or disposal of multi-source leachate. For treating multi-source leachate in the form of wastewater, EPA is promulgating concentration standards primarily based on biological treatment followed by chemical precipitation, or wet-air oxidation followed by carbon adsorption followed by chemical precipitation for organic and inorganic constituents. For nonwastewaters, EPA is promulgating concentration standards based on incineration for organic constituents and on stabilization for metals.

(d) Volumes Requiring Alternative Treatment or Recovery Capacity. EPA relied on data from the TSDR Survey, the Generator Survey, and other capacity data to determine whether sufficient alternative treatment or

recovery capacity is available for multi-source leachate.

Multi-source leachate is primarily generated in landfills. However, EPA recognizes that multi-source leachate can also be generated at closed facilities. Because only sparse data exist on such leachate, EPA requested comments on the characterization of multi-source leachate at closed facilities and on the volume of treated leachate that is presently land-disposed in surface disposal units. EPA also requested the submission of current data from interested parties on the volumes of multi-source leachate generated, the current management of such leachate, the amount of residuals generated, and the waste constituent composition of multi-source leachate.

Several commenters suggested that EPA has underestimated required capacity for multi-source leachate because leachate from closed landfills and ground water from corrective actions and CERCLA cleanups were not considered. EPA did not obtain adequate data to quantify the volumes of such leachates and leachate treatment residuals that might be surface disposed. These surface-disposed volumes, however, are not expected to affect the national capacity variance determination.

In addition to data from the TSDR and Generator Surveys, EPA examined data submitted as part of a leachate study plan by four major companies managing hazardous wastes at 17 facilities. EPA evaluated this information to estimate the volume of multi-source leachate requiring alternative treatment.

(e) Determining National Variances for Multi-Source Leachate. EPA analyzed the alternative treatment or recovery capacity for two categories of multi-source leachate: wastewaters and nonwastewaters.

Most multi-source leachate is managed in wastewater treatment systems and discharged via an NPDES permit and/or to a POTW. EPA estimates that over 41 million gallons of multi-source leachate nonwastewater residues are surface disposed.

Given the low volumes of surface-disposed multi-source leachate wastewaters and the adequate capacity to treat these wastes, EPA proposed and has decided not to grant a national capacity variance for surface-disposed multi-source leachate wastewaters. For multi-source leachate nonwastewaters, EPA is finalizing its proposal to grant a two-year national capacity variance for these wastes, because there is insufficient incineration capacity.

Most commenters agreed with the proposed variance for surface-disposed multi-source leachate nonwastewaters. However, a few commenters requested a national capacity variance for surface-disposed multi-source leachate wastewaters. However, commenters did not provide evidence of surface-disposed volumes of multi-source leachate wastewaters. EPA did not revise the estimates of wastewater volumes because no data were provided showing volumes of multi-source leachate wastewaters that are surface-disposed. Also, as noted above, this surface disposal must involve retrofitted surface impoundments, under RCRA section 3005(j), which ordinarily are section 3005(j)(11) impoundments. Therefore, there should be little additional demand for capacity for displaced leachate wastewaters. Commenters did not dispute this analysis.

(9) *Capacity Determination for Mixed Radioactive Wastes.* (a) Background. EPA has defined a mixed RCRA/radioactive waste as any matrix containing a RCRA hazardous waste and a radioactive waste subject to the Atomic Energy Act (53 FR 37045, 37046, September 23, 1988). Regardless of the type of radioactive constituents that these wastes contain (e.g., high-level, low-level, or transuranic), they are subject to the RCRA hazardous waste regulations, including the land disposal restrictions.

Radioactive wastes that are mixed with spent solvents, dioxins, or California list wastes are subject to the land disposal restrictions already promulgated for those hazardous wastes. EPA has determined, however, that radioactive wastes that are mixed with First Third and Second Third wastes will be included in the Third Third rulemaking (40 CFR 268.12(c)). Thus, today's rule addresses radioactive wastes that contain First Third, Second Third, and Third Third wastes.

(b) Data Sources. The Department of Energy (DOE) is a major generator of mixed RCRA/radioactive wastes. For data on DOE wastes, EPA used a data set submitted by DOE. This data set is based on a recent DOE survey and contains information on mixed RCRA/radioactive waste inventories, generation rates, and existing and planned treatment capacity at 21 DOE facilities.

A variety of non-DOE facilities also generate mixed RCRA/radioactive wastes, including nuclear power plants, academic and medical institutions, and industrial facilities. A variety of information sources were used to identify the non-DOE generators, estimate the quantities and types of mixed RCRA/radioactive wastes that they generate, and determine current management practices and treatment capacity. These sources included the TSDR Survey, the Generator Survey, and other studies. EPA believes that these sources provide available information on non-DOE mixed RCRA/radioactive wastes.

(c) Determining National Variances for Mixed RCRA/Radioactive Wastes. After investigating the data sources noted above, EPA estimated that approximately 393 million gallons of radioactive waste mixed with First, Second, and Third Third wastes will require treatment. Contaminated soil and debris accounts for 193 million gallons of this total, which also includes wastes generated annually as well as untreated wastes in storage. Although DOE is in the process of increasing its capacity to treat mixed RCAR/radioactive wastes, data supplied by DOE indicate a current capacity shortfall for the treatment of First, Second, and Third Third mixed RCRA/radioactive wastes. DOE indicated a stabilization capacity of approximately 2.8 million gallons and a neutralization capacity of approximately 400,000 gallons. The data, however, showed significant alternative treatment capacity shortfalls for all treatment technologies, including stabilization and neutralization. EPA's investigation of non-DOE data sources showed a significant lack of commercial treatment capacity as well. Although one facility was identified that manages a specific type of mixed RCRA/radioactive waste, data sources indicate a lack of sufficient treatment capacity for all treatment technologies. Thus, EPA has determined that sufficient alternative treatment capacity is not available and is granting a two-year national capacity variance for mixed RCRA/radioactive waste wastewaters and nonwastwaters.

One commenter indicated that the proposed two-year national capacity variance is unlawfully and unnecessarily broad, and that EPA should grant variances only for specific waste streams. EPA disagrees with this statement. The capacity analysis was based on detailed, stream-specific data supplied by DOE as well as the best available non-DOE data sources. Although sufficient treatment capacity may exist at certain facilities for certain mixed RCRA/radioactive wastes, EPA's capacity analysis methodology is designed to assess available treatment capacity at the national level. (See RCRA section 3004(h)(2).) EPA believes the capacity analysis performed demonstrates a mixed RCRA/radioactive waste capacity shortfall for

all alternative treatment technologies at the national level.

The same commenter indicated that EPA must determine that available treatment capacity existing for non-radioactive RCRA hazardous waste is inappropriate for mixed RCRA/radioactive wastes. EPA believes that the lack of commercial mixed RCRA/radioactive waste treatment capacity was sufficiently demonstrated in the proposed rule. Not only does the TSDR Survey show a lack of permitted treatment facilities accepting mixed RCRA/radioactive wastes, the most recent data made available by States and State low-level waste compacts support the same conclusion. For the reasons iterated here, EPA believes that the national capacity variance for mixed RCRA/radioactive wastes is both necessary and justified. All other commenters addressing the national capacity variance were in support of EPA's proposal.

One commenter raised the question of whether naturally-occurring radioactive materials (NORM) containing RCRA listed or characteristic hazardous wastes fall under the definition of mixed RCRA/radioactive wastes. The question was also raised whether the national capacity variance extends to these materials. EPA believes that because NORM are not regulated by the Atomic Energy Act, these materials do not fall under the definition of mixed RCRA/radioactive wastes. EPA recognizes, however, that insufficient alternative treatment capacity exists to handle these materials. Therefore, EPA is granting a two-year national capacity variance to hazardous wastes mixed with NORM.

EPA recognized that its information for the proposed rule on mixed RCRA/radioactive wastes generated and managed by non-DOE facilities might have been incomplete. Consequently, EPA requested comments by interested parties on the current generation of mixed RCRA/radioactive wastes. Of particular interest to EPA was information on mixtures of radioactive wastes and First, Second, or Third Third waste streams. Although several commenters addressed problems associated with the storage and disposal of mixed RCRA/radioactive wastes, only one commenter indicated that additional data were available. The data confirm the lack of available treatment capacity and the commenter supports the proposed national capacity variance.

2. Determination of Alternative Capacity and Effective Dates for Underground Injected Waste.

Today, EPA is prohibiting the underground injection of virtually all remaining RCRA section 3004(g) wastes, including characteristic wastes, for which no effective dates have been set. EPA is not acting on certain newly listed or newly identified wastes. In the proposed rule, EPA solicited comments on the volumes and characteristics of the wastes represented in this section, as well as any information on the characteristics and volumes of any multi-source leachate that is currently being injected.

EPA received several responses to this request. One commenter submitted data on the volume of U wastes (20,456 gallons) deepwell injected at its facility in 1989. However, this facility has subsequently received approval of its no-migration petition. Another stated that 3.3 million gallons of P and U wastes are underground injected at its facility. The facility has proved, however, that this stream qualified for the mixture rule exception under RCRA section 261.3(a)(2)(iv), and is therefore not considered a hazardous waste. One commenter indicated it was injecting 7,200 tons of D004 waste at one of its facilities. Further, one commenter stated that it was injecting a wastewater containing U115. Additionally, one commenter submitted an underground injection well survey. EPA acknowledges these comments and has incorporated them appropriately into the capacity analysis.

EPA also received comments pertaining to the form of certain wastes. Several commenters indicated that the nonwastewater forms of D002, D003 (reactive cyanide), D007, and K014 were injected and needed to be included in the capacity analysis. EPA agrees that nonwastewaters were not discussed for many deepwell injected wastes and has evaluated these waste forms for the final rulemaking.

a. Effective Date Determinations for Wastes with Treatment Standards in Today's Rule

Consistent with the policy established in previous land disposal restrictions, EPA is restricting on August 8, 1990, the underground injection of all wastes, with treatment standards in today's rule, that are not currently being deepwell-injected. This decision is consistent with the intent of RCRA in moving hazardous wastes away from land disposal and toward treatment. Wastes that are not currently being deepwell-injected are listed in table III.B.2.(a).

The volumes of deepwell-injected wastes that require alternative commercial treatment and/or recycling capacity are presented in table III.B.2.(b). This table does not include wastes that are currently being deepwell-injected by facilities with appropriate on-site alternative treatment technologies for treating the waste.

EPA is establishing effective date determinations for all underground injected wastes in treatability groups. If there is adequate available alternative treatment capacity for all the injected volume in a single treatability group, then every waste in that group will be restricted from underground injection. If there is inadequate available alternative treatment capacity for the injected volume in a single treatability group, then EPA is allocating as much of the available capacity to the wastes requiring treatment. All remaining wastes in the treatability group, for which no capacity exists, will receive a two-year national capacity variance. EPA believes that this is most consistent with Congressional intent, which favors both treatment over disposal and minimal use of capacity variances. EPA specifically solicited comments on this approach; however no comments were received during the public comment period.

EPA recognizes that the effective prohibition date of the Third Third rule will critically affect the management of large volumes of wastes disposed of on-site in injection wells at a number of facilities. On-site injection wells are characterized by direct piping of wastes from plant operations to the injection facility. In contrast, off-site injection facilities receive manifested wastes from other plant operations which are transported directly to the injection facility.

The injection wells at on-site facilities are directly connected to the plant operations and, all totaled, handle at least five billion gallons of hazardous waste per year. In order to realistically meet the treatment requirements for the Third Third rule, the plant managers will need time to make considerable logistical adjustments such as repiping, retooling, and development of transportation networks at the plant operation facility. Therefore, EPA does not believe that treatment capacity is available if there is no feasible way for generators to transport their wastes to the treatment facilities. EPA can legitimately consider the time necessary to do this in determining whether to grant a national capacity variance.

EPA has relied on such logistic factors in prior rulemakings to determine when

capacity is realistically available. EPA notes that these same logistic factors do not appear necessary to warrant any extension for waste sent to off-site commercial injection facilities as those for on-site injection facilities. EPA believes that facilities disposing of wastes through off-site deepwell injection already have these plant adaptations and transportation networks in place, and therefore do not require any extension of the effective date. Consequently, EPA is using its authority under section 3004(h) of RCRA to provide a six-month extension beyond the May 8, 1990 statutory prohibition date for all Third Third wastes disposed of at on-site injection facilities directly connected to plant operations.

Table III.B.2(c) indicates the amount of capacity available for treating underground injected wastes, the demand from these injected wastes on each treatability groups, and which treatability groups require capacity variances. More information on EPA's procedure for apportioning treatment capacity in these treatability groups can be found in the Third Third Background Document for the treatability groups.

A number of the following treatability groups account for relatively small (less than 100,000 gallons/year) amounts of underground injected wastes. EPA believes that these small streams place little demand on nationwide treatment capacity.

Presented below are the treatment technologies EPA used in the capacity analysis for all deepwell-injected wastes. EPA selected these technologies based on the BDATs used for establishing the concentration and technology based standards being promulgated today. For the capacity analysis, EPA assigned volumes of wastes mixed with other wastes to the appropriate treatment such that the treatment standards for all wastes will be met. Consequently, some of the technologies listed below are treatment trains that include the BDAT used to determine the standard plus another technology. Table III.B.2.(d) summarizes the wastes for which EPA is granting a two-year national capacity variance for underground injected wastes.

TABLE III.B.2.(a).—WASTES (WITH TREATMENT STANDARDS) THAT ARE NOT UNDERGROUND INJECTED

[Prohibited from Underground Injection on August 8, 1990]

First Third Codes

K004, K008, K015 (nonwastewaters), K017, K021 (wastewaters), K022 (wastewaters), K035, K036 (nonwastewaters), K037 (wastewaters), K044, K045, K046 (reactive nonwastewaters and all wastewaters), K047, K060 (wastewaters), K061 (wastewaters), K069 (CaSO4 nonwastewaters and all wastewaters), K073, K084, K085, K101 (nonwastewaters), K102 (nonwastewaters), K106, P001, P004, P010, P012, P015, P016, P018, P036, P037, P068, P070, P081, P082, P084, P087, P092, P105, P108, P110, P115, P120, P123, U010, U016, U018, U020, U022, U029, U036, U041, U043, U046, U050, U051, U053, U061, U063, U064, U066, U067, U077, U078, U086, U089, U108, U124, U129, U130, U137, U155, U158, U171, U177, U180, U209, U237, U238, U248, U249.

Second Third Codes

K025 (Wastewaters), K028 (wastewaters), K029 (wastewaters), K041, K042, K095 (wastewaters), K096 (wastewaters), K098, K105, P002, P003, P007, P008, P013 (wastewaters), P014, P026, P027, P049, P054, P060, P066, P067, P072, P099, P104, P107, P112, P113, P114, U003, U005, U011, U014, U015, U021, U023, U025, U026, U035, U047, U049, U057, U059, U060, U062, U073, U083, U092, U093, U094, U095, U097, U098, U099, U101, U109, U110, U111, U114, U116, U119, U127, U128, U131, U135, U142, U143, U144, U146, U149, U150, U161, U163, U164, U168, U172, U173, U174, U176, U178, U179, U189, U193, U196, U203, U205, U206, U208, U213, U214, U215, U216, U217, U218.

Third Third Codes

K003, K005 (wastewaters), K006, K007 (wastewaters), K026, K033, K034, K100 (wastewaters), P006, P009, P017, P022, P023, P024, P028, P031, P033, P034, P038, P042, P045, P046, P047, P064, P065, P073, P076, P077, P078, P088, P093, P095, P096, P101, P103, P116, P118, P119, U004, U006, U017, U024, U027, U030, U033, U038, U039, U042, U048, U052, U068, U071, U072, U075, U076, U079, U081, U082, U084, U085, U090, U091, U096, U117, U120, U121, U123, U125, U126, U132, U136, U139, U141, U145, U148, U152, U153, U156, U166, U167, U181, U182, U183, U184, U186, U187, U191, U201, U202, U204, U207, U222, U225, U234, U236, U240, U243, U246, U247.

Newly Listed Wastes

F025.

TABLE III.B.2.(b).—REQUIRED ALTERNATIVE COMMERCIAL TREATMENT/RECYCLING CAPACITY FOR UNDERGROUND INJECTED WASTES

[million gallons/year]

Waste code	Capacity required for underground injected wastes
First Third Code	
F006	5.0
F019	<0.1
K011	433.2
K013	407.2
K014	131.0
K031	1.1
K086	0.2
P005	<0.1
P011	<0.1
P020	0.1
P048	0.1
P050	0.4
P058	<0.1
P059	0.4
P069	0.1
P102	<0.1
P122	<0.1
U007	0.1
U009	<0.1
U012	0.1
U019	0.8
U031	0.1
U037	<0.1
U044	0.1
U074	<0.1
U103	<0.1
U105	0.1
U115	8.0
U122	0.1
U133	0.1
U134	0.2
U151	0.1
U154	0.3
U157	0.1
U159	<0.1
U185	1.0
U188	0.2
U192	0.1
U200	0.3
U210	1.0
U211	0.1
U219	<0.1
U220	<0.1
U226	0.1
U227	2.7
U228	<0.1
Second Third Code	
K097	<0.1
P057	<0.1
U002	0.1
U008	0.1
U032	<0.1
U070	0.1
U080	2.8
U106	0.1
U138	0.1
U140	1.0
U147	<0.1
U162	0.1
U165	<0.1
U169	0.1
U170	0.3
U239	0.2
U244	<0.1
Third Third Code	
D001	6.9
D002	1924.5
D003	1745.7
D004	10.0
D005	1.3
D006	1.6

Waste code	Capacity required for underground injected wastes
D007	201.2
D008	3.8
D009	1.2
D010	95.2
D011	0.3
D012	2.3
D013	2.3
D014	2.4
D015	2.3
D016	2.3
D017	2.3
F039 [1]	15.1
K002	0.1
K032	<0.1
K083	5.0
P051	<0.1
P056	<0.1
P075	<0.1
U001	0.5
U034	<0.1
U045	<0.1
U055	0.1
U056	<0.1
U112	<0.1
U113	<0.1
U118	<0.1
U160	<0.1
U194	<0.1
U197	0.1

[1] Multi-source leachate.

TABLE III.B.2.(c)—AVAILABLE AND REQUIRED ALTERNATIVE COMMERCIAL TREATMENT (INCLUDING RECYCLING) CAPACITY FOR UNDERGROUND INJECTED WASTES

[millions of gallons/yr.]

Technology	Available capacity	Required capacity	Variance
Acid leaching followed by chemical precipitation	0	<1	Yes.
Alkaline chlorination	1	48	Yes.
Alkaline chlorination followed by chemical precipitation	4	<1	No.
Biological treatment	47	2	No.
Biological treatment followed by chemical precipitation	13	15	Yes.
Chemical oxidation followed by chemical precipitation	21	1,684	Yes.
Chemical oxidation followed by chromium reduction and chemical precipitation	<1	195	Yes.
Chemical precipitation	314	119	No.
Chromium reduction followed by chemical precipitation	9	239	Yes.
Combustion of liquids	219	54	No.
Mercury retorting	<.01	<.02	Yes.
Neutralization	14	1,638	Yes.
Stabilization	305	4	No.
Wet-air oxidation	<1	1,027	Yes.
Wet-air oxidation followed by carbon adsorption	<1	<1	No.

TABLE III.B.2. (d) SUMMARY OF TWO-YEAR NATIONAL CAPACITY VARIANCES FOR UNDERGROUND INJECTED WASTES

Required alternative treatment technology	Waste code	Physical form
Acid leaching followed by chemical precipitation	D009	Low mercury nonwastewater
Alkaline chlorination	D003 [1]	Wastewater/nonwastewater
Chemical oxidation followed by chemical precipitation	D003 [2]	Wastewater/nonwastewater
Chemcial oxidation followed by chromium reduction and Chemical precipitation	D003 [3]	Wastewater/nonwastewater
Chromium reduction followed by chemical precipitation	D007	Wastewater/nonwastewater
Mercury Retorting	D009	High mercury nonwastewaters
Neutralization	D002 [4]	Wastewater/nonwastewater
Wet-air oxidation	K011	Wastewater
	K013	Wastewater
	K014	Wastewater/nonwastewater
Wet-Air oxidation followed by carbon carbon adsorption followed by checmical precipitation; biological treatment followed by chemical precipitation.	F039 [5]	Wastewater

[1] D003 (Cyanides)
[2] D003 (Sulfides)
[3] D003 (Explosives, water reactives, and other reactives)
[4] Deepwell injected D002 liquids with a pH less than 2.0 must meet the California list treatment standards on August 8, 1990.
[5] Multi-source Leachate

(1) *Acid Leaching followed by Chemical Precipitation.* EPA is promulgating concentration standards for low mercury D009 nonwastewaters based on acid leaching followed by chemical precipitation. EPA's data does not differentiate between low and high mercury concentration nonwastewaters. Consequently, for the capacity analysis EPA conducted a worst-case analysis and assigned the volume of deepwell-injected D009 nonwastewaters to both acid leaching followed by chemical precipitation and mercury retorting (the BDAT for the high concentration mercury subcategory).

There is no commercial acid leaching followed by chemical precipitation capacity, therefore, EPA is granting D009 low concentration mercury nonwastewaters a two-year national capacity variance, restricting this waste from underground injection on May 8, 1992.

(2) *Alkaline Chlorination.* Treatment standards based on alkaline chlorination are being promulgated today for D003 (reactive cyanide). (EPA also determined that the standards may be met using wet-air oxidation or electrolytic oxidation.) As shown in table III.B.2.(c), the less than 1 million gallons per year of available capacity are inadequate to address the quantity of hazardous waste annually deepwell-injected requiring this type of treatment.

Therefore, EPA is granting a two-year national capacity variance to D003 (reactive cyanide) wastewaters and nonwastewaters. This waste will be restricted from injection on May 8, 1992.

(3) *Alkaline Chlorination followed by Chemical Precipitation.* Treatment standards based on alkaline chlorination and chemical precipitation are today being promulgated for F006 cyanide wastewaters and F019 wastewaters. As shown in Table III.B.2.(c), the available capacity of 6 million gallons is adequate to treat the quantity of hazardous waste annually deepwell-injected requiring this type of treatment. EPA is prohibiting these wastes from underground injection on August 8, 1990. (For facilities with injection wells directly connected to plant production operations, the effective date is November 8, 1990, as discussed at the beginning of this section).

(4) *Biological Treatment.* For P020, P048, U002, U009, U019, U031, U112, U140, U159, U170, U188, U220, and U239, EPA is promulgating concentration standards based on biological treatment for wastewaters. (EPA also determined that the standards may be met using wet-air oxidation followed by carbon adsorption). Because there is adequate biological treatment capacity for these deepwell injected wastes, EPA is not granting a national capacity variance for them. (For facilities with injection wells directly connected to plant production operations, the effective date is November 8, 1990, as discussed at the beginning of this section.)

(5) *Chemical Oxidation followed by Chemical Precipitation.* EPA is promulgating concentration standards for P122 wastewaters based on chemical oxidation. For the capacity analysis, EPA assigned P122 wastewaters to chemical oxidation followed by chemical precipitation. EPA has determined that adequate capacity exists to treat P122 wastewaters; therefore, EPA is not granting P122 wastewaters a national capacity variance.

EPA is promulgating deactivation as the method of treatment for D003 (sulfides), which includes chemical oxidation. For the capacity analysis, EPA assigned this waste to chemical oxidation followed by chemical precipitation. As indicated in Appendix VI, EPA has identified other technologies for treating these wastes. The aggregate capacity of the additional technologies is still insufficient for treating these D003 wastes. Therefore, EPA is granting a two-year national capacity variance to D003 (sulfide) wastewaters and nonwastewaters. This waste will be restricted from injection on May 8, 1992.

(6) *Chemical Oxidation followed by Chromium Reduction and Chemical Precipitation.* For D003 (explosives, water reactives, and other reactives), EPA is promulgating standards based on deactivation. EPA did not have data in sufficient detail to differentiate between explosives, water reactives and other reactives. Consequently, for the capacity analysis, EPA has grouped these wastes into one group. For the capacity analysis, EPA assigned all volumes to chemical oxidation, chromium reduction, and chemical precipitation. As indicated in Appendix VI, EPA has identified other technologies for treating these wastes. The aggregate capacity of the additional technologies is still insufficient for treating these D003 wastes. Therefore, EPA is granting a two-year national capacity variance to these wastes, restricting D003 (explosives/reactives) wastewaters and nonwastewaters from underground injection on May 8, 1992.

(7) *Chemical Precipitation:* Wastewater forms of D004, D005, D006, D008 (lead-non-battery), D009, D010, D011, F006, K031, P011, P056, U134, and U151 represent those wastes best treated by chemical precipitation. As shown in table III.B.2.(c), the 331 million gallons per year of available chemical precipitation are adequate to treat the quantity of hazardous waste annually deepwell-injected requiring this type of treatment. EPA is prohibiting these wastes from underground injection on August 8, 1990. (For facilities with injection wells directly connected to plant production operations, the effective date is November 8, 1990, as discussed at the beginning of this section).

(8) *Chromium Reduction followed by Chemical Precipitation.* Treatment standards based on chromium reduction and chemical precipitation are today being promulgated for wastewater forms of D007, F006, K002, P011, and UO32. As shown in Table III.B.2.(c), the 32 million gallons per year capacity of available chromium reduction and chemical precipitation is inadequate to treat the quantity of hazardous waste annually deepwell-injected requiring this type of treatment. Excluding D007, however, adequate capacity exists to treat the remaining wastes. Therefore, EPA is granting a two-year national capacity variance to D007 wastewaters and nonwastewaters, prohibiting this waste from underground injection on May 8, 1992. For the remaining wastes, no national capacity variance is being granted.

(9) *Combustion of Liquids.* Combustion of liquids is the standard of treatment for deepwell injected D001 (ignitable liquids), D011, D012, D013, D014, D015, D016, D017, K032, K083, K086, K097, P005, P050, P051, P057, P059, P069, P075, P102, U001, U007, U008, U012, U019, U034, U037, U044, U045, U055, U056, U070, U074, U080, U103, U105, U106, U112, U113, U115, U118, U122, U133, U138, U147, U154, U157, U159, U160, U162, U165, U169, U185, U192, U194, U197, U200, U210, U211, U219, U220, U226, U227, U228, U239, and U244. Although U041, U077, U083, U084, and U213 are also underground injected, because they will be treated on-site, their quantities are not included in required capacity for combustion of liquids. As shown in table III.B.2.(c), the 219 million gallons per year of available capacity are adequate to treat the quantity of hazardous waste annually deepwell-injected requiring this type of treatment. Therefore, these wastes will be restricted from underground injection on August 8, 1990. (For facilities with injection wells directly connected to plant production operations, the effective date is November 8, 1990, as discussed at the beginning of this section).

(10) *Mercury Retorting.* Treatment standards based on mercury retorting are being promulgated for nonwastewaters forms of D009 wastes. As shown in table III.B.2.(c), the less than .01 million gallons per year of available mercury retorting capacity are inadequate to treat the quantity of this waste annually deepwell-injected requiring this type of treatment. EPA is granting a two-year national capacity variance to the nonwastewater forms of D009, restricting this waste from underground injection on May 8, 1992.

(11) *Neutralization.* EPA is promulgating deactivation as the method of treatment for D002 wastewaters and nonwastewaters. For the capacity analysis, EPA assigned all D002 acids and alkalines to neutralization. As indicated in appendix VI, EPA has identified other technologies for treating these wastes. The aggregate capacity of the additional technologies is still insufficient for treating D002 wastewaters and nonwastewaters. Therefore, EPA is granting a two-year national capacity variance for the D002 wastewaters and nonwastewaters, restricting this waste from underground injection on May 8, 1992. Deepwell injected D002 liquids with a pH less than 2.0, which received a two-year national variance in the California list rulemaking, are required

to meet the California list treatment standards on August 8, 1990.

(12) *Stabilization.* For residuals containing D005, D006, D007, D008 (lead-non-battery), D011, K002, K083, K086, and U032, stabilization is part of the treatment train. As shown in Table III.B.2.(c), the 265 million gallons per year of available capacity are adequate to treat the quantity of hazardous waste residuals requiring this type of treatment. These residuals will be prohibited from land disposal on August 8, 1990. (For facilities with injection wells directly connected to plant production operations, the effective date is November 8, 1990, as discussed at the beginning of this section.)

(13) *Wet-Air Oxidation.* K011, K013, and K014, represent all of the underground injected hazardous wastes addressed in today's rule that are best treated by wet-air oxidation. As shown in table III.B.2.(c), the less than 1 million gallons of available capacity are inadequate to treat the quantity of K011 wastewaters, K013 wastewaters, and K014 wastewaters and nonwastewaters annually deepwell-injected requiring this type of treatment. Therefore, EPA is granting a two-year national capacity variance to the wastewater forms of K011, K013, and K014, and the nonwastewater form of K014, prohibiting these wastes from underground injection on May 8, 1992.

(14) *Wet-Air Oxidation followed by Carbon Adsorption.* For P058 wastewaters, treatment standards based on wet-air oxidation and carbon adsorption are being finalized today. As shown in Table III.B.2.(c), the less than 1 million gallons of available capacity are adequate to treat the quantity of P058 annually deepwell-injected required this type of treatment; therefore, EPA is not granting a national capacity variance for this waste. (For facilities with injection wells directly connected to plant production operations, the effective date is November 8, 1990, as discussed at the beginning of this section.)

(15) *Biological Treatment followed by Chemical Precipitation or Wet Air Oxidation followed by Carbon Adsorption followed by Chemical Precipitation.* For F039 (multi-source leachate) wastewaters, EPA is promulgating concentration standards based primarily on biological treatment followed by chemical precipitation or wet air oxidation followed by carbon adsorption followed by chemical precipitation. As shown in table III.B.2.(c), the approximately 14 million gallons of available capacity is insufficient to handle the 15 million gallons of required capacity. EPA notes that the 14 million gallons of available capacity is the maximum available, as a portion of this volume is contributed by a facility that was scheduled to come on-line in 1988. EPA was unable to determine whether this facility is currently operating. Because of the lack of available capacity, EPA is granting a national capacity for this waste.

b. Response to Request for Data on Underground Injected K014 Nonwastewaters.

EPA addressed the underground injection of K011 and K013 nonwastewaters in the June 8, 1989, Second Third final rule. In that rule, a two-year national capacity variance was granted due to the lack of alternative incineration capacity (54 FR 26642). Action on K014 nonwastewaters was deferred so that EPA could evaluate information on the composition, characteristics, and volumes associated with this waste. EPA has received information indicating that, by definition, K014 nonwastewaters are being underground injected. Because inadequate wet-air oxidation capacity exists to treat K014 nonwastewaters, EPA is granting a two-year national capacity variance for the underground injection of these wastes, restricting K014 nonwastewaters from underground injection on May 8, 1992.

c. Deepwell Injected Multi-Source Leachate.

Commenters supported the proposed capacity variance for underground injected multi-source leachate. One commenter provided data or additional volumes of multi-source leachate that are underground injected. Consequently, EPA is updating its estimate of the volume of underground injected multi-source leachate by 1.5 million gallons. EPA estimates that at least 15 million gallons of multi-source leachate wastewaters are currently deep-well injected and will require alternative treatment capacity. EPA believes that most multi-source leachate currently underground injected contains both organic and inorganic constituents. EPA is promulgating concentration standards for wastewaters primarily based on biological treatment followed by chemical precipitation, or wet-air oxidation followed by carbon adsorption followed by chemical precipitation for organic and inorganic constituents. Because there is insufficient capacity to treat wastewaters based on these treatment technologies, EPA is granting a two-year national capacity variance for multi-source leachate that is underground injected. This waste will be prohibited from underground injection on May 8, 1992.

d. Mixed Radioactive Wastes.

EPA requires radioactive wastes mixed with RCRA-regulated solvents and dioxins to meet LDRs and treatment standards established for those solvents and dioxins when mixed with radioactive wastes. EPA currently has no information on mixed radioactive wastes that are underground injected. EPA requested comments on mixed radioactive wastes that are being underground injected. EPA received no information indicating that mixed radioactive wastes were being underground injected; thus, EPA is not granting a national capacity variance for them. These wastes will be prohibited from underground injection on August 8, 1990.

3. Capacity Variances for Contaminated Soil and Debris

Today, EPA is granting an extension of the effective date for certain First, Second, and Third Third contaminated soil and debris for which the treatment standards are based on incineration, vitrification, or mercury retorting; EPA is also granting a national capacity variance for inorganic solids debris contaminated with D004 through D011 wastes. RCRA section 3004(h)(2) allows the Administrator to grant an extension to the effective date based on the earliest date on which adequate alternative capacity will be available, but not to exceed two years ". . . after the effective date of the prohibition which would otherwise apply under subsection (d), (e), (f), or (g)." For First third and Second Third wastes that have heretofore been subject to the "soft hammer" provisions (see section I.B.9) but for which treatment standards are being promulgated today, EPA is interpreting the statutory language " * * * effective date of the prohibition that would otherwise apply" to be the date treatment standards are promulgated for these wastes (i.e., May 8, 1990), rather than the date on which the "soft hammer" provisions took effect (i.e., August 8, 1988, and June 8, 1989, respectively). EPA finds this the best interpretation for two reasons. Extensions of the effective date are based on the available capacity of the BDAT for the waste, so it is reasonable that such an extension begin on the date on which treatment standards based on performance of the BDAT are established. Furthermore, EPA does not intend, in effect, to penalize generators of First Third and Second Third wastes by allowing less time (i.e., 28 months and 37 months, respectively) for the development of needed capacity, while

generators of Third Third wastes in the same treatability group are allowed the maximum 48 months (assuming capacity does not become available at an earlier date). The capacity extension will therefore commence for First, Second, and Third Third wastes on May 8, 1990, and would extend (at maximum) until May 8, 1992.

For the purpose of determining whether a contaminated material is subject to this capacity extension, "soil" is defined as materials that are primarily geologic in origin, such as silt, loam, or clay, and that are indigenous to the natural geological environment. In certain cases, soils will be mixed with liquids or sludges. EPA will determine on a case-by-case basis whether all or portions of such mixtures should be considered soil (52 FR 31197, November 8, 1986).

Debris is generally defined as materials that are primarily non-geologic in origin, such as grass, trees, stumps, shrubs, and man-made materials (e.g., concrete, clothing, partially buried whole or crushed empty drums, capacitors, and other synthetic manufactured items). Debris may also include geologic materials (1) identified as not indigenous to the natural environment at or near the site, or (2) identified as indigenous rocks exceeding a 9.5-mm sieve size that are greater than 10 percent by weight, or that are at a total level that, based on engineering judgment, will affect the performance of available treatment technologies. In many cases, debris will be mixed with liquids or sludges. EPA will determine on a case-by-case basis whether all or portions of such mixtures should be considered debris.

In addition, EPA has established a specific treatability group for inorganic solids debris contaminated with D004 through D011 wastes. Wastes in this treatability group are defined as follows: nonfriable inorganic solids that are incapable of passing through a 9.5-mm standard sieve that require crushing, grinding, or cutting in mechanical sizing equipment prior to stabilization, limited to the following inorganic or metal materials: (1) Metal slags (either dross or scoria); (2) glassified slag; (3) glass; (4) concrete (excluding cementitious or pozzolanic stabilized hazardous wastes); (5) masonry and refractory bricks; (6) metal cans, containers, drums, or tanks; (7) metal nuts, bolts, pipes, pumps, valves, appliances, or industrial equipment; and (8) "scrap metal" (as defined in 40 CFR 261.1(c)(6)). EPA has determined that there is inadequate treatment capacity for all debris in this treatability group. Therefore, EPA is granting inorganic solids debris a national capacity variance.

Analysis of the TSDR Survey data indicated that a volume of approximately 17 million gallons of soil and debris contaminated with wastes subject to this rule were land-disposed in 1986. However, the Superfund remediation program has expanded significantly since that time. Plans for remediation at Superfund sites indicate that the excavation of soil and debris requiring treatment (including incineration and subsequent land disposal) will be far greater in 1990 than in 1986. Because of the major increase in the Superfund remediation program, EPA has determined that capacity is not adequate for incineration, vitrification, and mercury retorting of Third Third contaminated soil and debris. In addition, EPA has determined that there is insufficient treatment for inorganic solids debris. Therefore, EPA is granting a two-year national capacity variance for Third Third contaminated soil and debris for which BDAT is incineration, vitrification, or mercury retorting, and all inorganic solids debris.

EPA is also granting a two-year national capacity variance to all soil and debris contaminated with mixed RCRA/radioactive waste. EPA has estimated that insufficient treatment capacity exists to handle soil and debris contaminated with mixed radioactive waste.

EPA notes that if soil and debris are contaminated with Third Third prohibited wastes whose treatment standard is based on incineration (or other technologies for which EPA determines there is insufficient capacity) and also with other prohibited wastes whose treatment standard is based on an available type of technology, the soil and debris would remain eligible for the national capacity variance. This is because the contaminated soil and debris would still have to be treated by some form of technology that EPA has evaluated as being unavailable at present. However, there is one exception to this principle. If the soil and debris are contaminated with a prohibited waste (or wastes) that is no longer eligible for a national capacity extension, such as certain types of prohibited solvent wastes, then the soil and debris would have to be treated to meet the treatment standard for that prohibited waste (or wastes). Any other interpretation would result in EPA's extending the date of a prohibition beyond the dates established by Congress, and therefore beyond EPA's legal authority.

C. Ninety Day Capacity Variance for Third Third Wastes

EPA is delaying the effective date of the treatment standards in today's rule for three months, or until August 8, 1990 (except for those portions of the rule delayed because of long-term national capacity variances). EPA is taking this step because the Third Third rule is of unusual breadth (approximately 350 waste codes affected, plus all characteristic wastes, multi-source leachate, and mixed wastes), complexity, and difficulty. Persons having to comply must not only determine what the treatment standards are for their wastes, but must also grapple with the interplay between standards for listed and characteristic wastes, certain new interpretations regarding permissible and impermissible dilution, and certain new tracking requirements for characteristic wastes. Although the Agency has made all efforts legally available to communicate its resolution of some of these matters in advance of the May 8, 1990, prohibition date, most members of the regulated community are just receiving notice of the requirements with which they must comply. It takes some reasonable amount of time to determine what compliance entails, as well as time to redesign tracking documents, possibly adjust facility operations, and possibly segregate wastestreams which heretofore had been centrally treated. EPA believes that these legitimate delays are encompassable within the concept of a short-term national capacity variance because part of the notion of available capacity is the ability to get wastes to the treatment capacity in a lawful manner. Accordingly, the Agency is granting a short-term national capacity variance for three months.

The Agency emphasizes that during this variance, all Third Third wastes that remain hazardous and that are being disposed of in landfills or surface impoundments may only be disposed of in landfill or impoundment units that meet the minimum technology standards set out in § 268.5(h)(2). (See also section III.D of today's preamble explaining that a different principle holds for prohibited wastes that are now nonhazardous.) In addition, the recordkeeping requirements of existing 40 CFR 268.7 (a)(4) and (b)(6) will apply during this period. These provisions require a certification that a restricted waste is not subject to a prohibition for enumerated reasons, such as existence of a national capacity variance. EPA does not intend, however, that

recordkeeping requirements apply to characteristic wastes that have been treated to meet the treatment standard during this three-month period. The new recordkeeping requirements applicable to these situations in fact do not take effect for three months based on the Agency's determination that it will take that long to understand how to use them. Thus, tracking documents would only be required for restricted wastes that are hazardous wastes when sent off-site. In addition, all existing treatment requirements (e.g., California list requirements applicable during the period of a capacity extension) are applicable from May 8, 1990 to August 8, 1990.

D. Applicability of Land Disposal Restrictions

1. Introduction

Under RCRA, wastes can be designated as "hazardous" in one of two ways: (1) they may be specifically listed based on EPA's evaluation of factors set out in 40 CFR 261 subpart B ("listed wastes"), or (2) they may be considered hazardous because they exhibit certain indicator characteristics set out in 40 CFR part 261 subpart C ("characteristic wastes").

A central issue in this rulemaking concerns EPA statutory authority to require full treatment for characteristic wastes. Some industry commenters argue that EPA lacks jurisdiction over characteristic wastes if the indicator characteristic is removed before land disposal. Environmentalists and the treatment industry, on the other hand, argue that EPA must, in all cases, require treatment of characteristic wastes in the same manner it would for listed wastes. EPA disagrees with both positions. Rather, EPA believes that the statute provides EPA ample authority to determine whether additional treatment beyond removal of the characteristic is necessary for particular types of wastes to achieve the goals of the statute.

In some cases, EPA is requiring additional treatment beyond removing the characteristic; in others, EPA deems removal of the characteristic itself to be sufficient especially where no toxic contaminants are specifically identified; finally, in several cases, EPA has determined that there is only sufficient information in the record to justify treatment requirements to the characteristic levels at this time. For these respective wastes, data in the administrative record is not adequate to determine whether treatment below characteristic levels is feasible to minimize threats to human health and the environment for the wide range of differing waste matrices encompassed by a single characteristic waste code. In these respective cases, EPA is establishing a treatment level based on its best judgment on the information currently available, and will review its decision in light of new information in the future.

Another critical issue is whether or not to prohibit dilution of characteristic wastes as part of the LDR program. As discussed below, in some circumstances a dilution prohibition is important to ensure actual treatment of the waste. EPA is applying a dilution prohibition to wastes which exhibit a characteristic at the point of generation, with two exceptions. The first exception to the dilution prohibition is for characteristic wastes treated for purposes of CWA requirements. CWA requirements, including CWA dilution rules, serve goals similar to the LDR dilution rules. Relying on the CWA dilution rules will generally accomplish the goals of the LDR program without creating potential inconsistencies or duplication in EPA's regulations. A second general exception to the LDR prohibitions is for characteristic wastes that are subsequently diluted and disposed in injection wells authorized under the SDWA. This exclusion is based, in part, on EPA's evaluation that the disposal of dilute, nonhazardous wastes into appropriately confined injection zones would not constitute a threat to human health and the environment. EPA's decision also is based on the unnecessary regulatory burden that would ensue from application of the LDR prohibitions on the SDWA program regulating nonhazardous well disposal. A more detailed discussion of EPA's rationale and decision rules follow.

2. Legal Authority over Characteristic Wastes

a. *Introduction.* One of the most fundamental issues in this rulemaking is whether the prohibition on the land disposal of untreated characteristic wastes applies at the point of generation or at the point of land disposal. The choice of approach will affect EPA's ability to establish methods of treatment (rather than allowing dilution to meet a level), to apply a dilution prohibition, to require treatment of constituents other than those specifically addressed by the characteristic, and to establish treatment levels below characteristic levels.

This issue arises from current regulatory distinctions between characteristic hazardous wastes and listed hazardous wastes. Listed wastes, and wastes derived from the storage, treatment and disposal of listed wastes, remain hazardous for all regulatory purposes unless that waste is specifically delisted by Agency approval of a delisting petition under 40 CFR 260.22. Thus, a listed hazardous waste remains hazardous from the point of generation through the point of land disposal unless specifically delisted.

In contrast, a characteristic hazardous waste is no longer deemed hazardous when it ceases to exhibit a hazardous waste characteristic. 40 CFR 261.3(d)(1). However, as discussed below, the characteristic level is only one indicator of hazard and, thus, removal of the specific characteristic is not the same as assuring that the waste is safe. Until today, a hazardous waste characteristic could be removed by treatment; however, it could also be removed by simple mixing or dilution. Thus, if LDR requirements were applied only to wastes which exhibit a characteristic at the point of land disposal, EPA would be unable to require full treatment or, in some cases, any legitimate treatment of wastes which exhibit a characteristic at the point of generation.

EPA's proposed approach for both treatment standards and applying a dilution prohibition for characteristic wastes received many comments. Most commenters expressed concern about the regulatory impact of these rules on land disposal facilities regulated under RCRA subtitle D. There was particular concern over the impact of the proposed rules on existing wastewater treatment trains regulated under the Pretreatment and National Pollutant Discharge Elimination System (NPDES) programs, pursuant to sections 307(b) and 402 of the CWA, which use surface impoundments not regulated under RCRA subtitle C. In addition, there were many comments concerning the impact of the proposed rules on the SDWA program for nonhazardous injection wells.

As discussed below, Congress has given apparently conflicting guidance on how the Agency should address land disposal prohibitions for characteristic wates. EPA believes it has authority to reconcile these potential conflicts and to harmonize statutory provisions to forge a coherent regulatory system. (See RCRA Section 1006(b)—"The Administrator shall integrate all provisions of (RCRA) for the purposes of administration and enforcement and shall avoid duplication to the maximum extent practicable, with the appropriate provisions of the (CWA and SDWA)".) Within this authority EPA seeks to further the policy of section 3004(m) to treat hazardous waste prior to land disposal. However, EPA may also take

steps to address problems that could arise from integration of LDR prohibitions in the context of the RCRA Subtitle D, CWA and SDWA programs. A more detailed discussion of the legal authority for this approach is provided below.

b. *General Standard for Agency Construction of Statutes.* Chevron U.S.A. Inc. v. NRDC, 467 U.S. 837 (1984) sets forth a two-step process for determining whether to sustain an agency's statutory interpretations. First, a court determines whether Congress has spoken directly to the precise question at issue. If the intent of Congress is clear, then the agency construction must be consistent with the Congressional directive. If, however, the statute is silent or ambiguous with respect to the specific issue, the agency choice must be based on a permissible construction of the statute. The construction may reflect a reasonable accommodation of policies that are committed to the agency by statute.

For the reasons stated below, EPA believes that Congress has not spoken to the precise question of the point at which LDR prohibitions apply and, thus, the Agency may develop a reasonable interpretation of the statute considering the goals and objectives of the LDR program and RCRA in general.

c. *Scope of Agency Authority for Treatment Requirements.* Several industry commenters argue that EPA must determine the applicability of LDR requirements at the point of land disposal based on the language of RCRA section 3004(g), which authorizes EPA to prohibit "the land disposal of hazardous waste." Commenters argue that this language indicates a Congressional decision to apply LDR requirements only to waste which is listed or exhibits a characteristic at the point of land disposal.

The Agency agrees that this is one permissible construction of the language in section 3004(g). Clearly a waste must be "hazardous" to fall under the mandate of 3004(g). EPA could assess whether or not a waste is hazardous at the point of land disposal to determine whether the prohibition in 3004(g) applies. The Agency, however, does not believe this is the only permissible construction. Although section 3004(g) clearly authorizes EPA to prohibit the land disposal of characteristic waste, it does not specify that the status of the waste for purposes of the prohibition can only be evaluated at the point of land disposal. Rather, the evaluation of whether a hazardous waste is subject to the prohibitions can apply at the point of generation or at the point of disposal (and possibly at some other point or combination of the two). Indeed, section 3004(g)(5) requires EPA to consider "* * * the goal of managing hazardous waste in an appropriate manner *in the first instance*," (emphasis added) when determining the scope of the land disposal prohibitions. See reference to section 3004(d)(1)(B) in section 3004(g)(5). This language can be read to refer to a point of generation approach. Moreover, the statutory structure provides for treatment of hazardous waste under section 3004(m) treatment standards *before* land disposal and not necessarily at the physical point of land disposal. Commenters further argue that the Congressional policy is to limit the scope of the LDR provisions to facilities currently regulated under subtitle C of RCRA.

As discussed below, the Agency has concluded that applying LDR requirements at the point of generation is not only a permissible construction of the statute, but one which may better serve the goals and objectives of the LDR program.[6] Specifically, EPA believes that applying LDR requirements at the point of generation may, in some cases, be necessary to effectuate the requirement that the Agency set treatment standards or methods for characteristic wastes under section 3004(m). As the Agency noted in the proposal at 54 FR 48490, the point of disposal approach could undermine the Congressional goals of the land disposal restrictions in critical ways when applied to characteristic wastes.

First, the Agency would not effectively be able to set a particular method of treatment or limit dilution for a characteristic waste. A point of disposal approach might permit dilution of characteristic wastes, since waste diluted below a characteristic level prior to land disposal would not be regulated by LDR provisions. Such dilution could be in lieu of treatment or a specified method and would not fulfill the goals of section 3004(m). In many cases, dilution simply increases the volume of a waste without reducing or immobilizing the mass of hazardous constitutents in the waste.

Second, the point of disposal approach could be construed to limit treatment standards both in terms of treatment levels and the range of hazardous constituents affected by the treatment standard. For characteristic wastes, a point of disposal approach would, in effect, preclude a requirement to treat below the characteristic level. In some cases, characteristic levels are not levels below which there may be no significant risks to human health and the environment. Rather, the EP (and TC) limits are levels at which wastes clearly are hazardous. 45 FR 33084 (May 19, 1980); 51 FR 21648 (June 13, 1986); 55 FR 11798 (March 29, 1990).[7]

Characteristic wastes also may exhibit both a specific characteristic and contain significant concentrations of other hazardous constituents. (This is true, for example, of the high TOC ignitable wastes and reactive cyanide wastes regulated under today's rule.) Simply treating the one specific characteristic which is an indicator that the waste is a hazardous waste would not necessarily fulfill the goal of section 3004(m), *i.e.*, to "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" (emphasis added). The statutory focus on hazardous constituents beyond the specific characteristic constituent is also enunciated in sections 3004(d)–(g) of RCRA. These provisions authorize EPA to take into account "* * * the persistence, toxicity, mobility, and propensity to bioaccumulate of such hazardous wastes *and their hazardous constituents*" in establishing hazardous

[6] The Agency has previously adopted the point of generation approach with respect to identification of waste subject to the California list prohibitions set out in RCRA section 3004(d)(1) and (2). 52 FR 25760 (July 8, 1987). Like characteristic wastes, California list wastes must contain constituents or exhibit a property above a certain level. Moreover, as a general matter, to ensure the proper management of waste in the first instance, EPA has required application of several 40 CFR part 268 requirements at the point of generation. See § 268.30(a)(3) and 52 FR 21012 (June 4, 1987) (initial generator must determine whether solvent wastes are prohibited); 53 FR 31146–47 (August 17, 1988) and 54 FR 26605 (June 23, 1989) (waste code carry-through principle applies at the point of generation and determines both the prohibition and the treatment standard for listed wastes). All land disposal restriction tracking requirements likewise attach at the point of generation. (268.7(a) and 54 FR 36968 (Sept. 6, 1989).

[7] In *Hazardous Waste Treatment Council* v. *EPA* (HWTC III), 886 F.2d 355 (D.C. Cir. 1989) the court noted that it would be inappropriate under section 3004(m) to require treatment below levels which there are no longer threats to human health and the environment. *Id.* at 363. However, the court noted that the inquiry under section 3004(m) concerning the extent of treatment is different than levels established for other regulatory purposes, and specifically noted that EPA need not construe characteristic levels as levels below which no further minimization of threats can occur. *Id.* at 362. The Agency has recently discussed its rationale for a technology-based approach to treatment standards under section 3004(m) which does not cap the treatment requirements at delistings levels. (See 55 FR 6640, (February 26, 1990). EPA recognizes that *HWTC III* is not dispositive on the issue we address today whether characteristic levels at the point of disposal serve as a jurisdictional bar to application of section 3004(m) treatment standards.

waste prohibitions. Section 3004(d)(1)(C) (emphasis added). Thus, EPA believes it has statutory authority to take into account all aspects of a waste stream in determining appropriate treatment and is not limited to considering merely one specific "characteristic" that indicates that the waste is hazardous in the first instance.

EPA also has general authority under RCRA section 3004 (a)(3) to establish different criteria for determining when wastes will enter and exit the hazardous waste management system—*i.e.*, when they will initially be designated as hazardous waste and when they no longer require RCRA subtitle C management controls. For example, the clean-closure standards for regulated units that hold characteristic wastes require removal of hazardous constitutents even if the waste no longer exhibits a hazardous characteristic. See 53 FR 8705 (March 19, 1987). EPA also has previously promulgated regulations requiring that incinerators treating hazardous waste be operated to a certain efficiency even if a characteristic waste in the waste feed ceases to exhibit a characteristic somewhere in the combustion process.

EPA believes that under the first test in *Chevron*, Congress has neither mandated nor precluded a point of generation approach. In this case the "meaning or reach of a statute involve[s] reconciling conflicting policies." *Chevron*, 467 U.S. at 846 (citation omitted). Moreover, "a full understanding of the force of the statutory policy in the given situation has depended upon more than ordinary knowledge respecting the subject matters subjected to agency regulations." *Id.* Accordingly, EPA should make choices which represent "a reasonable accommodation of conflicting policies that were committed to the agency's care by statute." *Id.*

In this regard, section 1006(b) of RCRA provides EPA authority to integrate provisions of RCRA and other acts it administers, including the CWA and SDWA, for purposes of administration and enforcement. Such integration must be consistent with the goals and policies of these acts. Under this framework, EPA can analyze potential overlaps between regulatory programs in its decision-making. Where the goals are consistent, and uniform administration or enforcement is preferable, EPA may rely on one regulatory framework instead of applying potentially duplicative or inconsistent regulations. Accordingly, the Agency believes that it can harmonize potentially conflicting policies by considering both the benefits of a given approach and any regulatory problems (including regulatory overlap) that would be engendered by the approach. The balancing may thus result in different application of LDR requirements for certain classes of facilities.

d. *Agency Framework for Addressing Treatment Standards for Characteristic Wastes and Integrating them With Other Regulatory Programs.* The Agency believes that it has authority to apply LDR requirements at the point of waste generation for characteristic wastes and that such an approach will generally better achieve the goals of the LDR program. Specifically, EPA believes it has the authority to set treatment levels below the characteristic levels, to specify methods of treatment, and to prohibit dilution for characteristic wastes where necessary and appropriate to further the goals of the statute. EPA recognizes, however, that there are many far-reaching policy considerations respecting the actual implementation of this approach. For example, a point of generation approach could apply to management of waste prior to RCRA subtitle D land disposal.[8]

LDR standards which require waste to be treated to below characteristic levels would apply to wastes currently destined for RCRA subtitle D facilities. Application of the LDR provisions would be a very significant change in the regulatory scheme for these facilities, and could cause major administration and enforcement problems for both EPA and these facilities. For example, EPA currently has no authority to enforce subtitle D criteria against subtitle D facilities, and, hence has no enforcement program for these facilities. In order to ensure that these facilities met the subtitle C requirements, the Agency would have to implement an enforcement scheme that addressed thousands of subtitle D facilities. In addition, owners and operators of subtitle D facilities would need to meet complex LDR tracking requirements. Many may decide not to accept partially treated characteristic wastes rather than comply, thus, diverting potentially large volumes of non-hazardous waste to subtitle C facilities and potentially aggravating capacity problems at subtitle C facilities.[9] As noted in the proposal at 54 FR 48491, some of these problems may be addressed by future regulatory revisions. EPA will continue to evaluate this issue as it addresses standards for the wastes identified by the new Toxicity Characteristic (TC).

In addition, many of these potentially affected subtitle D units contain wastes that are regulated, in part, under the National Pollutant Discharge Elimination System (NPDES) and pretreatment programs under sections 301, 304, 307, and 402 of the CWA, and the Underground Injection Control (UIC) program under the SDWA. Requiring treatment below characteristic levels or imposing a dilution prohibition would require significant changes to the operations of these facilities and create problems of regulatory integration.

This is not to say that the section 3004(m) objectives carry little weight with respect to characteristic wastes. On the contrary, particularly with respect to toxic wastes, these policies are of critical importance. Moreover, many of these potential implementational problems may be addressed by future rulemakings.

Section 1006(b) of RCRA requires the Agency to integrate "for the purposes of administration and enforcement" RCRA subtitle C with the goals and policies of other portions of RCRA, as well as other statutes administered by EPA. In light of this requirement and the absence of any clear Congressional directive to apply LDR requirements directly to subtitle D facilities, the Agency must ask itself whether the benefits of treating below characteristic levels warrant the serious implementation problems such as those discussed above. This is particularly true where the administrative record contains inadequate data to set levels below the characteristic level for the many waste matrices represented by a single characteristic waste code. However, where the data is adequate, EPA believes it can successfully implement treatment requirements beyond removal of the characteristic, on a case-by-case basis, without significant disruptions to other regulatory programs to further the goals of section 3004(m) by requiring treatment beyond removal of the characteristic. EPA is prepared to reevaluate these issues in future rulemakings based on further information and experience with implementing the LDR program.

The extent to which the treatment goals of section 3004(m) are furthered by

[8] Waste disposed into such units would need to meet the treatment requirements unless disposal is (1) into a "no migration" unit approved under 40 CFR part 148 or 268, or (2) into a surface impoundment which meets the requirements of RCRA section 3005(j)(11).

[9] As noted below, EPA has provided a regulatory structure to enforce dilution rules which does not impact subtitle D facilities.

treatment beyond removal of the specific characteristic and by application of LDR dilution rules is discussed below for certain classes of wastes and certain classes of waste management practices. EPA also will consider section 3004(g) and the Congressional directive under section 1000(b) of RCRA to integrate regulatory programs. Accordingly, EPA's approach is to balance both the extent of additional treatment provided from treatment beyond removal of a characteristic and regulatory integration concerns for LDR standards relating to characteristic wastes.[10]

Below, EPA addresses three separate LDR requirements: treatment levels, methods of treatment, and dilution prohibitions. In addition, EPA discusses exclusions for some of these requirements for certain practices regulated under the CWA and SDWA.

3. Treatment Levels

a. *Environmental Considerations.* Section 3004(m) states that treatment standards should substantially diminish the toxicity or mobility and minimize short-term and long-term threats. The legislative history of this provision also states that regulation under RCRA should complement and reciprocally re-enforce regulations under the CWA. S. Rept. at 16. EPA's framework for developing best demonstrated available technologies helps to ensure that toxicity and mobility are minimized. Additionally, the methods or levels derived through the BDAT process also minimize short and long-term threats to human health and the environment. Thus, in establishing BDAT, EPA seeks to achieve substantial reductions in toxicity and mobility, not merely incidental or small reductions. Available data and objectives of the land disposal restrictions program are both relevant for determining the appropriate level of minimization in individual cases. Treatment to a characteristic level will result in a substantial reduction in the toxicity or mobility of the characteristic waste matrices EPA has evaluated in this rulemaking. For example, EPA's stabilization data for arsenic demonstrated untreated EP toxicity from 41 to 6450 mg/l. Treatment of these wastes to the characteristic level of 5 mg/l results in a reduction of 88 to 99.9%. The Agency also believes that further treatment may, in some cases, continue to minimize threats to human health and the environment. However, for other waste treatability groups addressed in this rulemaking, EPA believes it only has sufficient data, at this time, to establish treatment levels at the characteristic level. See section III A above.

This section sets forth EPA's approach for developing treatment standards for each category of characteristic wastes. The Agency based its decisions on the data available at the time of this rulemaking. See RCRA section 3004(d)(1). EPA plans to re-examine these standards as new information becomes available. In addition, EPA will develop additional standards for the newly-identified wastes in the toxicity characteristic rule.

Today's rule reflects a decision to take limited, but nonetheless significant, steps within the point of generation framework. As a general matter, the Agency believes that the goals of section 3004(m) may require application of standards which go beyond the characteristic level (subject to harmonization with section 3004(g) policies) in some future cases. EPA intends in the rulemaking for TC wastes to evaluate more stringent treatment levels for more treatability groups. This would potentially require lower levels for characteristic constituents and treatment of other hazardous constituents in a given characteristic waste matrix. The phased approach in today's rule is consistent with the principle that an agency is entitled to the highest deference in deciding the sequence and grouping in which it addresses issues. *Hazardous Waste Treatment Council* v. *EPA* , 861 F.2d 277, 287 (D.C. Cir. 1988) (upholding EPA's construction of HSWA statutory provisions in a way that allowed the Agency to take one step at a time in implementing the provisions under HSWA); *Associated Gas Distributors* v. *FERC,* 824 F. 2d 981, 1039 (D.C. Cir. 1987).

(1) *Toxic Wastewaters.* EP toxic inorganic wastewaters are primarily destined for NPDES wastewater treatment systems, pretreatment systems and UIC injection wells. Given current data EPA could set treatment levels about an order of magnitude below the characteristic levels for some of the EP toxic metal wastewaters. Imposing treatment standards below the characteristic level, however, could have the effect of invalidating legitimate methods of treatment involving surface impoundments that are part of CWA wastewater treatment trains (equalization basins used to equalize flows to centralized chemical precipitation and sedimentation treatment, for example). A treatment standard below characteristic levels would need to be met prior to placement in a subtitle D treatment impoundment. This would be so even though the impoundment might treat the waste for purposes of CWA requirements. In effect, this could move BAT/PSES standards from end-of-pipe to in-process, requiring facilities to change their existing wastewater treatment systems or comply with internal waste stream requirements that would overlap with CWA requirements. Imposing such standards on Class I non-hazardous UIC disposal could interfere with protective disposal practices with no corresponding environmental benefit (see discussion on dilution below).

As a result, EPA is not imposing treatment standards below characteristic levels for such wastewaters. Based on the information in the rulemaking record virtually all wastewaters are managed in the context of CWA treatment impoundments or UIC wells.[11]

(2) *Toxic nonwastewaters.* With respect to nonwastewaters exhibiting the EP characteristic for metals, EPA determined that BDAT is based on vitrification of stabilization. These technologies are matrix-dependent types of treatment. When considering characteristic wastes, the amount of diversity within a single waste code is typically extensive. This is because, unlike listed wastes, the characteristics do not identify wastes from single processes, single industries, or single chemical species, but rather can come from virtually any process or industry.

[10] In determining that some balancing of competing section 3004(m) and 1006(b)/3004(g) interests is necessary in establishing prohibitions for characteristic wastes, the Agency is further determining that the framework outlined in the court's opinion in *HWTC III,* 886 F. 2d 355 (D.C. Cir. 1989) and the Agency's response to that opinion (55 FR 6640 (Feb. 26, 1990)) is not dispositive in the differing context of characteristic wastes. Both the opinion and the Agency's response dealt with situations where listed hazardous wastes were being disposed so there were no competing interests to balance against the Section 3004(m) mandate. Consequently, the Agency determined that until it could develop *de minimis* concentration levels which establish when threats from prohibited wastes are minimized, it would opt for the certainty of technology-based treatment standards to remove as much of the uncertainty associated with land disposal of hazardous wastes. 55 FR at 6642. Characteristic wastes present a different situation, however, due to the potential disruption of other programs, see supra, and possible minimal benefits to treatment below the characteristic levels in some cases.

[11] If EPA should receive information in the future indicating that significant volumes of wastewater is land disposed in another context EPA will reevaluate the issue of setting treatment levels lower than the characteristic level for EP toxic metals. Again EPA is utilizing its considerable discretion to address issues one at a time. See *HWTCIII,* supra, 861 F. 2d at 287.

Using available data, it is not possible in this rulemaking, due to lack of time and data on this diverse universe, to subcategorize each characteristic waste into treatability groups designed specifically for certain industries or processes. Thus, in considering what treatment standards are achievable for EP toxic metal nonwastewaters, the Agency had to develop uniform standards based on BDAT technology that constitute all or most of the wastes identified by the characteristic.

As discussed in section IIIA. of the preamble, the Agency is confident that these wastes can be treated at least to characteristic levels. However, the Agency is unable to treatment standards below the characteristic level are achievable for all of such wastes. Certainly, as shown by data submitted by the waste treatment industry and other commenters, some samples in these waste categories can be treated to levels below the characteristic, and some to levels well below (an order of magnitude or more, in some cases). The Agency does not believe that these data are sufficiently representative, however, to warrant extrapolation to all waste matrices under a given waste code.[12] See discussion in section IIIA.

In reviewing the additional data submitted by commenters, the Agency was struck by the amount of diversity often present in the treatment data for a particular characteristic, not only confirming the matrix-dependent nature of the technology, but the difficulty of finding a single numerical standard that would be generally achievable for all wastes in that particular metal waste code. Another problem confirmed by data is that many wastes exhibit characteristics for more than one metal, and optimized treatment for one metal can preclude optimized treatment for another. Yet virtually all of the metal treatability data in this record is for treating only one metal.

Even if the Agency had enough data to require treatment below the characteristic levels for these wastes, it would likely have to establish specific treatability groups within the individual codes (as done today to a limited extent). Many of the difficulties in assessing data noted briefly above, and discussed in detail in the sections on each characteristic metal, appear to be industry or process specific. It should be noted that the Agency expects that treatment will result in levels slightly below the characteristic levels in any case. This is because most treatment technologies cannot easily be "turned off" at precisely the characteristic level and, thus, EPA believes the requirement to treat to the characteristic level will often result in further treatment.

For EP toxic pesticide nonwastewaters, treatment is based on a non-matrix dependent technology that can reduce hazardous constituent levels to orders of magnitude below the characteristic level. Thus, the types of difficulties posed for EP metals—assessing treatment achievability for a wide variety of wastes treated by a matrix-dependent technology—are not presented for pesticide wastes. Moreover, the pesticide wastes are potent carcinogens, so that removing the uncertainties of the threats they pose when land disposed is highly desirable. The Agency, thus, is establishing treatment standards for these wastes based on performance of optimized destruction technology. EPA does not believe the general regulatory difficulties in implementing this requirement to treat below characteristic levels are significant in the context of subtitle D facilities as there is a limited amount of this waste in existence and the destruction of the toxic constituents is a clear benefit over other treatment approaches.

(3) *Other Characteristic wastes.* As discussed in section IIIA., for most corrosive, reactive, and ignitable characteristic wastes, the Agency has determined that the appropriate treatment for these wastes is to remove the characteristic. The environmental concerns from the properties of ignitability, corrosivity, and reactivity are different from the environmental concern from EP toxic wastes. Toxic constituents can pose a cumulative impact on land disposal even where waste is below the characteristic level. Where wastes pose an ascertainable toxicity concern, as with high TOC ignitable wastes, and cyanide-bearing and sulfide-bearing reactive wastes, the Agency has developed treatment standards that address the toxicity concern and (in effect) require treatment below the characteristic level. As discussed in section IIIA., this approach is important to address toxic constituents in this waste. EPA does not believe the regulatory problems in implementing standards for this limited number of streams will be significant. Otherwise, treatment that removes the properties of ignitability, corrosivity, and reactivity, fully addresses the environmental concern from the properties themselves. Further discussion is contained in the preamble dealing with each specific characteristic.

b. *Regulatory Problems.* In reaching the approach set forth in today's rule, EPA has considered the advantages of additional treatment, with the difficulties in (1) implementing a requirement to treat below characteristic levels and (2) the effect of such a rule on overlapping federal environmental programs.

The characteristic level evaluated at the point of disposal serves to distinguish certain disposal practices and facilities from other permitting and regulatory requirements under Subtitle C of RCRA. Many commenters argued that there are significant advantages to providing a clear regulatory boundary which serves, in most cases, to separate the jurisdiction of different environmental programs. As discussed above, LDR provisions that apply to require treatment beyond removal of the characteristic might require complicated tracking and enforcement provisions that would apply at many subtitle D disposal facilities which are currently not subject to any subtitle C requirements. The most complicated of such requirements would involve enforcing levels below the characteristic levels. To enforce and implement such requirements, EPA would potentially need to expand the universe of disposal facilities covered by the LDR provisions to perhaps thousands of facilities.

Requiring levels of treatment below the characteristic level would also have specific disruptive impact on practices regulated, in part, under the CWA. In effect, a treatment standard below characteristic levels would need to be met prior to placement in a surface impoundment used in the treatment process. EPA estimates that up to 2000 nonhazardous treatment impoundments could be affected by a requirement for treatment below characteristic levels. There are other difficulties in applying treatment standards below characteristic levels to injection wells regulated under the SDWA which are described in detail below.

EPA does not believe that the current technical data in the record justifies treatment levels below characteristic levels for the nonwastewater EP toxic metals. Thus, EPA has not engaged in an extensive balancing of regulatory integration problems for the wastes in this rule. For the EP toxic pesticides, EPA believes treatment to the levels provided for in the BDAT incineration technology is important to destroy these particularly dangerous pesticides. Because there is a limited amount of these pesticides, EPA believes the

[12] The treatment industry data, for example, was often deficient in such information as to whether and how concentrated characteristic wastes are mixed and back calculations for dilution effects resulting from pretreatment mixing. See section IIIA.

environmental considerations outweigh any difficulties in implementing the LDR requirement to treat below the characteristic level. For wastewaters, EPA believes the regulatory difficulties in integrating the CWA and SDWA programs outweigh the limited benefit from additional treatment based on the current information. Finally, EPA has set requirements to remove certain toxic constituents from certain ignitable and reactive wastes. Some of these treatment requirements are in the form of methods which are discussed below. Again, EPA believes the environmental benefit in terms of treatment outweights the regulatory problems in providing such standards for these wastes because of the limited circumstances involving such wastes.

4. Methods of treatment

a. *Environmental Considerations.* EPA has express authority to specify methods of treatment as the treatment standard. As discussed above, this necessarily entails a point of generation approach. Imposition of these treatment methods normally results in more than the removal of the characteristic and further minimizes threats to human health and the environment.

EPA proposed methods of treatment for certain classes of characteristic wastes. There are several advantages to specifying a method of treatment. First, EPA may not have enough data to set a level of treatment. In such cases, a method can still fulfill the purposes of 3004(m) by providing for treatment. Second, analytic methods may not exist to measure key constituents in a prohibited waste, in which case designation of a method is the only way to ensure treatment. Third, a method may treat other constituents beyond those addressed by the specific characteristic. Finally, specifying a method may preclude other treatment alternatives which the Agency believes create other risks to the environment. For example, some wastewater treatment systems remove volatile organics from the wastestreams simply by venting these volatiles to the atmosphere. However, there are two disadvantages to specifying methods of treatment: (1) It may preclude the use of alternative methods or development of alternatives that are cost-effective and consistent with Agency objectives; and (2) it establish a national requirement that may not be appropriate for a variety of case-specific applications. For these reasons, EPA must consider carefully a decision to rely on methods of treatment.

In today's rulemaking, EPA is specifying incineration or fuel substitution for ignitable characteristic wastes with high levels of total organic carbon (TOC). The TOC content of these wastes serves as an indicator of high concentrations of hazardous constituents which incineration will destroy. See, e.g., Senator Chaffee's floor statement introducing the amendment that became section 3004(m): "for wastes with a high organic content, incineration should be required in lieu of land disposal." 130 Cong. Rec. S9179 (July 25, 1984).

b. *Regulatory Problems.* To have any practical effect, methods of treatment must generally attach at the point of generation. EPA does not believe, however, that this requirement will be difficult to implement in this rule because a limited number of characteristic wastes are affected. EPA is also somewhat limiting the circumstances under which the methods would apply to avoid certain regulatory integration problems with the SDWA program regulating underground injection wells. However, as discussed below, the requirement to incinerate these wastes is entirely consistent with and promoting of the objectives of the CWA. Accordingly, EPA believes the benefits of incineration of certain categories of characteristic waste outweigh any limited regulatory problems under the CWA.

5. General Dilution Prohibition

a. *Environmental Considerations.* Dilution rules are intended to prohibit dilution in lieu of treatment and to ensure that wastes are treated in appropriate ways. As discussed in the preamble sections on treatment of characteristic wastes, EPA believes the mixing of waste streams to eliminate certain characteristic is appropriate treatment for most wastes which are purely corrosive, or in some cases, reactive or ignitable. As a general matter, these are properties which can effectively be removed by mixing. On the other hand, simple dilution is not effective treatment for toxic constituents. Dilution does not itself remove or treat any toxic constituent from the waste. Accordingly, EPA believes that a dilution prohibition for characteristic wastes is important for purposes of the treatment requirements and carries a significant benefit.

The dilution rules will help minimize hazardous constituents that are currently disposed under both the RCRA subtitle C and D programs. Although few data on specific health and environmental impacts resulting from subtitle D facilities are available, the large volume of waste and number of facilities involved present concerns about actual and potential threats. Based on a 1984 study, EPA estimated that there were 7.6 billion tons of industrial nonhazardous waste disposed in approximately 28,000 industrial solid waste and disposal facilities. More than half of these facilities were surface impoundments, which create concerns because of the mobility and physical driving force of liquids in impoundments and the current limited use of design controls. Study results indicated only sporadic use of design and operating controls at industrial solid waste landfills and surface impoundments, with only 12 percent and 22 percent, respectively, employing any type of liner system. (53 FR 33320, August 30, 1988). Study findings also reveal that few of these facilities have monitoring systems, and only 35 percent were inspected by States in 1984, the latest year for which data are available. The present inspection status is unknown. Limited data on violations of State requirements, coupled with these statistics on design and operating controls, suggest that releases may be occurring (53 FR 33320, August 30, 1988). As discussed below, EPA believes this is an area where the environmental benefits imposing a prohibition on characteristic wastes at the point of generation outweigh the problems in integrating other regulatory programs.

b. *Regulatory Problems.* As discussed below, the LDS dilution prohibition could have a significant disruptive effect on practices regulated, in part, by programs under the CWA and SDWA. EPA generally agrees with the many comments regarding impacts on these programs. In harmonizing or reconciling the general need for a dilution prohibition with the need to avoid these disruptive impacts, EPA believes it is appropriate to exempt certain practices from the dilution prohibition. These practices and the rationale for the exemptions are described in the sections that follow.

EPA does not believe these same regulatory problems apply to the program for disposal of other waste under subtitle D of RCRA. Subtitle D establishes a framework for Federal, State, and local government cooperation in controlling the management of nonhazardous solid waste. The Federal role in this arrangement is to establish the overall regulatory direction, to provide minimum standards for protecting human health and the environment, and to provide technical assistance to States for planning and developing environmentally sound waste management practices. The actual planning and direct implementation of

solid waste programs under subtitle D, however, remain State and local functions. Most States impose some set of overall facility performance standards; however, among the States, specific design and operating standards vary greatly.

Under the authority of sections 1008(a)(3) and 4004(a) of RCRA, EPA promulgated the "Criteria for Classification of Solid Waste Disposal Facilities and Practices" (40 CFR part 257), and subsequently issued minor modifications to these Criteria. These Subtitle D Criteria establish minimum national performance standards necessary to ensure that "no reasonable probability of adverse effects on health or the environment" will result from solid waste disposal facilities or practices. The existing Part 257 Criteria include general environmental performance standards addressing eight major topics: floodplains, endangered species, surface water, ground water, land application, disease, air, and safety. Currently, EPA does not have the authority to enforce these criteria directly.

EPA does not believe this regulatory framework is at all similar to those under the CWA and SDWA which, as discussed below, the Agency is excluding from the LDR dilution rules. Specifically, there are limited federal regulatory, implementation or enforcement provisions that would require integration. (This is not the case, incidentially if treatment standards are established below characteristic levels.) In that case, the subtitle D facility would necessarily be involved in the implementation and enforcement of the prohibitions. Accordingly, EPA is codifying the general dilution prohibition for characteristic wastes with certain exceptions.

6. Exemption to Dilution Prohibition for Characteristic Wastes Treated for Purposes of Certain CWA Programs

a. *Introduction.* For listed wastes, there are generally no overlapping CWA and RCRA treatment requirements for wastewater ultimately discharged to a water of the United States or POTW.[13] (Of course, sludges or other residues from NPDES treatment trains which are subsequently land disposed are subject to the land disposal restriction provisions.) Some of these facilities, however, generate waste which exhibits a hazardous characteristic but after mixing with other waste streams ceases to exhibit that characteristic prior to placement in a subtitle D surface impoundment which is part of the wastewater treatment train. These surface impoundments are land disposal units for purposes of LDR prohibitions. The practice of mixing could thus trigger LDR dilution rules. EPA received many comments that the proposed RCRA dilution prohibition for wastewater going into these impoundments could undermine the ability of these operators to use nonhazardous waste surface impoundments as part of their NPDES treatment train.[14] This impact would occur despite the fact that further treatment would occur in the impoundment to remove constituents from the wastewater prior to discharge to waters of the United States or to a POTW. These commenters further argued that application of such RCRA rules to wastewaters already required to be treated under CWA requirements would be unduly confusing and duplicative.

b. *Environmental Considerations.* As discussed below, the NPDES program has a series of technology-based requirements for the treatment of wastewater prior to discharge to waters of the United States. See 33 U.S.C. 1314 and 40 CFR Parts 400–471. These requirements provide for treatment of wastewaters prior to discharge. Indeed, many of the LDR treatment standards are based on data used to set the CWA standards. Thus, EPA believes the overlap of an LDR dilution prohibition where an NPDES treatment train includes a nonhazardous treatment impoundment would not substantially further the treatment goals of the land disposal restrictions.

c. *Regulatory Problems.* The regulatory overlap of similar but not identical dilution rules would create significant regulatory disruption. Section 1006(b) of RCRA provides EPA the authority to consider these integration problems and set requirements that are consistent with the goals and policies of the CWA and RCRA. Many of the effluent limitations guidelines and standards, including all of those reflecting mass-based limits and standards, have factored in controls on dilution. In addition, NPDES permit writers can set requirements which reflect the nature of the treatment process, including best management practices, mass limitations in lieu of concentration based limitations, adjustments to reflect pollutants in intake water, 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 though many the categorical standards). 40 CFR 403.6 (d) and (e).

In this case, the general treatment requirements and associated dilution rules under the CWA are generally consistent with the similar requirements under RCRA. Relying on the existing CWA provisions is, thus, consistent with the goals of both Acts and avoids unnecessary duplication and potentially conflicting requirements.

EPA also believes, however, that where the Agency has established a method of treatment, and where application of that method is consistent with and promotes the objectives of the CWA program, then the dilution prohibition should apply to make it impermissible to dilute these wastes to avoid treating them by the designated treatment method. This group includes the ignitable nonwastewaters containing greater than 10% total organic carbon (TOC). The treatment methods for these wastes is incineration or, in the case of the ignitable waste, fuel substitution. Prohibiting dilution to require the specified method is entirely consistent with the regulatory framework for the CWA programs. The high TOC ignitable wastes, in particular, are inappropriate for wastewater treatment systems as the high TOC levels would overwhelm the capacity for most biological treatment systems. In addition, EPA believes there are few remaining pesticide wastes designated as D012–17. Thus, this requirement should have minimum impact on CWA systems. Accordingly, the exemption from the dilution prohibition for CWA systems is not an exemption for the requirement to follow specific methods of treatment.

[13] Wastewater which contains a listed hazardous waste and is ultimately discharged to waters of the United States under an NPDES permit pursuant to section 402 of the CWA or to a Publicly Owned Treatment Works (POTW) pursuant to section 307 of the CWA is not ordinarily subject to the land disposal prohibitions for several reasons. First, in many situations, the wastewater is managed in tanks prior to discharge and, thus, there is no placement in a land disposal unit. Second, even where a surface impoundment is used to treat hazardous waste prior to discharge such surface impoundments may satisfy the requirements of section 3005(j)(11) of RCRA in lieu of meeting section 3004(m) treatment standards. See § 268.4. Section 3005(j)(11) requires an impoundment to meet certain design requirements set out in section 3004(o)(1) of RCRA and be dredged annually to remove residues.

[14] As noted above, applying LDR requirements at a point of generation would require a facility either to (1) treat the waste prior to placement in the surface impoundment (2) obtain a "no migration variance, (3) comply with section 3005(j)(11); or (4) install tank treatment instead of using surface impoundments.

7. Exemption from LDR Prohibitions for Characteristic Wastes Disposed Below Characteristic Levels in Wells Regulated under the SDWA

a. *Introduction.* EPA has set out a regulatory program under sections 1421, 1422, and 1425 of the SDWA which contains "minimum requirements for effective programs to prevent underground injection which endangers drinking water sources." 42 U.S.C. 300h(b)(1). Class I deep wells inject below the lowermost geologic formation containing an underground source of drinking water (USDW). 40 CFR 144.6(a).[15] These wells are subject to location, construction, and operating requirements set out at 40 CFR parts 144 and 146. In addition, EPA may authorize states to administer the UIC program. 40 CFR parts 145 and 147. There are approximately 400 such wells currently injecting only nonhazardous waste.

The large facilities that have these wells often mix waste streams and through this mixing remove the characteristic prior to disposal. A dilution prohibition would require restructuring of these facilities. Alternatively, the facilities could apply for a "no migration" variance under 40 CFR part 148.

b. *Environmental Considerations.* LDR dilution rules for wastes currently disposed of below the characteristic levels in UIC wells would be limited to toxic wastes. As discussed below, EPA is generally providing that treatment of ignitable, corrosive or reactive wastewater may be accomplished simply by removing the characteristic. This could be accomplished by mixing. (There are a few exceptions discussed in the specific discussion on treatment standards.) These general standards are based on EPA's technical evaluation of appropriate treatment for purposes of 3004(m) regardless of the disposal scenario. Thus, for these particular characteristic wastes, the application of the part 268 dilution prohibition to operators of nonhazardous waste injection wells would not require any additional treatment beyond what is already occurring. Moreover, there is a very limited amount of the pesticide wastes D012–17, and EPA is unaware of deepwell injection practices for these wastes. Thus, the characteristic wastes of concern for UIC wells in this rule are those that exhibit the characteristic of EP toxicity for metals at the point of generation.

[15] A USDW is defined to include aquifers containing waters with up to 10,000 milligrams per liter ("mg/l") of total dissolved solids ("TDS"). 40 CFR 144.3.

EPA believes that the application of dilution rules to these wastes would not further minimize threats to human health and the environment. Specifically, EPA believes that disposal of these metals by underground injection at the characteristic level is as sound as the treatment option. Native formation fluids in injection zones already contain substantial concentrations of these metals. The addition of more metal-bearing fluid below characteristic levels would not appreciably alter these concentrations. Moreover, the propensity of such metals to adhere to and, thereby, generally stay contained in the injection zones makes the practice of deep well disposal of such constituents an environmentally sound one. The example of immobilizing heavy metals in a unit is also noted in the legislative history.[16] In addition, as discussed below, there is a significant body of information that EPA has received from the petition process under 40 CFR part 148 concerning the containment properties of injection zones for dilute levels of the wider range of toxic constituents. This data supports the containment properties of these injection zones.

c. Regulatory Problems. There would be significant regulatory problems from application of a dilution prohibition to this category of facilities. If such a prohibition were to apply, many well operators would seek a "no migration" variance for their wells. EPA considers such wells likely candidates to be granted variances. Currently, however, EPA is processing variances for hazardous waste injection wells and is not processing variances for nonhazardous wells.

Hazardous waste injection is specifically subject to RCRA's land disposal restrictions. RCRA section 3004 (f), (g) and (k). Approximately 65 of these facilities have submitted petitions to obtain "no migration" variances from the LDR treatment requirements as provided for in 40 CFR part 148. EPA has proposed to grant 15 such variances, has granted 12, and anticipates that many other petitions will be both proposed and granted for underground injection. Thus, as a general matter, EPA believes the practice of deep well injection can be a protective practice within the framework of the land disposal restrictions rule. The petition process, however, has been very time consuming and resource intensive. In addition, the process has involved a high degree of coordination with states that are authorized to administer the UIC permit program.

[16] "Another example of a potentially acceptable land treatment situation involves wastes containing heavy metals. Although land treatment does not render the waste nonhazardous, a prohibition would not be necessary if there is long-term certainty that the hazardous constituents would be immobilized" H. Rep. No. 198 at 34.

EPA experience with the "no migration" petition process indicates that many nonhazardous deep wells could probably qualify for a "no migration" variance under 40 CFR part 148. However, operators of nonhazardous waste wells have not had reason to believe that their operations would be subject to the land disposal restrictions and have not submitted variance petitions. Moreover, EPA is not convinced that the Part 148 regulations would be appropriate for nonhazardous waste wells. The goal of the SDWA regulations for deep well injection is containment of the wastes in an injection zone. This goal is consistent with the protectiveness goals behind the "no migration" variance under RCRA. There are no documented problems with the effectiveness of the UIC regulations.

Moreover, even where the practice involved disposal of hazardous waste, Congress fashioned statutory provisions in RCRA which reflect the view that there is more certainty concerning the safety of the deep well disposal practice than surface disposal practices. For example, RCRA sections 3004(c) and 3019(b) ban both landfilling of liquid hazardous waste and underground injection of hazardous waste into or above USDWs. RCRA provisions regarding deep well injection of hazardous waste, however, provided for further EPA review of this method of land disposal and allow for variances from the statutory prohibition. RCRA section 3004 (f) and (g). The legislative history of the 1984 Amendments also state that "underground injection of hazardous waste can be safe environmental technology," Statement of Senator Bentsen, 129 Cong. Rec. S9153 (daily ed. July 25, 1983), and envisioned that compliance with the then-existing underground injection control regulations could be sufficient to justify continued operation. *Id.* Through the Part 148 petitions, EPA has gained further knowledge concerning the critical issues determining the safety of the practice. In general, where the SDWA regulations are followed, injection of dilute amounts of toxic constituents is safe. Where injection is of waste below the characteristic level the injection zone will appropriately contain these hazardous constituents in a properly operating injection well.

Accordingly, if EPA were to apply a dilution prohibition to nonhazardous wells at this time, there would be

considerable disruption at facilities that EPA generally considers safe. On balance, EPA believes it is appropriate to exempt from the LDR prohibitions characteristic waste disposed below the characteristic level in these wells.

E. Implementation of Requirements for Characteristic Wastes

In today's final rule, the Agency is promulgating several new provisions concerning implementation of the land disposal restrictions for characteristic wastes. Specifically, the Agency is amending 40 CFR 268.7 and adding 40 CFR 268.9 to incorporate recordkeeping requirements and special rules for characteristic wastes, and is revising the current regulations in parts 261 and 262 regarding the identification and management of wastes that exhibit a characteristic. In addition, the Agency is clarifying which requirements apply during the period of a national capacity variance both to wastes that are prohibited on the basis of exhibiting a characteristic only, and to wastes that have applicable treatment standards as both listed and characteristic wastes. Finally, the Agency is clarifying whether to apply the TCLP or EP analytical methods to verify compliance with the treatment standards.

1. Overlap of Treatment Standards for Listed Wastes that also Exhibit a Characteristic

The Agency is today promulgating its proposed approach with respect to determining applicable treatment standards for wastes that carry more than one waste code.

(1) For wastes that carry more than one characteristic waste code, the waste must be treated to meet the treatment standard for each characteristic.

(2) If a listed waste also exhibits one or more hazardous characteristics, the waste must be treated to meet the treatment standard for each of the waste codes with one exception. Under that exception, if the relevant constituents or narrative characteristics are specifically addressed in the treatment standard for the listed waste, then the standard for the listed waste operates in lieu of the standard for the relevant characteristic(s).

One commenter suggested that EPA should require treatment in compliance with the most stringent treatment standard rather than the most waste-specific treatment standard. The Agency disagrees, and EPA is following the general principle set out in previous rulemakings that the more specific treatment standard takes precedence. This is the principle EPA adopted with respect to California list wastes that are covered by another treatment standard, an analogous situation. See 52 FR 25773 and 25776 (July 8, 1987). At the same time, when a listed waste exhibits a characteristic that is not addressed by the listed waste's treatment standard, EPA believes it is necessary for that characteristic to be treated to meet the characteristic treatment standard.

The Agency received several comments indicating that subjecting listed wastes to treatment standards for characteristics is a major shift in the current regulatory program. As stated in the proposed rule, the Agency believes that to ignore the characteristic would mean that the Third Third prohibition for that characteristic is being ignored, and that with respect to that constituent, the waste's toxicity or mobility is either not being reduced or not being minimized. Since this outcome would satisfy neither the statutory language nor its policy, EPA is requiring treatment. As with the California list wastes, EPA is applying this principle at the point of generation, since otherwise the treatment standard for the characteristic constituent could be ignored by removing the characteristic. EPA is consequently promulgating new requirements in § 268.9 (b) and (c) as proposed.

EPA is further promulgating provisions specifying that disposal of a waste which at the point of disposal exhibits a characteristic is prohibited unless the treatment standard for that characteristic component is above the characteristic level. This approach is again essentially the same as that which EPA adopted for the analogous situation involving California list wastes (see 52 FR 25767), and is needed to ensure that the statutory prohibition against disposal of characteristic hazardous wastes is not violated.

2. Revisions to Waste Identification Requirements

A consequence of the Agency's interpretation that the prohibition for characteristic wastes can apply concurrently to wastes that also are listed is a change in the initial determination that a generator must make pursuant to § 262.11. That section presently sets out an either/or scheme where if the generator determines that a waste is listed, the generator does not need to determine whether the waste exhibits a characteristic (40 CFR 262.11 (b) and (c)). For purposes of compliance with part 268, however, the generator would need to know if the waste exhibits a characteristic, even if the waste is listed, because further treatment of the waste is required if the treatment standard for the listed waste does not address the characteristic property. Consequently, EPA is amending section 262.11 to indicate that generators must determine whether listed wastes also exhibit characteristics of hazardous waste for purposes of compliance with part 268.

In addition, §§ 261.21—261.24 indicate that wastes that exhibit the respective characteristics and are not listed have the designations D001–D017. However, as discussed above, generators (and other handlers) will need to know both the listed waste code and the characteristic waste code in the event a listed waste also exhibits a characteristic which is not addressed by the treatment standard for the listed waste. EPA is consequently amending the language in these sections to indicate that wastes that carry characteristic waste codes may also be listed wastes.

3. Wastes Subject to a Capacity Variance

RCRA section 3004(h)(4) states that during periods of national capacity variances and case-by-case extensions, hazardous wastes subject to those extensions that are disposed in landfills and surface impoundments may only be disposed of if the landfill or surface impoundment is in compliance with the minimum technological requirements of section 3004(o). EPA has interpreted this language to mean that the landfill or impoundment unit receiving such wastes must be in compliance with the minimum technological requirements, § 268.5(h)(2), and this interpretation was sustained in Mobil Oil v. EPA, 871 F. 2d 149 (D.C. Cir. 1989).

Under the present rule, it is possible for prohibited characteristic wastes subject to a national capacity variance to become nonhazardous. For example, certain D009 mercury wastes are subject to a two-year national capacity variance. If, during the period of the variance, such a waste was treated to be nonhazardous by a means other than retorting and was disposed of in a landfill or surface impoundment, arguably the landfill or impoundment unit would have to meet the minimum technological requirements.

EPA does not read the statute or the rules this way. Rather, section 3004(h)(4) only requires compliance "with the requirements of subsection (o)." Section 3004(o), in turn, only applies to units subject to Subtitle C. See also § 268.5(h)(2), which likewise imposes minimum technological requirements only on landfill and impoundment units that are permitted or that have interim status. Consequently, EPA does not

interpret these provisions as requiring subtitle D landfill and surface impoundment units receiving prohibited wastes during a national capacity variance to have to satisfy the minimum technological requirements.

Finally, for wastes that are subject to more than one treatment standard, the Agency is clarifying that during the period of a national capacity variance for one of the wastes, the treatment standards for any other waste codes that have not received such a variance must be met. For example, if a K048 nonwastewater also exhibits the characteristic for chromium, the waste has a six-month capacity extension as a K048 listed waste, but no capacity extension as a D007 characteristic waste. Therefore, at a minimum, the waste must be treated to meet the treatment standard for D007 (and any other applicable characteristic treatment standard) prior to land disposal. This requirement is consistent with the Agency's approach in previous rulemakings in which it stated that in setting the treatment standard, the Agency is making a more waste-specific determination; however, this determination is not effective until the capacity variance ends. Because capacity exists to treat the characteristic waste, the characteristic treatment standards still apply, and the K048 waste must meet the prohibitions for characteristic wastes. The K048 treatment standard would then become applicable when the national capacity variance expires. See 53 FR 31188. Furthermore, if such listed/characteristic wastes have been treated so that they no longer exhibit any characteristic and are to be disposed of on a surface impoundment or landfill, the unit must meet the minimum technology requirements set out in section 3004(o), as required for listed wastes during the period of a national capacity variance.

4. Use of TCLP v. EP Analytical Methods for Compliance

The Agency proposed two alternatives in the proposed rule, that treatment standards for characteristic wastes either be a numerical standard (typically lower then the characteristic level) or be established at "the characteristic level." See, e.g., 54 FR 48430/3. If the latter alternative were adopted, the Agency did not specify whether the characteristic level would be measured by the EP test or by the TCLP. The Agency did indicate in a somewhat different context, however, that it strongly prefers to use the TCLP to measure compliance wherever possible Id. at 48432/3.

As stated in section III.D of today's preamble, EPA is establishing treatment standards for most characteristic wastes at the characteristic level. The Agency has determined that this level should be measured by the TCLP. This is the protocol that large quantity generators will use to assess the toxicity of their wastes starting on September 25, 1990 and small quantity generators will begin using on March 29, 1991. It is also the protocol used to measure the efficacy of stabilization or other immobilization treatment in most of the BDAT standards. Most of the data submitted in response to the Agency's proposal were based on the TCLP to measure treatment performance, and these data indicate (with a few exceptions) that treatment to the characteristic level, as measured by the TCLP, is achievable. (These data, incidentally, were available for reply comments, and the Agency received dozens of reply comments on the data.)

Furthermore, if EPA were to establish the EP as the protocol to measure compliance with metal standards, then regulated entities would have to subject many wastes to both the EP (for purposes of land disposal restriction compliance) and the TCLP (for waste identification purposes). The Agency prefers not to impose this type of duplicative burden. Accordingly, the Agency is adopting the TCLP as the means of measuring compliance with the metal standards for toxic characteristic Third Third wastes in this rule, with two exceptions. For lead characteristic nonwastewaters and all nonwastewaters containing arsenic as the primary hazardous constituent (*i.e.*, D004, K031, K084, K101, K102, P010, P011, P012, P036, P038, and U136), the Agency is specifying that if a waste does not achieve the nonwastewater standard based on analysis of a TCLP extract but does achieve the standard based on analysis of an EP extract, the waste is in compliance with the standard. The Agency is taking this action because the performance data used to develop the treatment standards for these wastes were based on EP toxicity leachate data. A more detailed discussion is provided in section III.A of today's preamble.

5. Newly Identified TC Wastes

There is one final interpretive point dealing with the interplay of the EP and the new TCLP. EPA interprets the statute such that wastes that exhibit the toxicity characteristic by the TCLP but not the EP are not presently prohibited, even if the constituent causing the waste to exhibit the TCLP is also a constituent controlled by the EP. This is because such wastes are newly identified pursuant to RCRA section 3004(g)(4); they were identified as hazardous after November 7, 1984.

6. Further Principles Governing Applicability

a. *Other Statutory Exemptions or Exclusions.* The issues in this rulemaking concerning when hazardous wastes become prohibited from land disposal does not change the status of other regulatory or statutory inclusions or exclusions to the definition of solid or hazardous waste found at 40 CFR 261.2–.6. These provisions can override the LDR point of generation evaluation to keep wastes from being prohibited and subject to a dilution prohibition or treatment standard. This result is consistent with EPA's existing regulation at 40 CFR 268.1.

EPA believes that different legal and policy considerations under exclusions from the statutory and regulatory definitions of solid waste and hazardous waste require an evaluation of the status of the waste at the point of disposal. Generally, these exclusions address the status of the waste without regard to a particular constituent concentration, and thus do not involve issues of treatment levels or dilution. EPA has not fully analyzed these exclusions and, in the absence of specific justification, will continue to provide exclusions from the land disposal restrictions for waste excluded from the definition of hazardous or solid waste under 40 CFR 261.2–.6.

For example, solid waste does not include solid or dissolved material in domestic sewage. RCRA section 1004(27). EPA regulations further provide that any mixture of domestic sewage and other waste that passes through a sewer system to a Publicly Owned Treatment Works (POTW) for treatment is not solid waste. 40 CFR 261.4(a)(1). Thus, even if a waste is hazardous at the point of generation, the domestic sewage exclusion would allow land disposal of the solid waste at the POTW without meeting treatment standards under section 3004(m) (assuming that there is no land disposal of the waste before it becomes subject to the domestic sewage exclusion).

b. *Restricted Wastes Versus Prohibited Wastes.* Consistent with the cradle-to-grave mandate of RCRA's land disposal restrictions, those who manage hazardous waste will need to assess what LDR prohibitions apply at different points in the waste management process. First, generators of restricted wastes must assess whether the waste is prohibited under the LDR. Restricted waste is defined by several conditions.

See 51 FR at 40619—40632 (November 7, 1986); 54 FR 36967, 36968 (Sept. 6, 1989).

As discussed above, however, certain statutory exemptions that would be evaluated at the point of land disposal may apply to restricted wastes. Moreover, during either a national capacity variance under section 3004(h)(2) or a case-by-case variance under section 3004(h)(3), disposal of certain restricted wastes into certain units would not be prohibited. Also, placement of waste in a "no migration" unit is not prohibited land disposal, nor is placement in an impoundment in compliance with 40 CFR 268.4. In addition, there are situations where waste in managed in a way which results in no land disposal. EPA outlined which LDR prohibitions attach to wastes managed under each one of the above scenarios in 54 FR 36967, 36968 (September 6, 1989).

c. *Changes in Treatability Groups.* The question of whether a given waste is going to prohibited land disposal is complicated by the fact that wastes may change form or treatability groups after undergoing treatment. For example, treatment of a wastewater often generates a nonwastewater sludge as well as a treated wastewater. Also, incineration of a nonwastewater can generate a nonwastewater (ash) as well as a wastewater (scrubber water). (A treatability group is defined both in terms of the applicable waste code and the form the waste is in.) The specific problem addressed here, which occurs most often with respect to characteristic wastes, is the effect that changes in treatability groups have on the initial status of a waste as prohibited or non-prohibited.

First, by way of background, the part 148 and 268 regulations generally divide the universe of wastes potentially subject to land disposal prohibitions into two broad categories: wastewaters and nonwastewaters. For purposes of the LDR program, "wastewaters" are generally defined to have less than 1% total organic carbon (TOC) and less than 1% total suspended solids. Any other waste stream is deemed a nonwastewater. (There are certain enumerated exceptions from certain wastes such as F001–F005 solvents, and K011, K013, and K014 acrylonitrile wastes. See generally § 268.2 in today's rule, incorporating the various regulatory definitions.) Part 268 provides for different treatment standards for these two broad categories of waste. The standards may also have different effective dates because of national capacity variances. Treatment standards for listed wastes apply to the waste as generated as well as to all of the residual wastes that are generated in treating the original prohibited waste. *See* 53 FR 31138, 31145 (August 17, 1988). However, when EPA specifies a treatment method as the treatment standard, residues resulting from the required treatment method are no longer prohibited from land disposal (unless EPA should specify other requirements). 54 FR 26594, 26624, 26630 (June 23, 1989).[17]

A change in treatability group during the waste management process can affect whether the waste prior to the change in treatability groups is subject to certain LDR requirements. The following rules are important to understand this point. First, if a treatability group, and treatment residues in the same treatability group, is not going to prohibited land disposal, then neither the original waste nor the residue is subject to the treatment standards or to the dilution prohibition. As a corollary, waste *is* prohibited if the treatability group, or residues from the same treatability group is land disposed. This interpretation provides a clear line of demarcation, avoids the enormous difficulties of determining new points of generation every time a hazardous waste is altered in some respect, and avoids having an initial waste's status as prohibited determined in all cases by some later management of a residue derived from the initial waste.

d. *Examples.* Several examples will be useful to help clarify this point.

Example 1. Listed wastewater A is treated in a tank that yields two residue streams: nonwastewater residue B and wastewater residue C. The nonwastewater residue is land disposed and the wastewater residue is discharged pursuant to an NPDES permit without being land disposed.

Only nonwastewater residue B is going to prohibited land disposal. Moreover, residue B is a newly generated hazardous waste belonging to a different treatability group than the original waste. *See* 53 FR 31209; 52 FR 25667 col. 1 (July 8, 1987). The original hazardous wastewater A is a restricted waste, but not prohibited, and so is not subject to the dilution prohibition in 40 CFR 268.3 or any treatment standard under part 268. Wastewater residue C also is a restricted waste (due to the "derived from rule" it carries the same hazardous waste code under 40 CFR part 261 as the original waste A), but it is not a prohibited waste because the wastewater treatability group is not going to prohibited land disposal.

Example 2. Listed nonwastewater D is treated to yield two nonwastewater residues E and F (which carry the same waste code as D based on the derived from rule). Residue E is incinerated and the ash is land disposed; residue F is directly reused as a substitute for a commercial chemical product. In this case, nonwastewaters D and E are subject to treatment standards and the dilution prohibition. EPA does not want impermissible dilution of nonwastewater D to be the reason that the nonwastewater residue E meets the BDAT level. Thus, since there is no change in treatability group between the original point of generation and land disposal for one residue of the original waste D the part 268 prohibitions apply. However, residue F is not a prohibited waste because the definition of solid waste excludes secondary materials that are directly reused as substitutes for commercial chemical products.

As illustrated by the above examples, a unit treatment operation can be a point of generation for certain treatability groups. To assess what prohibitions apply, one must first determine whether any residues of the listed waste go to prohibited land disposal. If no residues are land disposed then part 268 treatment requirements do not apply. If one or more residues are placed in prohibited land disposal, the dilution prohibition applies between the point of land disposal and the point that a given treatability group first exists. In example 1, that point is immediately after the tank treatment operation. In example 2, that point is the original point of generation for nonwastewater D.

The rules regarding treatability groups apply similarly to characteristic wastes. The fact that a waste loses its hazardous characteristic at some point prior to land disposal does not constitute a change in treatability group. The fact that the derived from rule does not apply to characteristic wastes is irrelevant because the derived from rule only affects hazardous waste status, not treatability group determination (which is a function of physical form). To determine if a characteristic waste is prohibited, the decision is still made based on whether the waste or any residue in the same treatability group is destined for land disposal. This approach is necessary to assure that this

[17] A facility is not allowed to dilute or perform partial treatment on a waste in order to switch the applicability of a nonwastewater standard to a wastewater standard or vice versa. *See* 52 FR 21012 (June 4, 1987); but see 52 FR 25767 (June 8, 1987) noting special circumstances when California list wastes are involved. Dewatering technologies (such as filtration and centrifugation) that are designed to separate wastewater from nonwastewater are not prohibited.

level was met by treatment and not by dilution. The following example helps illustrate this decision rule.

Example 3. Wastewater J is EP toxic for lead. It is treated in a tank and generates a sludge K, that is non-hazardous. The treated wastewater L, which no longer exhibits a characteristic, is then sent to a surface impoundment for further treatment, after which it is discharged under an NPDES permit. The sludge is sent to a landfill.

The sludge K is not a restricted hazardous waste, notwithstanding that it derives from treatment of a characteristic hazardous waste. This is because it is a new treatability group which is not hazardous at point of generation. The status of wastewaters J and L is determined by the special rules for characteristic wastes managed in CWA systems; therefore, they are prohibited wastes but are not subject to a dilution prohibition. Since wastewater L meets the treatment standard when it is land disposed, the disposal is legal.

Example 4. Electroplating wastewater M which exhibits a hazardous characteristic, is treated in a tank to yield a treated wastewater N and a nonwastewater sludge O. The treated wastewater N, which no longer exhibits a hazardous characteristic, is discharged into a Class I injection well and the sludge is sent to a landfill.

In this example, neither wastewater M nor N is a prohibited waste due to the special rules for wastes managed in Class I injection wells subject to the SDWA. Sludge O is a newly generated waste that meets the listing description for EPA Hazardous Waste No. F006. Sludge O is a prohibited waste because this nonwastewater is destined for placement in a land disposal unit.

Example 5. An EP toxic wastewater slude P is dewatered to yield a nonwastewater sludge Q which is EP toxic and now exceeds the California list level for lead. Also, a wastewater R is generated which exhibits a hazardous characteristic. The sludge Q is sent to a landfill and the wastewater R is mixed with domestic sewage and sent through a sewer system to a POTW.

Both sludges P and Q are prohibited wastes because Q is sent to land disposal and P is in the same treatability group as Q. Note that during a (hypothetical) national capacity variance for the lead characteristic treatment standard, Q must comply with the California list standard for lead. Wastewater R is a restricted waste, but not a prohibited waste because it is covered by a § 261.4 exclusion from the definition of solid waste.

In conclusion, it should be noted that the previous discussion applies in determining when prohibitions attach. The issue of what administrative requirements apply by virtue of a waste being restricted is discussed elsewhere in this preamble.

F. Amended Tracking System for Characteristic Prohibited Wastes

EPA's decisions concerning characteristic wastes necessitate certain modifications of the tracking provisions contained in § 268.7. See 54 FR 48491 and 48492 (requesting comment on this point). This section of the preamble outlines the modifications the Agency is making to the existing rules; and clarifies certain points regarding the rules' applicability to listed wastes as well as to characteristic wastes. The Agency is also amending one of the certification provisions that presently fails to mention compliance with the prohibition on impermissible dilution.

A. Applicability of Tracking Requirements

1. Clarification of and Changes to Generally Applicable Recordkeeping Requirements. Section 268.7 applies to generators, treaters, storers, and disposers of restricted wastes. Most of the provisions contemplate that restricted wastes are being shipped off-site for treatment or disposal (see § 268.7 (a)(2) and (a)(3), and § 268.7 (b)(4) and (b)(5)). The first point the Agency wishes to address is the existing requirements that apply when restricted wastes are managed on-site. At a minimum, certain recordkeeping requirements are triggered. Section 268.7(a) states that generators must first determine whether their waste is restricted. Section 268.7(a)(6) indicates that generators must retain a copy of all demonstrations and other waste analysis or documentation for all wastes sent to either on-site or off-site treatment, storage, or disposal. The Agency interprets these two provisions to mean that ordinarily generators managing hazardous wastes on-site must determine if the waste is restricted, and keep some documentation of that determination plus some documentation of where the restricted waste was treated, stored or disposed—whether treatment, storage, or disposal occurs on-site or off-site. These recordkeeping requirements for on-site management are needed to implement the various prohibitions or to account for those restricted wastes that for some reason are not also prohibited. The Agency notes briefly that certain wastes are not subject to recordkeeping requirements at all by virtue of the exemptions from all of part 268 that are contained in sections 268.1 (b) and (e). (See 54 FR 38968 (September 6, 1989), discussing what a "restricted" waste is.)

The Agency is applying the existing § 268.7 (a) and (a)(6) requirements to characteristic wastes that are restricted under today's final rule. These requirements apply even when the hazardous characteristic is removed prior to disposal, or when the waste is excluded from the definition of hazardous or solid waste under § 261.2–.6 *subsequent to the point of generation.* For example, if a characteristic waste is not prohibited because it is discharged pursuant to a NPDES permit without land disposal, some record must still be kept indicating why the waste is not prohibited. (For example, a statement that there is no land disposal in the system prior to the § 261.4 exclusion should be kept in the facility's operating record.) The rationale for this is that the § 261.4(a)(1) exclusion for domestic sewage does not attach until the mixture passes through the sewer system to a POTW; in the interim, the waste is restricted. (See also section III.E.6 of today's final rule.) Finally, this information should already exist in any case, to justify the absence of subtitle C regulation.

B. Tracking (i.e. Notification/Certification) Provisions Applicable to Generators Shipping Wastes Off-Site

Under existing § 268.7(a), generators managing restricted wastes must determine whether the wastes meet applicable treatment standards on the point of generation, or are otherwise exempt from those standards. Separate tracking provisions apply to each of these situations. Section 268.7(a) (1), (2), and (3). In all cases, however, the generator must prepare a notice for each off-site shipment setting out the hazardous waste identification number, applicable treatment standard or prohibition level, manifest number, and available waste analysis data. If a generator's waste meets the treatment standard, the generator must prepare a certification to this effect. (EPA is thus using the terms "tracking document" and "notification and certification" synonymously in the discussion that follows.)

If a generator's characteristic waste has been treated to meet the treatment standard before it is sent off-site, EPA believes that the existing tracking scheme requires some modification. There are two principal reasons to make changes. Characteristic wastes that meet treatment standards will be sent (almost invariably) to subtitle D facilities. EPA is concerned that sending part 268 notifications and certifications

to subtitle D facilities could be counterproductive. These facilities are not familiar with subtitle C paperwork and could easily mistake the tracking forms (i.e. the notifications and certifications) for manifests and refuse to accept the shipment. Even if the forms are not mistaken for manifests, the subtitle D facilities could view the forms as describing hazardous wastes and refuse to accept the wastes. This could result in a situation where scarce subtitle C management capacity is used for non-hazardous wastes because subtitle D facilities are refusing the non-hazardous wastes.

These potential misunderstandings are probably solvable as subtitle D operators become more sophisticated and as EPA further implements its land disposal restriction training and guidance efforts. The Agnecy believes further, however, that under today's rule no important interest would be vindicated by requiring notifications and certifications to be sent to subtitle D facilities. When listed wastes are involved, the tracking document tells disposal facilities what standard the waste must meet before it can be land disposed. Treatment standards for most characteristic wastes are established at characteristic levels, however. Thus, these wastes can be land disposed in a subtitle D facility when they no longer exhibit a characteristic. Having a generator certify to an off-site subtitle D facility that the waste no longer exhibits a characteristic adds little or nothing to the information the disposal facility needs to know to dispose of the waste. That is, the disposal facility already must determine that the waste no longer exhibits a characteristic. Since under the present rule, sending the tracking forms to subtitle D facilities could normally have only the counterproductive effects discussed in the previous paragraph, EPA has determined that the tracking forms should not accompany shipments from generators to subtitle D facilities. (As noted below, the Agency is adopting the same approach for any shipments to subtitle D facilities, so that a treatment facility that has treated a characteristic waste to meet a treatment standard also would not send tracking documents to a subtitle D disposal facility.) EPA realizes that some of the treatment standards in today's rule, notably those for reactive cyanides and pesticides, and the standards for characteristic wastes that are treatment methods, would generally result in treatment below characteristic levels. In these cases, the tracking documents would add information useful to a subtitle D facility. EPA is concerned enough about potential confusion and disruption of subtitle D disposal practices, however, that at this time the Agency believes it the better decision not to require tracking documents for this set of wastes to go to subtitle D facilities.

By deciding that tracking documents for prohibited characteristic wastes that no longer exhibit a characteristic should not go to subtitle D facilities, the Agency is not deciding that notifications and certifications should not be prepared for such wastes. The Agency's concern is where those notifications and certifications are sent. EPA believes, and is requiring, that the notifications and certifications be sent to the appropriate EPA Regional Administrator or his delegated representative, or to a state authorized to implement the land disposal restrictions. The person preparing the notification and certification must also include the identity and address of the facility where the treated waste is sent, including the address. This is the approach the Agency adopted in an analogous circumstance where sending notifications and certifications to the ultimate disposer would be counterproductive or otherwise be ill-advised. See § 268.7(b)(8) and 53 FR 31198 (Aug. 17, 1988) (notifications and certifications of persons treating hazardous wastes to produce hazardous waste-derived products that are to be used in a manner constituting disposal are to send the notifications and certifications to EPA or to an authorized state, not to the ultimate user of the hazardous waste-derived product). By requiring notifications and certifications to be prepared, EPA is also assuring that a record is kept that the characteristic waste has been treated to meet the standard and not impermissibly diluted. Generators (or treatment facilities, see below) would also have to certify that these requirements were satisfied. Thus, the key objectives of the notification and certification provisions are satisfied.

EPA is making some slight modifications in the notification form that would be sent to EPA (or to an authorized state). This is because the existing notification form refers to the waste's ID number and manifest number when shipped. Since wastes no longer exhibiting a characteristic have neither an ID number nor a manifest number, some small modifications are necessary. While the notification form would not contain hazardous waste codes, it must contain a complete and accurate description of the waste, including its former hazardous waste classification. In addition, although a manifest number would not be included, the notifications must clearly identify the facility receiving the waste.

EPA is not amending the tracking requirements for those characteristic wastes that still exhibit a characteristic when they are sent off-site. All of the normal § 268.7(a)(1) notice requirements fit this situation (i.e. the waste has an ID number; it does have to have a manifest, etc.) and do not require any change. The tracking document also would be going to a subtitle C facility so that none of the counterproductive effects discussed above with respect to subtitle D facilities would occur. Thus, no changes to existing rules are required.

The following examples illustrate how the revised tracking requirements would apply to generators of characteristic wastes:

1. Generator A generates a D008 nonwastewater that is sent off-site to a treatment facility.

The generator would prepare a § 268.7(a)(1) notice which would set out the EPA hazardous waste number, treatment standards, manifest number, and any waste analysis data. Because the waste is still hazardous, no revised notice is necessary.

2. Generator B generates a D008 nonwastewater that is not a spent lead acid battery. The generator treats the waste on-site to meet the treatment standard and then sends it off-site for disposal in a subtitle D landfill.

Generator B would have to prepare a notice and certification to document that the waste has met the treatment standard and has not been diluted impermissibly. Rather than send the notification and certification to a subtitle D facility, the generator would send it instead to the EPA Regional Office or to an authorized state. Included on the notification would be the identity and location of the subtitle D facility where the waste has been sent.

C. Tracking Provisions Applicable to Treaters

EPA is adopting the same approach for treaters of characteristic wastes as it is for generators. Thus, tracking documents for shipments of characteristic wastes that meet a treatment standard, and therefore no longer exhibit a characteristic of hazardous waste, would be sent to EPA or an authorized state (along with information documenting the receiving facility's location), not to a subtitle D facility. The reasons are the same as those for generators discussed above. EPA is also making the same slight

adjustments in the notification requirement.

The following examples illustrate how the amended rules would apply to treaters:

1. Treater A receives a D007 nonwastewater that it treats to meet the treatment standard and sends to a subtitle D landfill. The treater also generates a wastewater in the course of treatment that does not exhibit a characteristic.

The treater must prepare a notice and certification which it would send to the EPA Regional Office or to an authorized state. The wastewater generated during treatment is not a prohibited waste because it is a new treatability group whose status as a non-prohibited waste is determined when it (i.e. the new treatability group) is generated. Therefore, parf 268 does not apply to the wastewater.

2. Treater B receives a high TOC ignitable waste that it incinerates. The ash, which no longer exhibits a characteristic, is sent to a Subtitle D. landfill.

The treater would prepare a notification and certification and send them to EPA or to an authorized state, as in the previous example. At least at this time, the Agency is not requiring that tracking documents be sent to subtitle D facilities, even when the treatment standard is a designated method.

D. Land Disposal Facilities

Under existing rules, subtitle C disposal facilities receiving prohibited wastes must keep copies of the notice and certification prepared by the generator and/or the treater, must test wastes (or waste extracts) at a frequency specified in their waste analysis plan (as modified in today's rule), and must dispose of certain types of wastes in minimum technology units. Section 268.7(c) (1), (2), and (3). These requirements do not fit well for the characteristic wastes prohibited in today's rule. The requirement of disposal in minimum technology units does not have any applicability at all. Moreover, if a land disposal facility is a subtitle D facility receiving non-hazardous waste, EPA does not believe that testing requirements are appropriate to implement today's rule. These facilities are already barred from accepting hazardous waste and so must ascertain if the wastes they are receiving exhibit a characteristic. Thus, since few of the treatment standards adopted today require treatment to levels below the characteristic, the Agency believes that existing controls to ensure against receipt of hazardous waste will constitute sufficient corroborative testing by a disposal facility. The Agency is thus indicating that the requirements of § 268.7(c) do not apply to Subtitle D disposal facilities receiving wastes that no longer exhibit a characteristic.

E. Changes in Certification to Reflect Dilution Prohibition

EPA is also amending the certifications of compliance required of treaters and generators to state that the treatment standard was not achieved by a form of impermissible dilution. This requirement, of course, is already contained in § 268.3 and today's amendment simply includes a reference to this requirement in the certification. (The existing certification for treatment facilities in fact refers to the dilution prohibition, but does so in an overbroad manner by referring to all dilution, rather than only impermissible dilution. EPA is thus modifying this reference in today's rule.)

G. The Dilution Prohibition as it Applies to Centralized Treatment

1. Background

EPA discussed the issue of permissible and impermissible dilution of prohibited wastes at length in previous rulemakings. EPA's existing rules state that prohibited wastes cannot be diluted in order to circumvent a statutory or regulatory prohibition or effective date. 40 CFR 268.3.[18] The rules also generally discourage aggregation of wastes not amenable to cotreatment by providing that when wastes with different standards for a common constituent are combined for purposes of treatment, the treatment residue must meet the lowest applicable treatment standard. 40 CFR 268.41(b).

In interpretive preamble discussions, the Agency explained that these rules are not intended to discourage legitimate centralized treatment, and that aggregation of wastes preceding legitimate centralized treatment is not considered to be impermissible dilution. See *e.g.*, 52 FR 25766 (July 8, 1987) and other notices there cited. However, the Agency noted that centralized treatment of incompatible wastestreams was not legitimate treatment and constitutes impermissible dilution. *Id.* For example, it is impermissible dilution to aggregate a heavily concentrated organic solvent for which incineration is the appropriate treatment technology with less concentrated solvent streams for which biological treatment is appropriate.[19]

In this rulemaking, EPA believes that it is a necessary and responsible action on the Agency's part to indicate how these existing rules apply when prohibited characteristic wastes are involved. Contrary to the views of some of the commenters, this is not a new issue unrelated to the general substance of the Third Third rulemaking. Absent discussion, the existing rules would still apply to prohibited characteristic wastes, but the regulated community would be unaware of how the Agency interpreted their application and would be potentially unable to determine how to conduct their operations in order to comply with the dilution prohibition. EPA also believes that further clarification of the dilution rules with respect to prohibited listed wastes is warranted.

2. Summary of Proposal

EPA's proposal dealt with two particular issues. The first was the question of what constitutes legitimate treatment as opposed to impermissible dilution. The Agency indicated that any dilution that failed to meet the section 3004(m) standard of substantially reducing the prohibited waste's toxicity or mobility would be impermissible, and further proposed to quantify this statutory standard by indicating that there must be some actual reduction in the prohibited waste's toxicity or mobility as a result of treatment. 54 FR 48494. To satisfy this test, the Agency indicated at a minimum that there would need to be actual reduction through treatment of at least one BDAT constituent for each prohibited waste that is treated. *Id.* EPA further proposed that any dilution of a prohibited waste to render it non-hazardous, in lieu of treating, would be considered impermissible. *Id.* at 48495. The Agency solicited comment, however, on whether dilution could be considered a legitimate form of treatment for certain prohibited characteristic wastes. *Id.* at 48496.

These proposals were the focus of many of the comments, most dealing with the implications for wastewater

[18] Although section 268.3 is written in terms of "restricted" hazardous wastes, it applies equally to the narrower class of prohibited hazardous wastes. See 54 FR 38968 (Sept. 6, 1989) explaining the applicability of the dilution prohibition.

[19] EPA notes that its authority to promulgate a dilution prohibition rests not only on the land disposal restriction statutory provisions and Congressional directives (see in particular section 3004(m) and related statutory requirements for EPA to establish pretreatment standards as a condition to land disposal; see also H. Rep. No. 198, 98th Cong. 1st Sess. 38 (1983) and S. Rep. No. 284, 98th Cong. 1st Sess. 17), but in addition, the more general authority in section 3004(a)(3) to establish treatment standards "as may be satisfactory to the Administrator" and "as may be necessary to protect human health and the environment".

treatment systems that include land-based treatment (often biological treatment ponds) or storage (for example, holding ponds for corrosive wastes that have been neutralized by dilution). Commenters also correctly viewed this issue as being intertwined (at proposal) with the implications of requiring treatment of characteristic wastes below the characteristic levels. More broadly still, the issue presents another aspect of the question of whether to determine if wastes are prohibited at the point of generation or at the point of disposal.

3. Today's Action

The existing rules on dilution and EPA's interpretive statements regarding those rules indicate that the dilution prohibition has a two-fold objective: (1) To ensure that prohibited wastes are actually treated; and (2) to ensure that prohibited wastes are treated by methods that are appropriate for that type of waste. EPA has acknowledged that prohibited wastes which are aggregated are not diluted impermissibly if they are treated legitimately in centralized treatment systems, irrespective of the dilution inherent in such a system. Thus, if "dilution" is a legitimate type of treatment, or a necessary pretreatment step in a legitimate treatment system, such dilution is permissible. Conversely, prohibited wastes that are "treated" by inappropriate methods, or sent to treatment systems that do not treat the wastes, are diluted impermissibly.

In applying these principles to characteristic wastes, EPA encountered two major difficulties: first, the interface with regulatory systems established pursuant to the Clean Water Act and Safe Drinking Water Act, and second, difficulties in being able to quantify the proposal in a meaningful way. In section III.D above, we have already discussed the potential difficulties of integrating a full-scale dilution prohibition with the Clean Water Act's NPDES and pretreatment regulations, and the Safe Drinking Water Act's UIC program. We explain below the attempts EPA made to quantify the proposed standard, and the obstacles the Agency encountered.

The Agency's proposal to require reduction of a BDAT constituent as a means of evaluating if impermissible dilution has occurred did not indicate how much reduction would be deemed adequate, and thus without further elaboration not only fails to provide clear guidance but also potentially fails to achieve the objective of assuring that wastes are treated by an appropriate treatment method. More importantly, quantifying the extent of removal necessary to be considered legitimate treatment leads to a very complicated system given the number of prohibited wastes, treatability groups, treatment methods and treatment train configurations.

Given these problems and complications, EPA has decided that the most constructive course is to provide additional interpretive guidance on the existing dilution prohibition contained in § 268.3, and to explain more fully how those rules would apply in specific situations. We also explain again how we have determined to deal with the interface between RCRA and other wastewater regulatory programs.

a. *The existing dilution prohibition ordinarily would not apply to prohibited characteristic wastes generated and managed in treatment systems regulated by the CWA or SDWA.* As explained in a previous section, EPA has determined in most cases not to apply a dilution prohibition to characteristic wastes that are generated and managed in treatment systems regulated under the CWA or SDWA. EPA believes, however, that where the Agency has established a method as the treatment standard for a characteristic waste, and that where application of that method is consistent with and promoting of the objectives of the Clean Water Act or the Safe Drinking Water Act programs, then the method of treatment attaches to the waste at the point of generation, and dilution to change the treatability group to avoid application of the method is impermissible. For example, in this rule, this is true of the ignitible nonwastewaters containing greater than 10% TOC and the EP toxic pesticide wastewaters (D012–17) if these wastes are managed in wastewater treatment systems regulated under the Clean Water Act. The treatment method for these wastes is incineration, fuel substitution, or some type of wastewater treatment technology that destroys organics. Not only are these wastes amenable to conbustion treatment (or other treatment that destroys organics), but they typically contain high concentrations of toxic organic constituents whose destruction furthers the RCRA goal of decreasing waste toxicity and minimizing threats from land disposal.

Prohibiting dilution of these wastes (*i.e.*, requiring application of a specified treatment method) is entirely consistent with the existing regulatory framework of CWA's NPDES/pretreatment programs. For example, the 10% TOC ignitible wastes are inappropriate for wastewater treatment as they would overwhelm the capacity of most biological treatment systems. (As noted in the preamble section describing the D001 treatment standards, EPA in fact developed the 10% TOC cutoff for ignitible wastes based on the outer limit of design capacity for biological treatment systems.) The Clean Water Act effluent limitations guidelines and the standards addressing these types of wastes already contemplate that these wastes will not be diluted, but rather will be treated in the appropriate manner.

The logic that forces this decision for these wastes in a NPDES/pretreatment Clean Water Act system is not equally persuasive in the case of wastes disposed of by injection. As noted in section III.D, Class I deep wells inject below the lowermost geological formation containing an underground source of drinking water. Deep wells are not currently injecting wastes that contain any of the pesticide constituents found in D012–17 characteristic wastes. Additionally, there is not a design concern of overwhelming the biological treatment system in the deep well scenario. In this instance, it is illogical to force deep wells to utilize a specified method as there is little concomitment environmental or technical benefit through its utilization. Therefore, in today's final rule, the Agency is exempting deep wells from specified methods and the dilution prohibition as long as the characteristic is removed before disposal.

b. *Dilution is considered to be an acceptable method of treatment for non-toxic characteristic wastes.* Although EPA proposed that the dilution prohibition would cover all characteristic wastes, the Agency specifically noted that dilution might be an acceptable type of treatment for non-toxic characteristic wastes and solicited comment on the issue. 54 FR 48496. After considering the comments, the Agency has determined that for non-toxic hazardous characteristic wastes (*i.e.*, wastes that exhibit a hazardous physical or chemical property), it should not matter how the non-toxic characteristic property is removed so long as it is removed. Thus, dilution is an acceptable treatment method for such wastes. (This issue is discussed in more detail in the sections on each particular characteristic waste.). The Agency realizes that this approach does not fully address the potential problem of toxic constituents that may be present in such wastes, nor encourages minimization or recovery of non-toxic characteristic hazardous wastes. EPA has determined that these potential problems should be addressed, if at all,

in other rulemakings (or potentially in a reauthorized statute) and are too difficult to resolve in this proceeding, given the extraordinary pressures and limited review time imposed by the May 8 statutory deadline.

EPA also notes that it considers high TOC ignitable nonwastewaters, reactive cyanide wastes, and reactive sulfide wastes to be toxic characteristic wastes. As noted above, the high TOC ignitables have been shown to frequently contain high concentrations of organic toxicants. Reactive cyanide and sulfide wastes obviously contain toxic constituents. Thus, dilution would not be an appropriate method of treatment for any of these.

c. *Determining when types of treatment (including centralized treatment) involving dilution are permissible.* The Agency is able to provide limited additional guidance today on the issue of when treatment methods involving dilution are permissible. The issue frequently arises when prohibited wastes are aggregated for purposes of treatment. First, if the wastes are all legitimately amenable to the same type of treatment, and this method of treatment is utilized for the aggregated wastes, the aggregation step is not impermissible dilution. Thus, it is permissible (and normally desirable) for prohibited organic-containing wastes that are suitable for combustion to be aggregated before combustion even though the concentration of organics in some of the wastes decreases. (See, for example, the discussion for wastes K048–52.) On the other hand, as noted above, aggregation of high TOC ignitable wastes with ignitable wastewaters for centralized biological treatment is not permissible. Biological treatment is inappropriate for the high TOC ignitable wastes, and the aggregation step merely dilutes the high TOC stream.

As noted above, EPA is unable to quantify across-the-board what types of treatment are appropriate for particular prohibited hazardous wastes (both listed and characteristic). Clearly, as stated at proposal, units would have to be doing some treatment (*i.e.*, removing toxicity or mobility of BDAT constituents). In addition, treatment units would have to be treating wastes that are amenable to treatment in that type of unit or by that type of treatment, or, in the case of centralized treatment units treating aggregated wastes, appropriately combining wastes for common treatment. An example of type of treatment that is inappropriate for treatment of certain prohibited wastes would be biological treatment systems used to treat prohibited wastes having treatment standards for metals. In these systems, metal removal is incidental and nowhere as efficient as systems designed to treat metals; biological treatment systems are designed solely for organic treatment. (EPA notes, however, that since it is not applying dilution rules for most characteristic wastewaters, the above example would only apply in cases when a listed prohibited metal-bearing wastewater—a wastewater with treatment standards for metals—was being treated in a biological treatment unit. If this hypothetical biological treatment were a surface impoundment, EPA would not view it as satisfying the requirement of section 3005(j)(11) and § 268.4 that it be conducting "treatment." See discussion at 52 FR 25778–79 (July 8, 1987) where EPA determined in an analogous circumstance that impoundments which primarily evaporate hazardous constituents do not qualify as section 268.4 impoundments which may receive wastes that have not met the treatment standard.) The clearest objective indication that proper treatment for a prohibited waste is being conducted is if the treatment is the same type as that on which the treatment standard is based. Thus, any aggregation before such treatment would ordinarily not be considered to be impermissible dilution. However, other forms of treatment may also be appropriate. Such determinations will be made on a case-by-case basis.

d. Dilution to remove a characteristic. EPA proposed that prohibited hazardous wastes could not be diluted by impermissible means to render them non-hazardous, even though the waste resulting from dilution would not have to be managed in a subtitle C unit. 54 FR 48495. Although this possibility exists for all prohibited wastes—both those that are listed (i.e., dilution to achieve delisting levels) and those that exhibit characteristics—the issue arises most often with respect to characteristic prohibited wastes.

EPA is finalizing this approach in the final rule, modified, however, by a number of principles discussed above. Thus, since it is permissible to dilute prohibited non-toxic ignitable, reactive, and corrosive wastes, it is permissible to remove the characteristic from such wastes by this means. Second, dilution of prohibited characteristic wastewaters is normally permissible because the Agency does not wish to disrupt existing regulatory programs developed under other statutes for such wastewaters. These two modifications address the concerns raised by many of the commenters.

For other situations, however, dilution to remove a prohibited waste's characteristic (or to render it delistable) is used "as a substitute for adequate treatment to achieve compliance with [a treatment standard]", and so falls within the express terms of the § 268.3 dilution prohibition. Furthermore, as the Agency explained in detail in the proposal, if the dilution prohibition were not to apply in such circumstances, the authority Congress granted the Agency to establish treatment standards for characteristic wastes would be essentially meaningless. Thus, EPA adheres to the position that the act of impermissibly diluting a prohibited waste so that it no longer exhibits a characteristic (or is rendered delistable) is illegal.

5. Examples

a. Facility A generates an EP toxic wastewater that it mixes in tanks with other wastewater so that the characteristic is removed. After mixing, the aggregated wastewaters are discharged to waters of the United States.

The dilution prohibition does not apply because the wastewater is not a prohibited waste; it is not being land disposed. In addition, the Agency has determined not to apply the dilution prohibition rules to characteristic wastewaters (with the exception of those subject to certain treatment methods that are managed in Clean Water Act facilities).

b. Facility B generates a wastewater that is corrosive and EP toxic for a pesticide. It is mixed in tanks with other wastewaters generated at the same facility so that both characteristics are removed. The aggregated mixture is then injected into a Class I UIC well. While a restricted waste at the point of generation, these wastes are not prohibited because they are injected below the characteristic level in a Class I injection well. See § 268.1(c)(3).

c. Facility C generates a wastewater that is a listed hazardous waste that contains metals for which EPA has established treatment standards. It aggregates this waste with organic wastewaters that are generated on-site so that the metal levels in the aggregated wastewaters are below the treatment standard. The aggregated mixture is then sent to a surface impoundment for biological treatment and then discharged to waters of the United States.

The dilution prohibition would be violated. EPA does not consider

biological treatment to be an appropriate mode of treating metal-bearing toxic wastes (*i.e.*, wastes for which there are treatment standards for inorganic hazardous constituents). Any metal removal is incidental because the treatment technology is not designed to remove metals. In addition, removals are at a rate that is considerably less efficient than could be achieved by chemical precipitation or other forms of wastewater treatment. Thus, in the example, dilution would be used as a substitute for treatment of the listed waste and would therefore be illegal dilution and not treatment. (See 54 FR 38968 (Sept. 6, 1989) (dilution prohibition applies to wastes managed in section 268.4 impoundments).)

d. Facility D generates an EP toxic nonwastewater that it stabilizes to meet the treatment standard. The waste's volume increases 400 per cent as a result of stabilization.

Although there are too few facts in this example to give a definitive answer, normally this large an increase in waste volume would indicate that the treatment standard is being achieved as a result of dilution rather than treatment, and therefore would be impermissible.

H. Applicability of Today's Final Rule to Mineral Processing Wastes

Section 3001(b)(3)(A)(ii) of RCRA excludes from the hazardous waste regulations (pending completion of studies by the Agency) solid wastes from the extraction, beneficiation and processing of ores and minerals. On September 1, 1989, EPA published a final rule (54 FR 36592) that narrowed the scope of this exclusion for 25 enumerated wastes that meet the exclusion criteria of "high volume/low hazard," as specified in the September 1 rule. EPA determined that five specific mineral processing wastes clearly remain within the scope of the exclusion, and 20 additional specified mineral processing wastes remain within the exclusion pending collection of further volume and hazard data. All previously excluded mineral processing wastes, other than these 25 specified wastes, that exhibit one or more of the characteristics of hazardous waste will no longer be excluded from the hazardous waste regulations when the final rule became effective on March 1, 1990. On January 23, 1990 (see 55 FR 2322–2354), EPA published another final rule removing an additional five of these wastes from the exclusion based on additional volume and/or hazard data. This final rule becomes effective on July 23, 1990.

EPA believes that these previously excluded wastes are "newly identified" for the purpose of determining applicability of the land disposal prohibitions. Although technically the wastes are not being identified by a new characteristic, they are being brought into the Subtitle C system after the November 8, 1984 enactment of HSWA. A permissible interpretation of RCRA section 3004(g)(4), which is ambiguous as to whether it applies to wastes first brought into the Subtitle C system after 1984 due to regulatory re-interpretation, is that wastes brought into the system after the 1984 RCRA amendments may be prohibited from land disposal under a different schedule than those wastes that were hazardous on the date of enactment of HSWA, and also are not subject to the statutory hard hammer. The policy reasons for preferring this interpretation are those that prompted Congress to establish a separate prohibition schedule for other newly identified and listed wastes: the need to study such wastes separately, and prioritization of hammer dates. Consequently, because these wastes are considered to be newly identified, the Agency must develop treatment standards for them within six months of their being identified as hazardous wastes (RCRA section 3004(g)(4)(C)).

However, as stated above, these wastes are hazardous because they exhibit one or more of the characteristics of hazardous waste. Today's rule promulgates treatment standards for characteristic wastes. A question, therefore, is whether the treatment standards for characteristics should apply to these mineral processing wastes recently determined not to fall within the Bevill exclusion. Put another way, although as newly identified wastes they are not subject to the hard hammer, EPA has the choice of whether to apply the treatment standards for characteristic wastes to them at this time.

The Agency has not yet performed the technical analyses necessary to determine if the treatment standards promulgated today as BDAT for EP toxic hazardous wastes or other characteristic hazardous wastes can be achieved in treating the various mineral processing wastes. Therefore, EPA has determined that these newly identified mineral processing wastes are *not* subject to the BDAT standards promulgated today for characteristic hazardous wastes. The Agency plans to study the mineral processing wastes in the future to determine BDAT for these newly identified hazardous wastes.

There are circumstances when newly identified mineral processing wastes can, however, be subject to existing hazardous waste prohibitions. In particular, if the mineral processing waste is mixed with other prohibited wastes (*i.e.*, any prohibited solvent, dioxin, First or Second Third hazardous waste), it becomes subject to the prohibition for the prohibited waste with which it is mixed. EPA also solicited comment on applicability of California list prohibitions, but has determined that these prohibitions will not apply. See section III.F for a discussion of this issue.

Whether any of these prohibitions would have immediate regulatory effect would be determined by the authorization status of the State in which the waste is managed. Because the final rules removing wastes from the scope of the Bevill exclusion are not being adopted pursuant to HSWA, they do not take effect immediately in authorized States. Thus, in these States, these mineral processing wastes would only be hazardous wastes if they are included within the scope of the State's authorized program. If they are not, they would not be hazardous wastes until an amended State's program including them is authorized. Only after authorization would the land disposal prohibitions apply in that State. These mineral processing wastes would be hazardous wastes in unauthorized States as soon as the rule removing them from the exclusion becomes effective. At that time, any land disposal prohibitions that apply to them also would take effect.

The Agency, in the proposed rule, solicited comment on whether the BDAT treatment standards proposed for the EP toxic metals are appropriate for the newly identified mineral processing wastes. Of the comments received, almost all supported EPA's position that the mineral processing wastes are sufficiently different from other characteristic wastes to warrant additional analysis, and that the statutory hammer and the California list prohibitions apply only to those wastes regulated as hazardous at the time of the HSWA enactment.

Several commenters argued against the Agency's position on mineral processing wastes. One commenter stated that since EPA has extensive information available from the listing process, that should be sufficient to develop BDAT treatment standards. However, data collected and analyzed for the purpose of listing a waste as hazardous are different from those required to perform BDAT analyses. In addition, most of the analyses

performed have been to determine if the mineral processing wastes fall within the scope of the Bevill Amendment (*i.e.*, high volume/low hazard). Thus, the Agency does not agree that it has sufficient data to determine BDAT standards for mineral processing wastes.

Another commenter argued that these wastes were improperly excluded from regulation in the first place by an illegal interpretation of the Bevill Amendment in 1980, so should not be considered newly identified at this time. The Agency disagrees with the commenter that mineral processing wastes cannot be considered newly identified wastes. These wastes have become subject to the subtitle C regulations subsequent to the enactment of HSWA, and thus need not be subject to the hard hammer, nor must treatment standards for characteristic hazardous wastes be applied to them in this rulemaking. Certainly, there is no indication in either the statute or the legislative history that in creating a 66-month deadline for characteristic wastes, Congress expected the Agency to address wastes within the scope of the Bevill Amendment at the time of HSWA's promulgation.

I. Generator Notification Requirements

The generator notification requirements set forth in 40 CFR 268.7 specify that when the generator has determined, either through testing or through knowledge of the waste, that the waste is restricted and does not meet the applicable treatment standards, the generator must, with each shipment of waste, notify the treatment facility in writing of the applicable treatment standards and prohibition levels. This notice must include the EPA Hazardous Waste Number, the corresponding treatment standards and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA section 3004(d), the manifest number associated with the shipment of waste, and waste analysis data, where available (40 CFR 268.7(a)(1)). If the generator has determined that the waste being shipped is restricted, but can be land disposed without further treatment, the generator must submit to the land disposal facility the same information, as well as a certification stating that the waste meets the applicable treatment standards (40 CFR 268.7(a)(2)). (EPA reiterates that such determination must, of course, be accurate. Thus, failure to accurately determine a waste's status as restricted is a violation of § 268.7 (a)(1) or (a)(2), as well as a potential violation of other provisions.)

The Agency had received, prior to the Third Third proposed rule, a number of questions on whether the actual treatment standards (*i.e.*, the actual number or method) must be placed on the generator notification form, or if it is sufficient to reference the appropriate treatment standards by citation of the applicable part of 40 CFR 268.41, .42, or .43. EPA's interpretation has been that all applicable treatment standards must be listed completely on the generator notification form sent to the treatment, storage or disposal facility. A number of these pre-proposal commenters had indicated that they believe the current regulations can be interpreted to allow referencing, rather than listing the specific treatment standards as part of the generator notification. The commenters argued that referencing the standards serves the same purpose as listing the specific treatment standards. Furthermore, they stated that the notification forms are becoming longer, more complicated, and unwieldy as new wastes and corresponding treatment standards are added to the list of wastes restricted from land disposal, and thus listing each treatment standard on the notification form imposes an unnecessary burden on generators.

As proposed in the Third Third notice on November 22, 1989 (54 FR 48496), the Agency today is amending 40 CFR 268.7 to allow referencing the Code of Federal Regulations (CFR) rather than listing each treatment standard. EPA solicited comment in the Third Third proposed rule on this action to determine if the regulated community anticipated any problems with referencing of the CFR, and to determine the effect this action would have on hazardous waste generators. The comments EPA received on the proposal were overwhelmingly in favor of allowing referencing the CFR. Commenters stated that this action will significantly reduce the paperwork involved in handling the waste shipments, reduce transcription errors, and in no way cause harm to the environment.

Although EPA today is allowing such references to the CFR, the following information also must be included in the reference: the EPA Hazardous Waste No., the subcategory of the waste code (*e.g.*, D003, reactive cyanide subcategory), the treatability group(s) of the waste(s) (*e.g.*, wastewater or non-wastewater), and the CFR sections and paragraphs where the applicable treatment standards appear. In addition, where treatment standards are expressed as specified technologies in § 268.42, the 5-letter treatment code found in Table I of § 268.42 (*e.g.*, INCIN, WETOX) must be listed. Omissions or inaccuracies in listing any of these items will be considered a violation. In addition, the Agency emphasizes that the change to 40 CFR 268.7 allows referencing of the CFR in lieu of only the individual treatment standards; all other § 268.7 information is still required in the notification.

EPA notes that these revised notification requirements also apply to treatment and storage facilities, with the following exceptions. These changes do not apply to generators, or treatment or storage facilities that ship spent solvents (F001–F005), multi-source leachate (F039) or California list wastes off-site to a disposal facility. These waste categories each contain a number of individual constituents or waste groups (*e.g.*, the waste code for multi-source leachate (F039) contains 230 constituents). Therefore, referencing only the CFR section in lieu of the treatment standards would not provide the disposal facility with meaningful information regarding which constituents might reasonably be expected to be present in the waste. The same is true for California list wastes and spent solvents. For each of these wastes, therefore, all applicable waste groups and individual constituents actually must be listed on the notification.

In addition, some pre-proposal commenters raised concerns about notification requirements with regard to shipments subject to the March 24, 1986 small quantity generator (SQG) rule. This rule, specifically 40 CFR 262.20(e), exempts SQGs (100–1000 kg/mo.) with recycling tolling agreements (as defined in 40 CFR 262.20(e)) from the full Part 262 manifesting requirements. EPA received a number of comments supporting the proposed approach, and today is amending § 268.7 to allow a one-time notification and certification for SQG shipments subject to tolling agreements. Such agreements, as well as the one-time notifications and certifications, must be maintained by the generator for three years after termination or expiration of the agreement in keeping with the provisions of 40 CFR 262.20(e)(2).

The Agency is promulgating this amendment because it believes the subsequent handler of the waste under the contractual tolling arrangement has sufficient notification and knowledge of the nature of the wastes being handled. Tolling agreements provide for the collection and reclamation of a specified waste and for redelivery of regenerated material at a specified frequency. The Agency believes that since the same waste is picked up at regular intervals, one notice will suffice for the duration of

the agreement to apprise the subsequent handler of the land disposal restrictions applicable to the waste.

J. Waste Analysis Plans and Treatment/Disposal Facility Testing Requirements

In the proposed rule, EPA noted that §§ 268.7 (b) and (c) currently require treatment and disposal facilities to test their wastes in order to ensure that they are in compliance with applicable treatment standards and prohibition levels. EPA also noted that these provisions require such testing to be performed according to the frequency specified in the facility's § 264.13 or § 265.13 Waste Analysis Plan (WAP). Although §§ 264.13 and 265.13 require that waste analyses contain enough information to allow the owner/operator to comply with the 40 CFR 268 requirements, the Agency noted that a comment found in both of these sections has created implementation problems. The comment states, "the owner or operator of an off-site (treatment, storage, or disposal) facility may arrange for the generator of the hazardous waste to supply part or all of the (waste analysis) information." This language has been construed erroneously as precluding EPA (or an authorized State) from requiring the owner/operator to conduct a detailed chemical and physical analysis of the waste where the generator has supplied the owner/operator with such waste analysis information. Although EPA stated in the proposal that it has authority to require owner/operators to test their wastes in such cases, the Agency stated its preference for removing any ambiguities and modifying the regulations in order to clarify EPA's intent.

The Agency noted in the proposal its belief that ordinarily, treatment and disposal facilities should do some corroborative testing to ensure compliance with LDR treatment standards and prohibitions. Although there are certainly situations where test data submitted by the generator, or the knowledge of the generator, may constitute an essential part of the necessary information, EPA's proposal was premised on a need to ensure that the LDR requirements are met *prior* to disposal. The Agency also noted that such corroborative testing provides records that may be useful in ascertaining compliance with LDR requriements. Thus, EPA stated that treatment and disposal facilities normally should do periodic independent corroborative testing of prohibited wastes, even if the generator also tests the waste or otherwise certifies that it is eligible for land disposal.

Given this context, the Agency proposed two approaches for specifying the circumstances under which EPA could require corroborative testing. The first approach would allow off-site facilities to arrange for the generator and/or treater of wastes to supply all or part of the waste analysis information only if an EPA-approved WAP affirmatively allows the generator and/or treater to supply this information. Since interim status facilities do not have their WAPs approved until their permit applications are reviewed by EPA (or the authorized State), such facilities would no longer be able to rely upon generator data under this approach. Under the second approach, the Regional Administrator or his designate would determine the owner/operator's testing frequency, but such facilities would be required to conduct waste analyses at least once a year. Since such an approach would be self-implementing, no revisions to existing permits would be necessary.

Numerous commenters pointed out the advantages and disadvantages of both approaches. The primary issues raised by commenters related to the flexibility and resources associated with the proposed approaches. Several commenters supported the flexibility that the first approach would provide. Individual facility circumstances can be considered, which the commenter, believed would result in appropriate testing frequencies. The Agency agrees with the commenters and continues to believe that the frequency of testing is best determined on a case-by-case basis by the permit writer. This is because the range of variables (*e.g.*, variety of wastes managed, different types of waste matrices, number of processes invovled) is too broad to justify a single national testing frequency. However, evaluating the appropriate testing frequencies for every treatment and disposal facility can be very resource-intensive, a task that likely would take several years to complete. Some commenters expressed a preference for specific minimum testing frequencies, in part to establish a baseline level from which to depart. As stated above, a required testing frequency is difficult to specify for all facilities, and would be excessive and redundant in some situations while not being protective enough in others. To address this problem, the Agency is developing guidance to help identify what testing frequency, based on site-specific considerations, is reasonable and appropriate for treatment and disposal facilities.

Several commenters stated that corroborative testing by treatment and disposal facilities is unnecessary where generators supply such waste analysis data. Some of these commenters felt that testing should be required only where the generator does not supply testing data (*i.e.*, where the generator supplies waste characterization data based only on his knowledge of the waste or waste generation process). EPA disagrees with the commenters, and notes that the D.C. Circuit, in upholding EPA's § 268.7 testing framework, has expressed its support for treatment and disposal facility corroborative testing requirements:

> [I]t is the treatment facility's job to *transform* waste otherwise deemed too dangerous to permit into landfills into acceptable form. It is therefore not irrational for the EPA to introduce a backup, arguably "redundant" testing stage for these wastes requiring treatment and even to consider this a "critical" stage in the process.

886 F.2d at 370.

The court also noted that such corroborative testing is necessary for dispoasl facilities:

> [J]ust prior to land disposal, waste must be vigorously tested to confirm that it is what others have represented it to be and that it may permissibly be land disposed.

Id.

Given these concerns, the Agency today is promulgating an approach that combines elements of both the proposed approaches. EPA is revising the comment in §§ 264.13 and 265.13 to implement this approach.

Under the final approach, treatment and disposal facilities may generally rely on information provided to them by generators or treaters of the waste. However, treatment and disposal facilities must conduct periodic detailed physical and chemical analysis on their waste streams to assure that the appropriate part 268 treatment standards are being met. Specifically, today's final rule amends the comment in §§ 264.13 and 265.13 to make it clear that the restricted waste testing requirement (or other frequency approved by the Agency) is not superseded by the ability of the facility to rely on information supplied by the generator or treater. Also, with today's change, § 264.13 more clearly specifies that EPA may, through the permit, require the owner or generator of a treatment or disposal facility to conduct periodic chemical and physical analysis prior to treatment or other management of wastes.

Interim status facilities are subject to the testing requirement for restricted wastes. Interim status waste analysis plans are developed by the facility and maintained on-site, in accordance with self-implementing procedures of § 265.13. Therefore, interim status facility owners or operators should ensure that their plan conforms with today's new requirement. For example, if the facility's plan specifies total reliance on generator or treater-provided information, then the plan will likely need to change to require appropriate testing (See discussion below regarding general Agency waste testing considerations). Also, interim status facilities should update their pending permit applications promptly to ensure that the applications reflect the most current information and today's revised regulatory requirements.

If a permitted facility wants to amend its WAP to better address restricted waste testing requirements, then it would follow the permit modification procedures in § 270.42. Under those modification procedures, a change to indicate a different testing frequency would most likely be a Class 2 modification (see appendix I to § 270.42, item B(1)).

EPA believes that there will be sufficient time to incorporate appropriate waste analysis requirements into the development of permits for the approximately 1000 interim status treatment and storage facilities expected to receive RCRA permits in the next several years. WAPs for permitted storage and treatment facilities (including incinerators) will be examined no later than at permit reissuance. Reevaluation of land disposal facility permits will occur no later than the five year permit review required by § 270.50(d), so WAP changes can be accomplished at that time. It should also be noted that for permitted facilities, EPA may address selected WAPs earlier than the above timeframes by using its general authority to reopen permits when new standards or regulations have been promulgated (§ 270.41(a)(3)).

For both permitted and interim status facilities, the Agency retains its authority (particularly where a revised WAP has not been Agency-approved) to determine that, based on an inspection or other information, the testing frequencies and/or protocols are inadequate at a particular facility. In such cases, EPA (or an authorized State) may take a number of actions, including, but not limited to, terminating or modifiying a facility's permit or pursuing an enforcement action.

In order to aid permit writers and the regulated community in determining the appropriate testing frequencies at both stages in time, the Agency expects to issue guidance soon which will further address these issues.

K. Testing of Wastes Treated in 90-Day Tanks or Containers

As noted in the November 22, 1989 proposal, treatment of prohibited wastes conducted in so-called 90-day tanks (or containers) regulated under § 262.34 is not presently subject to a waste analysis plan requirement. 54 FR 48497. Thus, there is no regulatory vehicle for determining testing frequency in such circumstances. In contrast, under § 268.7(b), treatment facilities treating prohibited hazardous wastes must test the treatment residues that they generate at a frequency determined by their waste analysis plan in order to ascertain compliance with the applicable treatment standards. All treatment facilities operating pursuant to interim status or a full permit must have a waste analysis plan.

Therefore, in order to close this regulatory gap, EPA proposed that generators treating prohibited wastes in § 262.34 tanks and containers must prepare a plan justifying the frequency of testing they choose to adopt (54 FR 48497). EPA disagrees with several commenters who contended that sufficient regulatory mechanisms are already in place for these units. Most importantly, there is no regulation at all addressing testing frequency. Since a substantial volume of hazardous waste is treated in these units, the issue of testing frequency is viewed by the Agency as important for ensuring the integrity of the section 3004(m) treatment standards. Furthermore, today's imposition of a waste analysis plan requirement—addressing, among other issues, testing frequency—on persons treating in 90-day tanks is consistent with the Agency's determination in the Solvents and Dioxins final rule that generators who also treat must assume the same responsibilities as off-site treaters. See 51 FR 40597). Put another way, EPA believes that persons treating prohibited wastes should ordinarily have the same recordkeeping and documentation responsibilities whether the treatment occurs off-site or in 90-day tanks.

Therefore, in today's final rule, the Agency is promulgating the proposed action with several modifications in § 268.7(a)(4). In addition to the modifications (and in accordance with majority of comments), the Agency is clarifying that only generators treating wastes to comply with the applicable BDAT treatment standards (as opposed to wastes treated partially but receiving further off-site treatment before meeting the treatment standard) are subject to the new requirement to prepare a waste analysis plan. Specifically, generators treating prohibited wastes in § 262.34 tanks and containers to meet the applicable BDAT treatment standard must prepare a plan detailing the frequency of testing that is to be conducted. The plan is to be justified on detailed chemical and physical analysis of a representative sample of the prohibited waste(s) being treated, and must contain all information necessary to treat the waste(s) in accordance with requirements of part 268 (see §§ 264.13 and 265.13, from which these substantive requirements are drawn), including the selected testing frequency. Examples of factors EPA would expect to be included in the plan are: discussion of the number of prohibited wastes treated, their variability, and the variability of the treatment process. See section III.J of today's preamble for more detailed information on factors to include in the plan.

EPA does not believe however, that it needs to require waste analysis plans from 90-day generators who treat partially, but do not treat to achieve the treatment standard. Such a requirement would duplicate waste analysis plans of the ultimate treatment facility. The requirement that EPA is adopting today is meant to close an outright regulatory gap which exists only when the 90-day generator is the sole treater.

The plan will be self-implementing in the sense that there is no requirement of prior approval from any regulatory entity. There is, however, a requirement that the plan be retained as a facility record, where it serves as the means of justifying to enforcement officials why the frequency of testing selected by the facility is reasonable. Furthermore, as suggested by several commenters, this plan should be filed with the EPA Regional office or State within 30 days prior to the activity by some mechanism that can verify delivery (*e.g.*, return receipt requested, Federal Express, or messenger). This provision will allow the Agency or State an opportunity to review the testing plan established. EPA notes, however, that it reserves the right at any subsequent time to disapprove of the testing plan. This review mechanism should ease one commenter's concerns about these plans being self-implementing *and* not subject to regulatory review.

L. Clarification of "P" and "U" Solid Wastes

1. Residues Remaining in Containers or Inner Liners

In the November 22, 1989 proposal, EPA proposed several amendments to clarify the existing language of 40 CFR 261.33. The first amendment involved 40 CFR 261.33(c), a provision that lists residues remaining in containers or in an inner liner that have held commercial chemical products listed in 40 CFR 261.33(e). EPA believes that this language was partially in error as it does not include residues remaining in containers or in an inner liner contaminated with the 40 CFR 261.33(f) materials. All of the other provisions in 40 CFR 261.33 refer to both 40 CFR 261.33 (e) and (f) wastes, and there is no reason that 40 CFR 261.33(c) should not as well. The omission results in fact from an oversight, and is not based on any choice by the Agency.

Many commenters misunderstood the Agency's intent by this clarification. It was not our intent to subject "U" wastes (*i.e.*, non-acute hazardous wastes) to the triple-rinsing requirements of 40 CFR 261.7(b)(3) as this section applies solely to acute hazardous wastes. In 40 CFR 261.33(c), there is not a corresponding reference, however, that residues remaining in containers or in an inner liner contaminated with "U" wastes are subject to regulation, unless empty as defined in 40 CFR 261.7(b)(1). This omission could be read as allowing the disposal of full containers of "U" listed wastes. While this would clearly be an incorrect reading, today's final action corrects this omission.

2. Spill Residues

In addition, EPA proposed a clarifying amendment to 40 CFR 261.33(d) to be codified in 40 CFR 261.2 (b) and (c) to state that residues of spills of commercial chemical products listed in 40 CFR 261.33 (e) and (f) will be considered solid wastes if they are not recycled within 90 days of the spill. 54 FR 48493–94. The Agency's rationale was that although such spilled materials may be considered to be "abandoned" under the existing regulatory language, it might be more appropriate to establish a specific time period after which such spills became solid wastes. The Agency noted further that it ordinarily views spilled commercial chemicals as solid wastes because the nature of a spill constitutes disposal, and because of the difficulty of recycling spill residues in such matrices as soil or groundwater. *Id.* In these instances, not only are spill residues of commercial chemical products unlike other 40 CFR 261.33 material (e.g., off-specification products), but the Agency believes that marginal claims of recyclability could be asserted to avoid proper cleanup of spills. *Id.*

While comments on this issue were mixed, a number of commenters made the point that this issue was inappropriate for determination in the Third Third rulemaking because it is not directly related to the Land Disposal Restrictions program. Given that these comments have merit and considering the number of issues that must be decided under the pressing timetable imposed by the statute, the Agency will not go forward with the quantified standard that it proposed.

Furthermore, the Agency believes that this issue can be addressed by interpretation of existing regulations. Under 40 CFR 261.33, mere assertion of intent to recycle a spill residue of a commercial chemical product does not automatically immunize the spill area from RCRA subtitle C jurisdiction. The generator has the burden of proving that the spilled material is not a solid waste, and a generalized assertion does not satisfy the burden. See 40 CFR 261.2(f). Objective considerations that could be pointed to to satisfy this burden include whether the generator has begun to recycle the spill residue, the length of time the spill residue has existed, the value of the spilled material, whether it is technically feasible or technically practical to recycle the spill residue, and whether there is any past history of the company recycling this type of residue. EPA repeats that assertion of intent to recycle does not satisfy the generator's burden of proof. Rather, there must be objective indicators of intent, and the indicators must be strong given that a spill of hazardous material to soil or groundwater is normally a simple act of disposal.

3. *De Minimis* Exception to the Mixture Rule

In the context of the Third Third proposal, several commenters requested clarification of the scope of the mixture rule exemption to the definition of hazardous waste under 40 CFR 261.3(a)(2)(iv). This provision exempts mixtures which contain small amounts of listed spent solvents ("F-listed solvents") or other *de minimis* losses of commercial chemical wastes ("P and U wastes") from manufacturing operations when these listed wastes are mixed with other wastewater "the discharge of which is subject to regulation under either section 402 or section 307(b) of the Clean Water Act (including wastewater at facilities that have eliminated the discharge of wastewater)." [20] Commenters raised the issue of whether disposal of such mixtures via Class I UIC wells allows the facility to claim this exemption. In particular, commenters expressed concern that recent EPA statements regarding the scope of this exemption imply that large volumes of wastewater will require treatment of the P and U wastes within the wastewater stream before injection of a Class I well, and that capacity for treatment of such wastestreams is not currently available.

Before responding to these comments, some background information is in order. RCRA subtitle C generally regulates as hazardous all mixtures of listed hazardous wastes and other solid wastes. One exception from this rule is for mixtures that "consist[] of wastewater the discharge of which is subject to regulation under either section 402 or 307(b) of the Clean Water Act (including wastewater at facilities which have eliminated the discharge of wastewater) and: [contain specific amounts of listed solvents or *de minimis* losses of discarded chemical products]." 40 CFR 261.3(a)(2)(iv). This exception to the mixture rule was established by regulation on November 17, 1981. *See* 46 FR 56582. A specific level for spent solvents is established by the regulation (either 1 ppm or 25 ppm). The regulation sets a worst-case maximum concentration of solvent within the wastewater stream; the actual concentration will almost certainly be less. Conversely, there is no set regulatory concentration for *de minimis* loss levels of P and U wastes that are listed in 40 CFR 261.33(e) and (f).

In the 1981 interim final rule, EPA did not exempt all *de minimis* mixtures generated at all facilities. Rather, EPA limited the exemption as follows: "[The exemption] applies only to wastewater mixtures managed in wastewater treatment systems whose discharge is subject to regulation under * * * the [CWA]. This requirement will help to prevent indiscriminate discharge of wastes into wastewater treatment systems because to do so would jeopardize the generator's ability to comply with its [CWA] discharge requirements. * * * [T]he Agency

[20] The exemption also covers mixtures of small amounts of listed hazardous wastes in wastewaters resulting from laboratory operations. 40 CFR 261.3(a)(2)(iv)(E). Also, there is similar, but not identical, language contained in a final rule that provided interpretations of certain terms and provisions of standards for hazardous waste tank systems (53 FR 34079, September 2, 1988). Today's notice is not changing the applicability of the September 2, 1988 final rule with respect to hazardous waste tank systems.

means to include all facilities which generate wastewater which is discharged into surface water or into a POTW(.) The Agency also means to include those facilities (known as 'zero dischargers') that have eliminated the discharge of wastewater as a result of, or by exceeding (*i.e.*, doing better than), NPDES or pretreatment program requirements.' 46 FR 56584 (Nov. 17, 1981).

Furthermore, the applicability of the mixture rule exemption for P and U wastes was limited to the introduction of these wastes into wastewaters "in the normal handling of these materials, either as raw products used in the manufacturing process or as intermediate or chemical products *used in or produced by the manufacturing process.*" [emphasis added] 46 FR 56586.

Certain commenters assert that the mixture rule exemption currently applies to wastewater disposed of in a UIC well. Specifically, these commenters argue first that all injection wells dispose of wastewater "the discharge of which is subject to regulation [under the CWA]." Second, commenters argue that UIC wells *per se* constitute a method for facilities to "eliminate * * * the discharge of wastewater." Commenters further suggest that wastewater disposal via UIC wells should be exempted as consistent with the purposes for the exemption expressed by EPA, *i.e.*, that such wastewater mixed with *de minimis* levels of listed wastes are adequately regulated by another statute. These commenters express their belief that disposal of such mixtures down UIC wells would be adequately controlled under the UIC regulations, and that injection was the environmentally sound method of disposal for these wastewaters.

EPA does not agree completely with the commenters' analysis of the scope of the mixture rule exemption. First, injection of a fluid in a UIC well is not a "discharge" within the meaning of the CWA. Injection wells can, in appropriate instances, constitute a practice which has "eliminated the discharge of wastewater," but these instances must be evaluated on a case-by-case basis. As the regulation states, the issue is whether the "discharge" is subject to section 402 or 307(b) of the CWA, not whether the facility is "subject to regulation" under section 402. A UIC well, whether or not the state adopts its regulations under 402(d) addressing such a well, is not a CWA discharge point. Thus, facilities with wells for injection of wastewater do not fall within the mixture rule exemption simply because they have an injection well on site.

UIC wells may, however, be "zero discharge" facilities, i.e., those which have eliminated their discharge. To qualify as such a facility, it must satisfy the definition of a "zero discharge" facility outlined in the November 17, 1981 regulation. To repeat the language from the 1981 preamble discussing that provision, "(t)he Agency * * * means to include those facilities (known as 'zero dischargers') that have eliminated the discharge of wastewater *as a result of, or by exceeding, NPDES or pretreatment program requirements.*" 46 FR 56584 (Nov. 17, 1981) [emphasis added]. Thus, a UIC well will certainly qualify as a zero discharge facility *if* the facility injects the wastewater to comply with NPDES permit conditions or an applicable CWA effluent guideline. A well at a facility which is not "subject to (CWA) regulation" under an NPDES permit or an effluent guideline is not within the scope of the language of the mixture rule exemption. EPA notes that this interpretation is fully consistent with its 1981 preamble, and thus does not constitute a "change" in interpretation, as suggested by certain commenters.

EPA notes, that, as a practical matter, the facilities concerned about the scope of the mixture rule exemption are likely unaffected by today's clarification. Most of these facilities are, in fact, in an industry category (organic chemicals) whose facilities are "subject to regulation" under section 402 by virture of the effluent guideline for that category. *See* 40 CFR part 414 (1989). Thus, EPA does not believe that there will be a problem with treatment capacity for P and U wastes, because most wastewaters containing *de minimis* amounts of P and U wastes now being injected are not hazardous waste now being injected are not hazardous waste and will be unaffected by today's rule. Nonetheless, EPA wishes to caution such facilities that the mixture rule exemption does not constitute a license to mix collected volumes of E, P, or U wastes into a treated wastewater stream and then inject such a stream. As EPA clearly stated in 1981, the exemption is designed to cover situations where "various spills or incidental losses" of solvents or commercial chemicals are "reasonably and efficiently managed by being discharged into a plant's wastewater treatment system." 46 FR 56584. EPA clearly did not assume that facilities would attempt to avoid treatment of such wastes.

M. Storage Prohibition

In the proposed rule, EPA recognized that there are concerns with its existing interpretation of the statutory storage prohibition set out in section 3004(j) of RCRA. Section 3004(j) provides that storage of prohibited hazardous waste is itself prohibited "unless such storage is solely for the purpose of the accumulation of such quantities of hazardous waste as are necessary to facilitate proper recovery, treatment, or disposal." Principal concerns are that some storage may be prohibited even where it is not being used with the intent to circumvent the land disposal prohibitions, and whether the storage prohibition should only apply if storage is used as surrogate disposal.

To fully evaluate these concerns, the Agency requested comment on an alternative interpretation of 40 CFR 268.50. Under the alternative approach, storage of prohibited wastes in tanks or containers pending the utilization of proper treatment, recovery or disposal capacity would not be prohibited. EPA provided two examples of allowable storage under this alternative approach:

(1) Where a generator is storing wastes in tanks for six weeks because of a backup at an incinerator which the generator has a contract to use; and

(2) Where a treatment facility treats a prohibited waste to a level that does not meet the treatment standard and then stores the waste before treating it again to meet the standard.

EPA recognized in the proposal that under the alternative approach, the phrase "utilization of *proper* treatment, recovery or disposal capacity" needed to be further defined. The Agency also sought further comment on how a temporal element might be added to the phrase "pending the utilization * * *" in order to define the limits of the proposed approach. Commenters were also asked to address other potential situations where they believed that an overly literal reading of 3004(j) may have consequences they believe Congress did not intend.

Many of the commenters supported the proposed broadening of the allowable bases for storing prohibited wastes. However, the commenters did not offer specific workable suggestions for defining terms such as "pending" and "proper", as EPA noted was necessary. Without objective criteria for defining the limits of allowable storage, EPA believes that the proposed reinterpretation will be very difficult to implement and enforce. For example, does it matter how far in the future—five years, two years, six months—

proper treatment might be utilized? Must there be a contract with a treatment company? What if it is contingent, or contains option provisions? Thus, the Agency is instead retaining its longstanding interpretation of the storage prohibition and is not finalizing the proposed alternative approach.

Under the existing approach, both RCRA 3004(j) and 40 CFR 268.50 provide that storage of prohibited hazardous wastes is itself prohibited "unless such storage is solely for the purpose of the accumulation of such quantities of hazardous waste as are necessary to facilitate proper recovery, treatment or disposal." Storage of prohibited wastes is only allowed in non-land based storage units (*i.e.*, tanks and containers), since land-based storage is a type of land disposal.

Two major principles underlie the storage prohibition: (1) the need to reduce the risks created by long-term storage; and (2) the goal of the Land Disposal Restrictions, and HSWA generally, to encourage the expeditious use of alternative treatment technologies. Cf. *Hazardous Waste Treatment Council* v. *EPA*, 886 F.2d. 355 (D.C. Cir. Sept. 15, 1989) ("*HWTC III*") where the court said:

> Congress believed that permitting storage of large quantities of waste as a means of forestalling treatment would involve health threats equally serious to those posed by land disposal, and therefore opted in large part for a "treat as you go" regulatory regime.

886 F.2d. at 357.

Mechanisms such as national capacity variances and case-by-case extensions are intended to address situations where there is a lack of treatment capacity.

No firm time limit is established pursuant to § 268.50. Generators and owners or operators can store as long as necessary. The legislative history makes it clear that the intent of RCRA 3004(j) and § 268.50 is to prohibit use of long-term storage to circumvent treatment requirements imposed by the Land Disposal Restrictions. 129 Cong. Rec. H8139 (daily ed. October 6, 1983). However, if prohibited wastes are stored beyond one year, the owner/operator has the burden of proving (in the event of an enforcement action) that such storage is for the allowable reason; prior to one year, EPA maintains the burden of proving that storage has occurred for the wrong reason.

Finally, EPA reemphasizes that intent is not a critical factor in determining liability. In order to successfully enforce this provision, the Agency need not demonstrate that those storing prohibited wastes have a particular state of mind. Rather, objective factors such as the type and amount of waste in storage and the time in storage still may be relied upon as the key factors in interpreting this provision. In determining whether storage is lawful, the Agency will continue to evaluate these factors in light of its "treat as you go" approach noted in *HWTC III*. EPA notes, however, that the intent of those storing prohibited wastes may be relevant in the Agency's determination regarding what type of relief, if any, to seek in a civil or criminal enforcement action.

1. Storage of Radioactive Mixed Waste

Several commenters urged the Agency to modify its existing interpretation of the section 3004(j) storage prohibition as it relates to radioactive mixed waste. Mixed waste contains both a hazardous waste component subject to RCRA hazardous waste management standards and a radioactive waste component regulated under the Atomic Energy Act (AEA). The commenters asserted that there is little or no available permitted treatment or disposal capacity for commercially generated mixed waste, and that many of these mixed wastes contain spent solvents or California list wastes that are not eligible for the national capacity variance which EPA is granting for mixed waste containing first, second, and third-third wastes. The commenters emphasized that generators have no practical option but to store their prohibited mixed waste on-site, pending the availability of treatment and disposal capacity. The commenters stated that the Agency should not interpret such storage as "surrogate disposal" that violates section 3004(j), since this interpretation would result in a requirement allowing no possibility of compliance by generators. The commenters further asserted that interpreting section 3004(j) in this manner could give rise to an inconsistency with the AEA, within the meaning of RCRA section 1006(a).

EPA is aware of the difficulties posed by the applicability of the section 3004(j) storage prohibition to mixed wastes under circumstances where there is no treatment or disposal capacity. These issues and their effects on certain low-level waste generators (e.g., hospitals, research institutions, universities), were also discussed at length in a recent report developed by the Office of Technology Assessment (OTA). (See "Partnerships Under Pressure, Managing Commercial Low-level Radioactive Waste," OTA, November 1989).

EPA acknowledges that the current shortage of treatment or disposal capacity, and the requirements and deadlines under other statutory programs, are factors which are affecting the management of mixed waste. EPA will further evaluate the legal, policy, and factual issues relevant to this matter. Since this issue is not material to the requirements which EPA must promulgate in order to meet the May 8, 1990 Third Third rule statutory deadline, EPA will resolve this matter separately from this rulemaking. The Agency expects to issue its policy on the mixed waste storage issue during the next 90 days.

N. Case-by-Case Extensions

Under RCRA Section 3004(h)(3), EPA can grant case-by-case extensions of the prohibition effective dates for up to one year beyond the applicable deadlines; extensions are renewable once for up to one additional year. On November 7, 1986, EPA published a final rule (51 FR 40572) establishing the regulatory framework to implement the land disposal restrictions program, including the procedures for submitting case-by-case petitions.

To obtain a case-by-case extension, the statute requires that the applicant make the following demonstrations:

(1) A binding contractual commitment has been made to construct or otherwise provide alternative treatment, recovery, or disposal capacity that protects human health and the environment.[21]

(2) Due to circumstances beyond his or her control, such alternative capacity cannot reasonably be made available by the applicable effective date.

(3) If a surface impoundment or landfill is used by the applicant to manage the waste during the extension period, the unit must meet the requirements of section 3004(o). EPA has interpreted these statutory provisions to also require the following (see 40 CFR 268.5(a)):

(1) A good-faith effort must be made to locate and contract with treatment, recovery, or disposal facilities nationwide to manage the waste in accordance with restrictions by the applicable effective date.

(2) The capacity being constructed or otherwise provided will be sufficient to manage the entire quantity of waste that is the subject of the petition.

---

[21] Section 3004(h)(3) refers to "such alternative capacity," referring back to Section 3004(h)(2), which speaks of "alternative treatment, recovery, or disposal capacity which protects human health and the environment." For disposal capacity, EPA interprets this language to mean a no-migration unit, See Sections 3004 (d)(1), (e)(1), and (g)(5). For treatment and recovery capacity, the reference refers to capacity that satisfies the Section 3004(m) standard.

(3) A detailed schedule for obtaining required operating and constructing permits, or an outline of how and when alternative capacity will be available.

(4) Adequate capacity is available to manage the waste during the extension period, documenting in the petition the location of all sites at which the waste will be managed.

After an applicant has been granted a case-by-case extension, the applicant must notify the Administrator as soon as he or she has knowledge of any change in the demonstrations made in the petition. In addition, the applicant must submit progress reports, at specified intervals, that describe the progress being made towards obtaining adequate alternative capacity, identify any delay or possible delay in developing the capacity, and describe the mitigating actions being taken in response to the event. See 40 CFR 268.5 (f) and (g).

The Agency has received a number of inquiries on whether a proposed no-migration petition or proposed treatability variance would satisfy the first statutory requirement. That is, could a proposed no-migration variance or a proposed treatability variance constitute the "alternative treatment, recovery, or disposal capacity." If so, and if the Agency were to grant a case-by-case extension, this could provide petitioners with additional time while their no-migration petition or treatability variance is being considered for final approval.

First, it should be noted that the amount of time required to process no-migration and treatability variances (for other than injected wastes) is expected to be 12–18 months due to the complexity of the technical demonstrations that must be made, and their subsequent evaluation. On the other hand, the case-by-case petitions generally can be processed in about 6–8 months because the required demonstrations are more straightforward. This could give the petitioner about 6 months of relief. Some petitioners believe that there are a number of legitimate circumstances where the few extra months gained would make the difference between closing a facility which ultimately will be granted a valid variance request, and keeping it in operation.

In response to these inquiries, EPA is taking this opportunity to clarify that the statutory requirement to obtain a "binding contractual commitment to construct or otherwise provide alternative treatment, recovery, or disposal capacity" may be satisfied by a Federal Register notice wherein the Agency *proposes* to grant either a no-migration extension or a treatability variance. The Agency believes that EPA's proposing to grant either a treatability variance petition or a no-migration petition is sufficient demonstration that the petitioner has made a good faith effort to commit to obtaining alternative protective disposal capacity; any further commitment is solely contingent on EPA's action at this point. In addition, the Agency's action in proposing to grant the variance petition serves as a partial imprimatur that the alternative capacity under consideration will prove to be protective. However, the mere filing of a variance petition provides no such guarantee (most of the no-migration petitions for surface units filed to date, for example, have proven technically deficient), and thus cannot be deemed to satisfy the statutory requirement.

Of course, should EPA then grant a case-by-case extension, that grant would be conditional: if EPA denies the no-migration petition or the treatability variance, then the basis for the case-by-case extension may no longer exist, and the variance will be terminated unless there is additional basis for the variance. In addition, when the no-migration or treatability variance is granted, the case-by-case extension automatically expires (since it is no longer needed).

Because significant time and resources would have been expended on the case-by-case petition review unnecessarily if the no-migration petition or treatability variance is ultimately denied, EPA will begin review of a case-by-case extension petition *only* after receiving a clear indication that the Agency has the intention of proposing to grant the no-migration petition or treatability variance (and will not propose to grant a case-by-case extension unless the Agency has actually proposed to grant the variance). Conversely, when the clear indication is that the no-migration petition or treatability variance will be denied, EPA will not review the case-by-case petition, and the petitioner will be notified at the same time he or she is notified of the status of the other petition.

O. Applicability of California List Prohibitions after May 8, 1990

In the November 22, 1989 proposal, EPA discussed two issues relating to California list wastes. 54 FR 48498. The first issue is the question of continued applicability of California list prohibitions to wastes which are granted a national capacity variance in today's rulemaking. The second issue is whether California list prohibitions apply to wastes that are first identified and listed after the date of the HSWA amendments. 54 FR 48498–99.

EPA discussed the relationship of California list prohibitions to scheduled wastes subject to a capacity variance (either national or case-by-case) in the preamble to the First Third rule. 53 FR 31188. The Agency established in the First Third rule that although specific prohibitions and treatment standards take precedence over California list prohibitions, during the period of a capacity variance the California list prohibitions continue to apply. EPA included this discussion in the Third Third proposal not to reopen the issue but to put persons on notice that the same reading applies to Third Third wastes, including characteristic wastes. In fact, the few commenters on the issue indicated that they agreed with and were aware of the Agency's position.

The Agency did solicit comment, however, on whether it would be permissible to reevaluate whether the California list prohibitions for acid corrosive wastes would apply during the period of a national capacity variance for Third Third acid corrosive wastes (which are identical substances). Several commenters suggested that the prohibition for California list corrosives should not apply to Third Third corrosives that are granted national capacity variances in today's rulemaking. The Agency disagrees with this assertion and believes that not applying the more generally applicable California list prohibitions as an interim prohibition is contrary to the literal statutory language and enunciations of Congressional intent in the legislative history. See S. Rep. No. 284, 98th Cong. 1st Sess. 17. Also, given the fact that these wastes have been restricted since July 8, 1987, it is illogical that the Agency would grant these wastes a capacity extension in today's rulemaking. Therefore, a corrosive waste that is injected underground is at a minimum subject to the California list prohibitions on August 8, 1990.

The other issue on which EPA solicited comment is whether newly identified or listed wastes could be covered by California list prohibitions. Most of the comments supported the Agency's tentative conclusion that the statutory language does not compel a reading that California list prohibitions apply, and further supported the view that California list prohibitions should not apply. EPA is adopting that reading in today's rule. As the Agency noted at proposal, there would be massive dislocations in the regulated community if California list prohibitions were to apply to newly identified and listed

wastes. For example, if wastes identified by the new Toxicity Characteristic were HOCs, thus triggering immediate California list prohibitions, there would be immediate prohibitions of these wastes rather than the more phased schedule specified in section 3004(g)(4). EPA does not believe this result is desirable. In addition, the Agency believes that the better reading of the statute is that the California list prohibitions were not meant to apply to wastes that are newly identified or listed. Consequently, EPA is determining today that wastes that are newly identified and listed [22] are prohibited only when the Agency takes specific action with regard to them pursuant to section 3004(g)(4).

Since the California list prohibitions are superseded by more specific treatment standards (with the *caveat* that the prohibitions continue to apply during capacity variance periods as discussed above) with the promulgation of the Third Third final rule, almost all of the California list prohibitions will be superseded by more specific prohibitions and treatment standards.[23] The California list prohibitions remain applicable for (1) liquid hazardous wastes that contain over 50 ppm PCBs; (2) HOC-containing wastes identified as hazardous by a characteristic property that does not involve HOCs, as, for example, an ignitable waste that also contains greater than 1000 ppm HOCs (but not an EP toxic waste that exhibits the characteristic because it contains one of the six chlorinated organic pesticides covered by the EP toxicity characteristic); and (3) liquid hazardous wastes that exhibit a characteristic and also contain over 134 mg/l of nickel and/or 130 mg/l of thallium.

Finally, EPA proposed that it would delete the provision specifying burning in boilers and furnaces as a specified method of treatment for California list HOCs (existing § 268.42(a)(2)) because there are virtually no situations to which the provision could apply. 54 FR 48499. There was virtually no comment on this point, and EPA is finalizing this action as proposed for the reasons stated at proposal.

[22] Newly identified means either newly subject to an existing characteristic (*e.g.*, such as those wastes removed from the Bevill exclusion) or subject to a new characteristic. Newly listed wastes may still be subject to any preexisting applicable characteristic standards or California list prohibitions stemming from the characteristic.

[23] See 52 *FR* 29993 (August 12, 1987) and 52 FR 25773 (July 8, 1987); see also 40 CFR 268.32(h) (HOC prohibition superseded by treatment standard and effective date for a particular HOC).

IV. 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.

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

The exception is the clarifying amendment to § 261.33(c). This clarification is not effective in authorized States since the requirements are not imposed pursuant to HSWA. Thus, these requirements will be applicable only in those States that do not have interim or final authorization. In authorized States, the requirements will not be applicable until the State revises its program to adopt equivalent requirements under State law.

B. Effect on State Authorizations

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

Section 271.21(e)(2) requires that States that have final authorization must modify their programs to reflect Federal program changes and must subsequently submit the modification to EPA for approval. The deadline by which the State must modify its program to adopt these regulations is July 1, 1991, in accordance with section 271.21(e). These deadlines 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 rule. These State regulations have not been assessed against the Federal regulations being promulgated 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 modification is approved. Of course, States with existing standards may continue to administer and enforce their standards as a matter of State law. In implementing the Federal program, EPA will work with States under 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 promulgated today need not affect the State's Underground Injection Control (UIC) primacy status. A State currently authorized to administer the UIC program under the Safe Drinking Water Act (SDWA) could continue to do so without seeking authority to administer these amendments. However, a State which wished to implement Part 148 and receive authorization to grant exemptions from the land disposal restrictions would have to demonstrate that it had the requisite authority to administer sections 3004(f) and (g) of RCRA. The conditions under which such an authorization may take place are summarized below and are discussed in a July 15, 1985 final rule (50 FR 28728).

C. State Implementation

The following four aspects of the framework established in the November 7, 1986, rule (51 FR 40572) affect State implementation of today's rule and impact State actions on the regulated community:

1. Under part 268, subpart C, EPA is promulgating land disposal restrictions for all generators, treaters, storers, and disposers of certain types of hazardous waste. In order to retain authorization, States must adopt the regulations under this Subpart since State requirements can be no less stringent than Federal requirements.

2. Also under part 268, EPA is granting two-year national variances from the effective dates of the land disposal restrictions based on an analysis of available alternative treatment, recovery, or disposal capacity. Under § 268.5, case-by-case extensions of up to one year (renewable for one additional year) may be granted for specific applicants lacking adequate capacity.

The Administrator of EPA is solely responsible for granting variances to the effective dates because these determinations must be made on a national basis. In addition, it is clear that RCRA section 3004(h)(3) intends for the Administrator to grant case-by-case extensions after consulting the affected States, on the basis of national concerns which only the Administrator can evaluate. Therefore, States cannot be authorized for this aspect of the program.

3. Under § 268.44, the Agency may grant waste-specific variances from treatment standards in cases where it can be demonstrated tht the physical and/or chemical properties of the wastes differ significantly from wastes analyzed in developing the treatment standards, and the wastes cannot be treated to specified levels or treated by specified methods.

The Agency is solely responsible for granting such variances since the result of such an action may be the establishment of a new waste treatability group. All wastes meeting the criteria of these new waste treatability groups may also be subject to the treatment standard established by the variance. Granting such variances may have national impacts; therefore, this aspect of the program is not delegated to the States at this time.

4. Under § 268.6, EPA may grant petitions of specific duration to allow land disposal of certain hazardous wastes where it can be demonstrated that there will be no migration of hazardous constituents for as long as the waste remains hazardous. States which have the authority to impose restrictions may be authorized under RCRA section 3006 to grant petitions for exemptions from the restrictions. Decisions on site-specific petitions do not require the national perspective required to restrict wastes or grant extensions. EPA will be handling "no migration" petitions for surface disposal facilities at Headquarters, though the States may be authorized to grant these petitions in the future. The Agency expects to gain valuable experience and information from review of "no migration" petitions which may affect future land disposal restrictions rulemakings. In accordance with RCRA section 3004(i), EPA will publish notice of the Agency's final decision on petitions in the **Federal Register**.

V. Effect Of the Land Disposal Restrictions Program on Other Environmental Programs

A. Discharges Regulated Under the Clean Water Act

As a result of the land disposal restrictions program, some generators might switch from land disposal of restricted Third Third wastes to discharge to publicly-owned treatment works (POTWs) in order to avoid incurring the costs of alternative treatment. In shifting from land disposal to discharge to POTWs, an increase in human and environmental risks could occur. Also as a result of the land disposal restrictions, hazardous waste generators might illegally discharge their wastes to surface waters without treatment, which could cause damage to the local ecosystem and potentially pose health risks from direct exposure or bioaccumulation.

Some generators might treat their wastes prior to discharging to a POTW, but the treatment step itself could increase risks to the environment. For example, if incineration were the pretreatment step, metals and other hazardous constituents present in air scrubber waters could be discharged to surface waters. However, the amount of Third Third waste shifted to POTWs would be limited by such factors as the physical form of the waste, the degree of pretreatment required prior to discharge, and State and local regulations.

B. Discharges Regulated Under the Marine Protection, Research, and Sanctuaries Act

There could be a potential demand for some of the hazardous wastes included in today's rulemaking to be shifted from land disposal to ocean dumping and ocean-based incineration. If the cost of ocean-based disposal plus transportation were lower than the cost of land-based treatment, disposal, and transportation, this option could seem to be an attractive alternative. In addition, ocean-based disposal could seem attractive to the regulated community if land-based treatment were not available.

However, the Ocean Dumping Ban Act of 1988 has restricted ocean dumping of sewage sludge and industrial wastes to existing, authorized dumpers until December 31, 1991, after which ". . . it shall be unlawful for any person to dump (sewage sludge or industrial wastes) into ocean waters. . .". Therefore, the Ocean Dumping Ban Act has made moot any economic or other incentive to ocean dump industrial hazardous wastes, including the wastes subject to this regulation.

C. Wellhead Protection Regulated under the Safe Drinking Water Act (SDWA)

Section 1428 of the SDWA contains requirements for the development and implementation of state Wellhead Protection (WHP) Programs to protect wells and wellfields which are used, or may be used to provide drinking water to public water systems. Under section 1428, each state must adopt and submit to EPA for approval a WHP program that, at a minimum:

(1) Specifies the duties of state agencies, local governments, and public water systems

in the development and implementation of the WHP program;

(2) For each wellhead, determines the wellhead protection area (WHPA), as defined in section 1428(e) of SDWA, based on all reasonably available hydrogeologic information on ground-water flow, recharge, and discharge and other information the state deems necessary to adequately determine the WHPA;

(3) Identifies within each WHPA all potential human sources of contaminants which may have any adverse health effects;

(4) Describes provisions for technical assistance, financial assistance, implementation of control measures, and education, training, and demonstration projects to protect the water supply within WHPAs from such contaminants;

(5) Includes contingency plans for the location and provision of alternate drinking water supplies for each public water system in the event of well or wellfield contamination by such contaminants;

(6) Requires that state and local governments and public water systems consider all potential sources of human contamination within the expected wellhead area of a new water well which serves a public water system; and

(7) Requires public participation in developing the WHP program.

SDWA required all states to submit a WHP program to EPA by June 19, 1989, for EPA review and approval. EPA has received 29 state submittals for review. SDWA requires that all Federal agencies having jurisdiction over any potential source of contaminants identified by a state program under this section shall comply with all the requirements of the state program.

Any private or public entity subject to the land disposal restrictions regulations must also be in compliance with the appropriate state's wellhead protection program. The Agency reiterates that the land disposal of hazardous wastes must comply not only with the land disposal restrictions and other RCRA regulations, but with other environmental programs, such as the Wellhead Protection Program under the Safe Drinking Water Act.

D. Air Emissions Regulated Under the Clean Air Act (CAA)

There are two air emission concerns with respect to the land disposal restrictions. The first is a cross-media concern about air emissions that occur as a result of waste treatment such as incineration of metal-bearing wastes causing metal emissions to the atmosphere. Another concern is with air emissions from the land disposal of the treatment residue. Air emissions control programs are under development using both the CAA and RCRA to address these concerns as discussed below.

Specific cross-media air emission concerns have been identified for treatment technologies applicable to Third Third wastes, but EPA believes that existing Clean Air Act controls adequately address the potential problems. Retorting of mercury sulfide wastes can result in air emissions of both elemental mercury and sulfur dioxide (SO2). The Agency has promulgated a National Emission Standard for Hazardous Air Pollutants (NESHAP) for mercury emissions under section 112 of the CAA (40 CFR part 61, subpart E). There are no industry-specific national CAA control standards for SO2 emissions from retorting mercury sulfide wastes. There are, however, regulations for the prevention of significant deterioration (PSD) of air quality that would address not only these SO2 emissions but also any mercury emissions that are not regulated by the NESHAP.

The NESHAP limits mercury emissions to the atmosphere from mercury processing facilities, mercury cell chlor-alkali plants, and plants that incinerate and/or dry wastewater treatment plant sludges. In all these cases, the NESHAP limits mercury emissions across the entire processing facility to the extent necessary to protect human health. The NESHAP would not apply to a dedicated mercury sulfide waste retorting facility that is not located in an ore processing or a mercury cell chlor-alkali plant. EPA is addressing problems of potential mercury emissions by requiring that retorters either be subject to the NESHAP or operate with the PSDs on which the NESHAP was based.

Under section 165(a) of the CAA, all new major stationary sources and major modifications to existing sources of air pollution must obtain a PSD permit. If the mercury of SO2 emissions from the retorting process were to come from a major stationary source or a major modification subject to the PSD regulations and would be emitted in significant amounts (greater than 0.1 tons per year of mercury or 40 tons per year of SO2), then such emissions would be subject to best available control technology (BACT) requirements. An air quality analysis for mercury and SO2 would also be required under PSD. Moreover, an air quality analysis must be conducted to demonstrate that the SO2 emissions would neither cause nor contribute to violations of any national ambient air quality standard (NAAQS) or PSD increment for SO2. Facilities that are located in areas that have failed to meet any NAAQS for SO2 (i.e., designated nonattachment areas) and emit more than 100 tons per year of SO2, must not only apply emission controls that meet the lowest achievable emission rate but also offset their remaining SO2 emissions by acquiring federally enforceable emission reductions from other nearby SO2 emissions sources.

The Agency is also concerned whether incineration of wastes containing brominated organics or organo-nitrogen compounds may adversely affect air quality. The presence of bromine complicates the evaluation of incineration of these wastes. A detailed discussion of the Agency's approach for brominated organics is contained in section III.A.5.b of today's preamble. A discussion of potential nitrogen oxide emissions from organo-nitrogen wastes is contained in section III.A.5.c.

There are several general regulatory development programs under RCRA that address treatment technology air emissions. The Agency has initiated a three-phased program under § 3004(n) of RCRA to address air emissions from hazardous waste management units other than incinerators. The first phase addresses organic air emissions as a class from two types of emission sources. The first source category is process equipment (pumps, valves, etc.) that contact hazardous waste that contain greater than 10 percent organic compounds, including such as distillation units and incinerators. The second source category is certain vents on various treatment technologies, such as air or steam strippers. These standards were proposed in the **Federal Register** on February 5, 1987 (52 FR 3748) and are expected to be promulgated this spring.

The second phase of standards development under section 3004(n) of RCRA addresses organic air emissions as a class from tanks, containers, and surface impoundments. Treatment technologies that occur in tanks or containers that are not controlled by the Phase I standards would be controlled by these standards. Wastes that would be prohibited from land disposal may continue to be managed in a surface impoundment as long as the treatment residuals that do not meet the applicable treatment standards are removed from the impoundment within one year of entry into the impoundment. These standards will control air emissions from the management of wastes in the surface impoundment. These standards are expected to be proposed in the **Federal Register** this spring.

In the third phase of the section 3004(n) standards development, the Agency will develop additional standards for the sources addressed in

the first two phases as necessary to address residual risks.

In addition to the section 3004(n) standards, general standards to control both organic and metal emissions from the combustion of hazardous waste in incinerators and other types of combustion devices are under various stages of development.

In certain cases, waste treatment may occur in treatment technologies that are not required to obtain RCRA permits. Guidance for the control of air emissions from these sources, such as exempt biological treatment tanks and recycling units, is being developed under the CAA.

None of the regulatory efforts discussed above address air emissions from the land disposal of treatment residue in landfills, land treatment units, or waste piles because the Agency presently presumes that these units will only receive wastes that have been treated to meet the BDAT requirements. The Agency is considering whether to propose regulations in a separate rulemaking to limit air emissions from land disposal units seeking to land dispose of wastes under a no migration variance.

E. Clean Up Actions Under the Comprehensive Environmental Response, Compensation, and Liability Act

The land disposal restrictions may have significant effects on the selection and implementation of response actions that are taken under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). There are three primary areas in which these effects may occur.

One area that may be affected by the land disposal restrictions is in the selection of treatment standards at the remedial action site. The cleanup standards set at CERCLA sites are risk-based, while treatment standards developed under the land disposal restrictions program are technology-based. Therefore, the technology-based treatment standards may be more stringent than the risk-based cleanup standards developed based on the CERCLA selection of remedy criteria, and vice versa. Another matter that may be affected is the treatment of soil and debris contaminated with wastes restricted from land disposal. Contaminated soil and debris are a primary type of waste that must be remediated at most CERCLA sites. In many cases, the soil matrix is different from that of the industrial wastes for which treatment standards are set. CERCLA site managers must either comply with the treatment standards or request and be granted a variance from the treatment standard (§ 268.44) or a "no-migration" variance (§ 268.6).

Finally, even though the hazardous substances at a CERCLA remediation site may have been disposed prior to the effective date of RCRA, if the action involves removal of restricted wastes after the prohibition effective date, the land disposal restrictions are legally applicable (51 FR 40577, November 7, 1986). See also *Chemical Waste Management* v. *EPA*, 869 F. 2d at 1535–37 (D.C. Cir. 1989). For example, if a waste is excavated from a unit, treated, and redisposed, EPA has indicated that "placement" (see RCRA section 3004(k)) of the waste in a land disposal unit has occurred, and the applicable treatment standards must be met (see 53 FR 51444 and 51445, December 21, 1988). However, if the waste is capped in place, removal or "placement" has not occurred, and the treatment standards are not legally applicable.

F. Applicability of Treatment Standards to Wastes from Pesticides Regulated Under the Federal Insecticide, Fungicide, and Rodenticide Act

A number of generators of pesticide waste that have heretofore been comparatively unaware of the land disposal restrictions may be regulated under today's rulemaking. This will require that the Agency develop guidance materials and provide training on how to comply with the requirements of the land disposal restrictions.

Generators of significant quantities of pesticide P and U wastes are farmers and commercial pesticide applicators. The provisions of 40 CFR 262.70 and 268.1 exempt farmers from regulation under the land disposal restrictions program; however, no such exemption exists for commercial applicators. Such generators of hazardous wastes have traditionally land disposed their pesticide wastes. With promulgation of today's final rule, these generators must comply with the requirements of the land disposal restrictions if they dispose a restricted hazardous waste.

G. Regulatory Overlap of Polychlorinated Biphenyls (PCBs) Under the Toxic Substance Control Act (TSCA) and RCRA.

Certain P and U listed wastes contain PCBs. The PCB component of such a waste mixture is regulated primarily under TSCA (although it may also be a California list waste, and subject to RCRA regulation (both substantive and administrative as well)), while the listed P or U component of the waste is regulated under RCRA. Such a mixture of listed/PCB waste must meet the applicable requirements under both statutes. Such a waste must go to an incinerator permitted under both TSCA and RCRA. Any ash residual from incineration must meet the treatment standard for the listed waste component prior to land disposal.

VI. Regulatory Requirements

A. Regulatory Impact Analysis—Surface Disposed Wastes

In accordance with Executive Order No. 12291, the Agency has reviewed the costs and benefits of today's final rule and has determined that today's final rule constitutes a "major regulation" because it results in an annual cost to the economy in excess of $100 million. As a result of this determination, the Agency has conducted a regulatory impact analysis (RIA) in support of today's final rule. The complete RIA document, Regulatory Impact Analysis of the Land Disposal Restrictions for Third Third Scheduled Wastes Final Rule (April 24, 1990), is available for review in the public docket for today's final rule. The complete document was also submitted to the Office of Management and Budget for review, as required by Executive Order No. 12291.

This section of the preamble summarizes the results of the regulatory impact analysis of the final rule, as detailed in the RIA document, as well as comments received on the regulatory impact analysis for the proposed rule. Section VI.A.1 below describes the universe of wastes and facilities affected by today's rule. Section VI.A.2 below summarizes the analysis of human health and environmental benefits attributable to today's rule. Section VI.A.3 summarizes the economic cost and impact analysis performed for today's rule.

The Agency analyzed benefits, costs, and economic impacts using the same approach and methodology that was used for the August 17, 1988, First Third final rule (53 FR 31138).[24] The effects of the final rule were estimated by comparing post-regulatory management practices and conditions with those occurring under baseline conditions. Two post-regulatory scenarios were examined. Under the first scenario, the "subtitle C" scenario, all treatment residuals would be disposed of in subtitle C units. For the second, "subtitle D," scenario, all characteristic waste treatment residuals would be disposed of in Subtitle D units. The baseline was

[24] For detailed information on the cost methodology, see *Regulatory Impact Analysis of the Land Disposal Restrictions on First Third Wastes: Final Report*, August 1988, ICF Incorporated.

defined as continued land disposal of wastes in units meeting minimum technological requirements.

The Agency adjusted reported waste management practices to reflect compliance with the land disposal restriction rules covering solvents and dioxins, California list wastes, and First and Second Third scheduled wastes. In making these adjustments, EPA assumed that facilities would comply with these other rules by the least costly methods allowable. However, though First Third soft hammer wastes were examined under the First Third rule Second Third soft hammer wastes are included in today's analysis. Thus, all First Third, Second Third, and Third Third wastes have been addressed in the land disposal restrictions rules collectively.

1. Overview of Affected Wastes, Facilities, and Management

The universe of waste and facilities examined for the RIA was developed from EPA's "National Survey of Hazardous Waste Treatment, Storage, Disposal, and Recycling Facilities" (hereafter, the TSDR survey) and EPA's 1984 "National Survey of Hazardous Waste Generators and Treatment, Storage, and Disposal Facilities Regulated under RCRA in 1981" (hereafter, the RIA Mail survey). Data from these surveys have been updated as part of the capacity analysis accompanying this rulemaking (see discussion in Section 3B). The data used for the final regulatory analysis reflect this updated data base and are consistent with the data used for the capacity analysis accompanying the proposed rule.

As with past land disposal restrictions RIAs, the TSDR and RIA Mail surveys provide an overview of the number of facilities treating, storing, and disposing of waste; the quantities and types of waste (by RCRA waste code) managed at each facility; and the current practice or method of treatment. The adjusted information contained in the two surveys is accepted as the baseline (i.e., pre-Third Third rule) practice for this RIA.

Several commenters noted that the quantities of waste estimated do not include non-hazardous waste that may have been affected by the Agency's proposed dilution prohibition. In today's rule, however, the Agency is allowing facilities that discharge their characteristic wastes under a NPDES permit or dispose of it in a UIC well to dilute. The Agency is also allowing facilities that generate non-toxic characteristic wastes (with the exception of high TOC ignitable nonwastewaters, reactive cyanide wastes, and reactive sulfide wastes) to dilute their wastes in order to achieve treatment standards. However, characteristic wastes discharged pursuant to an NPDES permit, with a specified method, cannot be rendered nonhazardous through dilution alone. The Agency believes, therefore, that it has accurately analyzed the impact of today's rule.

Quantity of Affected Waste. Today's rule affects approximately 277 million gallons of waste per year as shown in Table VI-1. An additional 44 million gallons (per year) of multisource leachate may also be affected by today's rule.

TABLE VI-1.—THIRD THIRD RULE QUANTITY BY WASTE TYPE

[in million gallons per year]

	Vol.	Percent
Ignitable (D001), corrosive (D002), and reactive wastes (D003)	42	15
EP toxic wastes (D004-D016) and mixtures	122	44
Listed wastes	2	1
Mixtures of wastes	32	12
CBI wastes	79	28
Total	277	100

Characteristic wastes constitute the largest volume of wastes covered by the final rule. In addition to the 59 percent identified as D001-D016, the waste mixtures category is dominated by characteristic wastes. Table VI-2 gives the volumes of the most affected characteristic wastes.

TABLE VI-2.—PREDOMINANT CHARACTERISTIC WASTES BY VOLUME

[in million gallons per year]

D008 (EP Toxic for lead)	53
D007 (EP Toxic for chromium)	41
D002 (Corrosive)	17
D001 (Ignitable)	17
Mixtures of D006 and D008	9
D006 (Cadmium)	8
D003 (Reactive)	7

Affected Facilities. A total of 110 waste management facilities and nearly 1,700 waste generators are affected by today's final rule. Table VI-3 provides a breakdown of affected facilities and their volumes managed.

TABLE VI-3.—THIRD THIRD RULE VOLUMES BY FACILITY TYPE

[in million gallons per year]

Facilities	Volume	Percent	No. of facilities
Commercial Facilities	212	77	37
Non-Commercial Facilities	65	23	73
Generators	NA	NA	1,686
Total	277	100	1,796

The affected facilities represent a wide variety of industries in 22 major industrial groups. A further examination of the TSDR survey data reveals the following information about the range of industries with large volumes of Third Third wastes.

The volume of commercial process waste, which accounts for 77 percent of the total waste volume, is distributed across the following SIC groups:

- Electric, Gas, & Sanitary Services (SIC 49)..... 43 percent
- Services Not Elsewhere Classified (SIC 89)..... 8 percent
- Chemicals & Allied Products (SIC 28)..... 7 percent
- CBI Facilities..... 32 percent

The volume of noncommercial process waste, which accounts for 23 percent of the total waste volume, is distributed across the following Standard Industrial Code (SIC) groups:

- Non-classifiable Establishments (SIC 99)..... 52 percent
- Primary Metals Industries (SIC 33)...13 percent
- Petroleum Refining & Related Industries (SIC 29)..... 10 percent
- Chemicals & Allied Products (SIC 28)..... 6 percent
- CBI Facilities..... 16 percent

Waste Management Practices. Based on the TSDR survey, the RIA examined five land disposal baseline management practices: disposal in landfills, disposal by land treatment, disposal in surface impoundments, treatment in waste piles, and storage in waste piles. Table VI-4 provides a breakdown of these baseline management practices by volume and number of facilities. As shown, approximately half of the waste volume covered by the final rule is currently managed in landfills. Landfills are also the most prevalent baseline practice, occurring at just over one half of the affected facilities.

TABLE VI-4.—THIRD THIRD RULE BASELINE MANAGEMENT PRACTICES

[in million gallons per year]

Baseline practice	Volume	Percent
Facilities:		
Landfill	212	77
Land treatment	6	2
Storage waste piles	28	10
Treatment waste piles	27	10
Disposal surface impoundments	3	1
Total *	277	100

* Excludes estimated 44 million gallons of multisource leachate.

The quantity of multisource leachate is not well characterized at present. However, the RIA estimates that over 150 million gallons of leachate are generated (annually) creating up to 44 million gallons of leachate residue subject to the land disposal restrictions.

Treatment practices in compliance with today's final rule significantly redistribute the quantities of waste among managemnt practices. Most important, while 277 million gallons of waste per year are land disposed under baseline management practices (of which 212 million gallons are landfilled), 206 million gallons of waste per year would be disposed of in landfills under the subtitle C scenario as a result of today's final rule and 208 million gallons of waste per year under the subtitle D scenario. Thus, the final rule results in a 26 percent reduction in the volume of Third Third wastes being land disposed under the Subtitle C scenario, and a 25 percent reduction under the subtitle D scenario. Many of the wastes covered by the final rule are treated by chemical precipitation or stabilization.

2. Benefits of the Final Rule

The final rule would result in several benefits including reduced human health risks, imroved safety at facilities, and reduced ecological effects. As with previous land disposal restrictions, the Agency quantified the human health benefits and conducted a qualitative analysis of the other benefits.

Human Health Benefits. The quantitative benefits analysis estimated that over a 70-year lifetime, the final rule reduces cancer cases by 316 and reduces the number of people exposed to at least one noncarcinogen above health based criteria by about 5,400. These results are the same for both scenarios.

In general, the majority of cancer cases averted is due to reduced inhalation exposure to benzene, acrylonitrile, phenanthrene, fluroanthene, dichloromethane and other carcinogenic constituents in D001 ignitable wastes and mixtures of ignitable and reactive wastes. The majority noncarcinogenic benefits is due to reduced ingestion of cadmium (D006), chromium (D007), lead (D008), as well as mixtures with these metals or mercury and D001 ignitable waste containing pentaclorobenzene and methanol.

It is important to note that these human health benefits are highly sensitive to the facility (and population) and waste characterizations used for the analysis. In fact, the majority of human health benefits is due to a limited number of waste streams at a few facilities. For example, over 4,000 of the non-cancer "benefits" result from the reduction of a highly concentrated chromium waste that leaches to ground water used as a drinking water source for a populous Northeastern community. And nearly 1,000 non-cancer"benefits" are attributable to reducing high concentration air releases of pentachlorobenzene and methanol in a land application and a landfill unit. Similarly, over 200 of the cancer cases averted result from reducing air releases of phenanthrene and fluroanthene in land application units at two facilities.

What these examples reveal is the relationship between human health benefits and the attributes of a facility. Given any data base, the facilities with highly concentrated waste in densely populated areas will significantly drive the human health benefits results. Therefore, we believe that the data gives a true representation of reality by the inclusion of these few driving facilities.

The Agency has not estimated benefits attributable to treating multisource leachate residue because of a lack of characterization and facility data. However, the Agency, by way of a screening analysis, developed a hypothetical characterization of multisource leachate residue and simulated releases at several well-defined facilities. While the results are extremely sensitive to the assumptions and hypothetical characterization, they showed the possibility of roughly 200 cancer and 200 non-cancer cases avoided. Again, these results are highly uncertain because of the lack of sufficient data, but they do suggest that the benefits associated with the treatment of multisource leachate residues may be significant.

The Agency believes that the overall benefit estimates are uncertain and may overstate or underestimate the human-health benefits of the proposed rule The RCRA Risk-Cost Analysis model does not contain enough data to model all of the constituents found in the Third Third wastes. As a result, benefits of regulating wastes with one or more of these missing constituents may be underestimated. This underestimate is most likely to occur for wastes containing pesticides, the sole hazardous constituent of D012–D017, and about 16 "P" wastes.

Human health benefits may also be underestimated because the benefits model only includes exposure via drinking water or air. Not estimated are the deleterious effects from consuming of contaminated food, such as fish caught downstream of releases, recreation exposure, due to contact with polluted rivers, lakes, or streams, and the averting of public benefits due to the destruction of these recreational areas.

At the same time, benefits may be overestimated due to conservative exposure assumptions. Exposure scenarios are based on drinking 2 liters/day for seventy years of contaminated water or inhalation of 20 cubic meters/day of air for seventy years.

Safety Benefits. In addition to adverse human health effects, ignitable (D001) and reactive (D003) wastes may pose a general safety hazard. In the past, land disposal of these wastes has only been allowed if the waste either is deactivated or precautions are taken to prevent accidental ignition or reaction. Until the ignitable or reactive wastes are deactivated, there is some continuing risk that the precautions may fail, resulting in fires, explosions, or release of toxic gases. The final rule requires deactivation of the approximately 24 million gallons of D001 and D003 being land disposed, thereby eliminating the safety risk. However, this benefit is not significant due to the popular practice of deactivation currently employed by facilities.

Environmental Benefits. The final rule results in an overall reduction in toxic releases to the environment, thereby reducing adverse effects to ecosystems. The resulting improvement in ecological health is extremely difficult to quantify due to uncertainty in estimating exposure levels and species populations. However, the sensitivity of certain species to hazardous constituents of wastes covered by the final rule suggests a very high potential for ecological effects.

As an example, aquatic species are at least two orders of magnitude more sensitive than humans to arsenic (D004), mercury (D009), silver (D011), lindane (D013), methoxychlor (D014), and toxaphene (D015). Therefore, aquatic ecosystems may be at some risk even when there is no human health risk.

Another way to look at the potential for ecological effects is to consider the proximity of land disposal facilities to waterbodies. A recent Agency study on ecological risks showed that for a sample of 52 National Priorities List sites, almost 90 percent of the sites posed a threat to freshwater ecosystems due to their proximity to waterbodies.[25] Wastes removed from some of these sites may be subject to the treatment standards promulgated in this rule. Thus, the final rule reduces ecological risk associated with Third Third wastes managed at these sites.

3. Costs

The final rule results in an annual incremental cost of approximately $353 million under the Subtitle D scenario and $440 million under the Subtitle C scenario, and affects over 1,700 facilities in 22 industrial sectors. Table VI–5 summarizes the estimated incremental costs associated with today's final rule by waste type.

TABLE VI–5.—THIRD THIRD RULE VOLUMES AND INCREMENTAL COST

[Million gallons/yr and million $/yr]

Waste type	Volume	Cost (in dollars)	
		Subtitle D	Subtitle C
D001, D002, D003	42	$61	$67
D004–D016	122	123	166
Listed waste	2	15	15
Mixtures	32	93	102
CBI facilities	79	61	90
Total	277	$353	$440

As expected, based on volumes, the largest incremental cost is attributed to the management of D008 (lead) waste. Although the listed wastes are a small volume and have the lowest total cost, expensive treatment technologies such as incineration result in a much higher cost per volume treated. Conversely, the corrosive wastes and mixtures with corrosive wastes are relatively inexpensive to neutralize, resulting in a low cost per volume treated.

Five characteristic wastes contribute about 45 percent of the incremental cost of the rule as shown in table VI–6. EP toxic wastes for lead (D008) and ignitable wastes (D001) are the two single wastes that incur the most incremental cost.

[25] *Summary of Ecological Risks. Assessment Methods, and Risk Management Decision in Superfund and RCRA* (EPA–230–03–89–046) June 1989.

TABLE VI–6.—WASTES INCURRING THE MOST INCREMENTAL COST

[In million dollars/year]

Waste stream	Costs	
	Subtitle D	Subtitle C
D008	57	85
D001	46	47
D007	34	38
D009	16	17
D004/D006/D007/D008	16	16
D003	9	12
D007/D008	12	12
D001/D002/D007/D008	11	11
D002	6	9

The cost of treating D002 corrosive wastes attributed to the final rule may be overestimated by as much as $5 million because some of these wastes may be treated due to the California List Land Disposal Restrictions rule (52 FR 25760). That rule established a performance standard prohibiting land disposal of wastes with a pH less than 2, while the final rule establishes a technology-based standard of deactivation (i.e., neutralization). The Agency does not have data on how facilities are meeting the California List standard. Without specific data about the post-California List practices, the entire cost of neutralizing D002 acidic wastes were attributed to this final rule.

4. Economic Impacts

Tables VI–7 and VI–8 summarize the cost and economic impact of the final rule under subtitle D and subtitle C, respectively. Compliance costs are the tax-adjusted revenue requirements needed to fund the incremental costs discussed above. Significantly affected facilities are those that either need to increase costs by more than 5 percent or their compliance costs exceed 5 percent of their cash from operations.

TABLE VI–7.—SUMMARY OF ECONOMIC IMPACT BY TYPE OF FACILITY—SUBTITLE D

Economic impact	Noncommercial	Com	Generator	Total
Compliance cost ($Mil)	24	329	235	259
Affected facs.	73	37	1,686	1,796
Significantly affected	3	NA	429	432
Estimated closures	0	NA	14	14
Affected industry groups	12	9	16	22

TABLE VI–8.—SUMMARY OF ECONOMIC IMPACT BY TYPE OF FACILITY—SUBTITLE C

Economic impact	Noncommercial	Com	Generator	Total
Compliance cost ($Mil)	30	410	299	329
Affected facs.	73	37	1,686	1,796
Significantly affected	4	NA	552	556
Estimated closures	0	NA	14	14
Affected industry groups	12	9	16	22

The economic analysis estimates that the final rule does not have a significant effect on industry. The effects of the final rule are distributed over a wide range of industries in 22 major industrial groups rather than concentrated in a few industries.

Generators are the type of facilities that incur the largest economic impact. The analysis estimates that 91 percent of the compliance cost are borne by generators under both subtitle C and subtitle D scenarios. Also, 33 percent of the affected generators are significantly affected under subtitle C scenario, and 25 percent are significantly affected under subtitle D scenario.

The analysis estimates that 14 facilities would close as a result of the final rule. By comparison, the First Third rule was estimated to result in almost 200 closures. These 14 potential closures represent less than 4 percent of the 429 significantly affected generators under subtitle D scenario and less than 3 percent of the 552 significantly affected generators under subtitle C scenario.

The TSDR survey identified only 2 small businesses that currently land dispose Third Third waste. Neither is significantly affected under the final rule.

B. Regulatory Flexibility Analysis—Surface Disposed Waste

Pursuant to the Regulatory Flexibility Act, 5 U.S.C. 601 *et seq.*, whenever an Agency is required to publish a notice of rulemaking, it must prepare and make available for public comment a Regulatory Flexibility Analysis (RFA) that describes the effect of the rule on small entities (i.e., small businesses, small organizations, and small governmental jurisdictions). This analysis is unnecessary, however, if the Agency's Administrator certifies that the rule will not have a significant economic effect on a substantial number of small entities.

EPA evaluated the economic effect of the final rule on small entities, here defined as firms employing fewer than 50 persons. Because of data limitations, the Agency was unable to include generators of large quantities of Third Third wastes. The small business population therefore included only two groups: all noncommercial TSDFs employing fewer than 50 persons and all small quantity generators (SQGs) that were also small businesses. As a result, the effect of the final rule on small businesses is underestimated. However, the Agency would not expect the conclusions of the small business analysis to change significantly if the generator data were available.

According to EPA's guidelines for conducting an RFA, if over 20 percent of the population of small businesses, small organizations, or small government jurisdictions is likely to experience financial distress based on the costs of the rule, then the Agency is required to consider that the rule will have a significant effect on a substantial number of small entities and to perform a formal RFA. EPA has examined the final rule's effects on small entities as required by the Regulatory Flexibility Act.

The economic analysis identified only 2 small businesses affected by the final rule. Neither of the 2 would be significantly affected. The Administrator therefore certifies that part 268 does not have significant economic effects on a substantial number of small entities. As a result of this finding, the Agency has not prepared a formal RFA.

C. Regulatory Impact Analysis—Underground Injected Wastes

The Agency has completed a separate regulatory impact analysis for underground injected wastes affected by today's final rule. The completed RIA document, Regulatory Impact Analysis of Proposed Hazardous Waste Disposal Restrictions For Class I Injection of Third Thirds List Wastes, is available in the public docket for the final rule.

There are 65 injection facilities, of the total number of Class I injection facilities, injecting approximately 6 billion gallons of Third Third wastes annually, including over 4.7 billion gallons of characteristic wastes. These Class I hazardous injection facilities are required to either treat wastes, or file "no migration" petitions as outlined in 40 CFR part 148 (See 53 FR 28118 preamble for a more thorough discussion of the no migration petition review process). The additional facilities affected by today's rulemaking substantially contribute to overall compliance costs already incurred by Class I injection well owners and operators managing hazardous wastes regulated by previous rulemaking.

The Agency analyzed costs and benefits for today's rule by using the same approach and methodology developed in the Regulatory Impact Analysis of the Underground Injection Control Program: Proposed Hazardous Waste Disposal Injection Restrictions used for the July 26, 1988 final rule (53 FR 28118) and subsequent rulemaking. An analysis was performed to assess the economic effect of associated compliance costs for the additional volumes of injected wastes attributable to today's final rule.

Total compliance costs for injected wastes are estimated at $54 million annually. Alternative treatment costs are estimated at $53.7 million annually, and no migration petition costs are annualized at $0.3 million. The RIA estimates that 17 facilities will eventually treat their wastes, and therefore be significantly affected economically by today's final rule. All of these costs will be incurred by Class I hazardous injection well owners and operators.

The benefits to human health and the environment in the RIA are generally defined as the reduced human health risk resulting from fewer instances of ground-water contamination. In general, potential health risks from Class I hazardous waste injection wells are extremely low. However, the RIA references a few isolated cases where risks to human health and the environment may be greater, but are still too low to quantify. These cases involve possible grout seal failure around the protective casing of an injection well, and the occurrence of unplugged bore holes around the injection well site. Of studies conducted to describe Class I well problems, only six wells, or less than two percent of all Class I wells, were reported to have experienced malfunctions that contributed to any contamination of the surface or an underground source of drinking water. No health-related problems attributed to Class I injection were reported.

D. Regulatory Flexibility Analysis—Underground Injection Wastes

Owners and operators of hazardous waste injection wells are generally major chemical, petrochemical, and other manufacturing companies. The Agency is not aware of any small entities of injection wells that would be affected by part 148 of today's final rule. The Administrator therefore certifies that part 148 and part 268 will not have significant economic effects on a substantial number of small entities. As a result of this finding, the Agency has not prepared a formal RFA.

E. Paperwork Reduction Act

All information collection requirements in this final rule were promulgated in previous land disposal restrictions rulemakings (including those for the Underground Injection Control Program) and approved by the Office of Management and Budget (OMB) at that time. Since there are no new information collection requirements being promulgated today, an Information Collection Request has not been prepared.

F. Review of Supporting Documents

The primary source of information on current land disposal practices and industries affected by this rule was EPA's 1986 "National Survey of Hazardous Waste Treatment, Storage, Disposal, and Recycling Facilities" (the TSDR Survey). The average quantity of waste contributed by generator facilities was obtained from EPA's "National Survey of Hazardous Waste Generators and Treatment, Storage, and Disposal Facilities Regulated under RCRA in 1981" (April 1984).

Waste stream characterization data and engineering costs of waste management were based on the following EPA documents:

- "Characterization of Waste Streams Listed in 40 CFR Section 261 Waste Profiles," Vols. I and II (August 1985);
- "Characterization of Constituents from Selected Waste Streams Listed in 40 CFR Section 261," Vols. I and II (August 1985);
- RCRA background and listing documents for 40 CFR Section 261;
- RCRA Section 3007 industry studies;
- "RCRA Risk-Cost Analysis Model, Appendix A: Waste Stream Data Base" (March 1984);
- Source assessment documents for various industries; and
- "1986–1987 Survey of Selected Firms in the Commercial Hazardous Waste Management Industry: Final Report" (March 1988).

Financial information for the economic impact analysis was obtained from the 1982 Census of Manufacturers and 1984 Annual Survey of Manufacturers. Producer price indices were used to restate 1984 dollars in 1990 terms.

List of Subjects in 40 CFR Parts 148, 261, 262, 264, 265, 268, 270, 271, and 302

Administrative practice and procedure, Confidential business information, Designated facility, Environmental protection, Hazardous

materials, Hazardous materials transportation, Hazardous waste, Intergovernmental relations, Labeling, Manifests, Packaging and containers, Penalties, Recycling, Reportable Quantities, Reporting and recordkeeping requirements, Waste treatment and disposal, Water pollution control, Water supply.

Dated: May 8, 1990.

F. Henry Habicht,

Acting Administrator.

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

PART 148—HAZARDOUS WASTE INJECTION RESTRICTIONS

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

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

2. Section 148.1 is amended by adding paragraph (d) to read as follows:

§ 148.1 Purpose, scope, and applicability.

* * * * *

(d) Wastes that are hazardous only because they exhibit a hazardous characteristic, and which are otherwise prohibited under this part, are not prohibited if the wastes:

(1) Are disposed into a nonhazardous or hazardous injection well defined under 40 CFR 144.6(a); and

(2) Do not exhibit any prohibited characteristic of hazardous waste identified in subpart C of part 261 at the point of injection.

3. Section 148.14 is amended by redesignating paragraphs (d), (e), (f), and (g) as paragraphs (e), (g), (h), and (j); by revising the introductory text of newly redesignated paragraph (j); and by adding new paragraphs (d), (f), and (i) to read as follows:

§ 148.14 Waste specific prohibitions—first third wastes.

* * * * *

(d) Effective August 8, 1990, the wastes specified in 40 CFR 261.31 as EPA Hazardous Waste Number F006 (wastewaters) and F019; the wastes specified in 40 CFR 261.32 as EPA Hazardous Waste Numbers K004, K008, K015 (nonwastewaters), K017, K021 (wastewaters), K022 (wastewaters), K031, K035, K046 (reactive nonwastewaters and all wastewaters), K060 (wastewaters), K061 (wastewaters), K069 (calcium sulfate nonwastewaters and all wastewaters), K073, K083, K084, K085, K086 (all but solvent washes), K101 (high arsenic nonwastewaters), K102 (high arsenic nonwastewaters), and K106; and the wastes specified in 40 CFR part 261.33 as EPA Hazardous Waste Numbers P001, P004, P005, P010, P011, P012, P015, P016, P018, P020, P036, P037, P048, P050, P058, P059, P068, P069, P070, P081, P082, P084, P087, P092, P102, P105, P108, P110, P115, P120, P122, P123, U007, U009, U010, U012, U016, U018, U019, U022, U029, U031, U036, U037, U041, U043, U044, U046, U050, U051, U053, U061, U063, U064, U066, U067, U074, U077, U078, U086, U089, U103, U105, U108, U115, U122, U124, U129, U130, U133, U134, U137, U151, U154, U155, U157, U158, U159, U171, U177, U180, U185, U188, U192, U200, U209, U210, U211, U219, U220, U226, U227, U228, U237, U238, U248, and U249 are prohibited from underground injection at off-site injection facilities.

* * * * *

(f) Effective November 8, 1990, the wastes specified in paragraph (d) of this section are prohibited from underground injection at on-site injection facilities.

* * * * *

(i) Effective May 8, 1992, the wastes specified in 40 CFR 261.32 and 261.33 as EPA Hazardous Waste Numbers K011 (wastewaters), K013 (wastewaters), and K014 are prohibited from underground injection.

(j) The requirements of paragraphs (a) through (i) of this section do not apply:

* * * * *

4. Section 148.15 is amended by redesignating paragraphs (d) and (e) as paragraphs (e) and (g); by revising the introductory text of newly redesignated paragraph (g); and by adding new paragraphs (d) and (f) to read as follows:

§ 148.15 Waste specific prohibitions—second third wastes.

* * * * *

(d) Effective August 8, 1990, the wastes specified in 40 CFR 261.32 as EPA Hazardous Waste Number K025 (wastewaters), K029 (wastewaters), K041, K042, K095 (wastewaters), K096 (wastewaters), K097, K098, and K105; and the wastes specified in 40 CFR part 261.33 as P002, P003, P007, P008, P014, P026, P027, P049, P054, P057, P060, P066, P067, P072, P107, P112, P113, P114, U002, U003, U005, U008, U011, U014, U015, U020, U021, U023, U025, U026, U032, U035, U047, U049, U057, U059, U060, U062, U070, U073, U080, U083, U092, U093, U094, U095, U097, U098, U099, U101, U106, U109, U110, U111, U114, U116, U119, U127, U128, U131, U135, U138, U140, U142, U143, U144, U146, U147, U149, U150, U161, U162, U163, U164, U165, U168, U169, U170, U172, U173, U174, U176, U178, U179, U189, U193, U196, U203, U205, U206, U208, U213, U214, U215, U216, U217, U218, U239, and U244 are prohibited from underground injection at off-site injection facilities.

* * * * *

(f) Effective November 8, 1990, the wastes specified in paragraph (d) of this section are prohibited from underground injection at on-site injection facilities.

(g) The requirements of paragraphs (a) through (f) of this section do not apply:

* * * * *

5. Section 148.16 is amended by redesignating paragraph (c) as paragraph (g); by revising the introductory text of newly redesignated paragraph (g); and by adding new paragraphs (c), (d), (e), and (f) to read as follows:

§ 148.16 Waste specific prohibitions—third third wastes.

* * * * *

(c) Effective August 8, 1990, the wastes identified in 40 CFR 261.31 as EPA Hazardous Waste Number F039 (multi-source leachate); the wastes specified in 40 CFR 261.32 EPA Hazardous Waste Numbers K002, K003, K005 (wastewaters), K006, K007 (wastewaters), K023, K026, K032, K033, K034, K093, K094 and K100 (wastewaters); the wates specified in 40 CFR 261.33 as P006, P009, P017, P022, P023, P024, P028, P031, P033, P034, P038, P042, P045, P046, P047, P051, P056, P064, P065, P073, P075, P076, P077, P078, P088, P093, P095, P096, P099, P101, P103, P109, P116, P118, P119, U001, U004, U006, U017, U024, U027, U030, U033, U038, U034, U038, U039, U042, U045, U048, U052, U055, U056, U068, U071, U072, U075, U076, U079, U081, U082, U084, U085, U087, U088, U090, U091, U096, U112, U113, U117, U118, U120, U121, U123, U125, U126, U132, U136, U139, U141, U145, U148, U152, U153, U156, U160, U166, U167, U181, U182, U183, U184, U186, U187, U191, U194, U197, U201, U202, U204, U207, U222, U225, U234, U236, U240, U243, and U247; and the wastes identified in 40 CFR 261.21, 261.23 or 261.24 as hazardous based on a characteristic alone, designated as D001, D004, D005, D006, D008, D009 (wastewaters), D010, D011, D012, D013, D014, D015, D016, D017 are prohibited from underground injection at off-site injection facilities.

(d) Effective August 8, 1990, mixed radioactive/hazardous waste in 40 CFR 268.10, 268.11, and 268.12, that are mixed radioactive and hazardous wastes, are prohibited from underground injection.

(e) Effective November 8, 1990, the wastes specified in paragraph (c) of this section are prohibited from underground

injection at on-site injection facilities. These effective dates do not apply to the wastes listed in 40 CFR 148.12(b) which are prohibited from underground injection on August 8, 1990.

(f) Effective May 8, 1992, the wastes identified in 40 CFR 261.22, 261.23 or 261.24 as hazardous based on a characteristic alone, designated as D002 (wastewaters and nonwastewaters), D003 (wastewaters and nonwastewaters), D007 (wastewaters and nonwastewaters), and D009 (nonwastewaters) are prohibited from underground injection. These effective dates do no apply to the wastes listed in 40 CFR 148.12(b) which are prohibited from underground injection on August 8, 1990.

(g) The requirements of paragraphs (a) through (f) of this section do not apply:

PART 261—IDENTIFICATION AND LISTING OF HAZARDOUS WASTES

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

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

Subpart C—Characteristics of Hazardous Waste

2. In § 261.20, paragraph (b) is revised to read as follows:

§ 261.20 General.

* * * * *

(b) A hazardous waste which is identified by a characteristic in this subpart is assigned every EPA Hazardous Waste Number that is applicable as set forth in this subpart. This number must be in complying with the notification requirements of section 3010 of the Act and all applicable recordkeeping and reporting requirements under parts 262 through 265, 268, and 270 of this chapter.

* * * * *

3. In § 261.21, paragraph (b) is revised to read as follows:

§ 261.21 Characteristic of ignitability.

* * * * *

(b) A solid waste that exhibits the characteristic of ignitability has the EPA Hazardous Waste Number of D001.

4. In § 261.22, paragraph (b) is revised to read as follows:

§ 261.22 Characteristic of corrosivity.

* * * * *

(b) A solid waste that exhibits the characteristic of corrosivity has the EPA Hazardous Waste Number of D002.

5. In § 261.23, paragraph (b) is revised to read as follows:

§ 261.23 Characteristic of reactivity.

* * * * *

(b) A solid waste that exhibits the characteristic of reactivity has the EPA Hazardous Waste Number of D003.

6. In § 261.24, paragraph (b) introductory text is revised to read as follows:

§ 261.24 Toxicity characteristic.

* * * * *

(b) A solid waste that exhibits the characteristic of toxicity has the EPA Hazardous Waste Number specified in Table I which corresponds to the toxic contaminant causing it to be hazardous.

* * * * *

Subpart D—Lists of Hazardous Wastes

7. Section 261.31 is amended by adding the following waste code in alphanumeric order.

§ 261.31 Hazardous wastes from non-specific sources.

* * * * *

Industry and EPA hazardous waste No.	Hazardous waste	Hazard code
*	*	*
F039	Leachate resulting from the treatment, storage, or disposal of wastes classified by more than one waste code under Subpart D, or from a mixture of wastes classified under Subparts C and D of this part. (Leachate resulting from the management of one or more of the following EPA Hazardous Wastes and no other hazardous wastes retains its hazardous waste code(s): F020, F021, F022, F023, F026, F027, and/or F028.).	(T).

8. Paragraph (c) of § 261.33 is revised to read as follows: (the comment paragraph remains):

§ 261.33 Discarded commercial chemical products, off-specification species, container residues, and spill residues thereof.

* * * * *

(c) Any residue remaining in a container or in an inner liner removed from a container that has held any commercial chemical product or manufacturing chemical intermediate having the generic name listed in paragraphs (e) or (f) of this section, unless the container is empty as defined in § 261.7(b) of this chapter.

* * * * *

9. Appendix VII is amended by adding the following waste stream in alphanumeric order to read as follows:

Appendix VII—Basis for Listing Hazardous Waste

EPA hazardous waste No.	Hazardous constituents for which listed
*	*
F039	All constituents for which treatment standards are specified for multi-source leachate (wastewaters and nonwastewaters) under 40 CFR 268.43(a), Table CCW.
*	*

PART 262—STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE

1. The authority citation for part 262 continues to read as follows:

Authority: 42 U.S.C. 6906, 6912, 6922, 6923, 6924, 6925, and 6937.

Subpart A—General

2. Paragraph (c) introductory text of § 262.11 is revised to read as follows:

§ 262.11 Hazardous waste determination.

* * * * *

(c) For purposes of compliance with 40 CFR part 268, or if the waste is not listed in subpart D of this part, the generator must then determine whether the waste is identified in subpart C of 40 CFR part 261 by either:

* * * * *

Subpart C—Pre-Transport Requirements

3. Paragraph (a)(4) of § 262.34 is revised to read as follows:

§ 262.34 Accumulation time.

(a) * * *

(4) The generator complies with the requirements for owners or operators in subparts C and D in 40 CFR part 265, with § 265.16, and with 40 CFR 268.7(a)(4).

* * * * *

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

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

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

Subpart B—General Facility Standards

2. In § 264.13, the comment following Paragraph (a)(2) is revised to read as follows:

§ 264.13 General waste analysis.

(a) * * *

(2) * * *

[Comment: For example, the facility's records of analyses performed on the waste before the effective date of these regulations, or studies conducted on hazardous waste generated from processes similar to that which generated the waste to be managed at the facility, may be included in the data base required to comply with paragraph (a)(1) of this section. The owner or operator of an off-site facility may arrange for the generator of the hazardous waste to supply part of the information required by paragraph (a)(1) of this section, except as othewise specified in 40 CFR 268.7 (b) and (c). If the generator does not supply the information, and the owner or operator chooses to accept a hazardous waste, the owner or operator is responsible for obtaining the information required to comply with this section.]

* * * * *

Subpart K—Surface Impoundments

3. The introductory text of § 264.229 is revised to read as follows:

§ 264.229 Special requirements for ignitable or reactive waste.

Ignitable or reactive waste must not be placed in a surfaee impoundment, unless the waste and impoundment satisfy all applicable requirements of 40 CFR part 268, and:

* * * * *

Subpart L—Waste Piles

4. The introductory text of § 264.256 is revised to read as follows:

§ 264.256 Special requirements for ignitable or reactive waste.

Ignitable or reactive waste must not be place in a waste pile unless the waste and waste pile satisfy all applicable requirements of 40 CFR part 268, and:

* * * * *

Subpart M—Land Treatment

5. The introductory text of § 264.281 is revised to read as follows:

§ 264.281 Special requirements for ignitable or reactive waste.

The owner or operator must not apply ignitable or reactive waste to the treatment zone unless the waste and the treatment zone meet all applicable requirements of 40 CFR part 268, and:

* * * * *

Subpart N—Landfills

6. In § 264.312, paragraphs (a) introductory text and (b) are revised to read as follows:

§ 264.312 Special requirements for ignitable or reactive waste.

(a) Except as provided in paragraph (b) of this section, and in § 264.316, ignitable or reactive waste must not be placed in a landfill, unless the waste and landfill meet all applicable requirements of part 268, and:

* * * * *

(b) Except for prohibited wastes which remain subject to treatment standards in subpart D of part 268, ignitable wastes in containers may be landfilled without meeting the requirements of paragraph (a) of this section, provided that the wastes are disposed of in such a way that they are protected from any material or conditions which may cause them to ignite. At a minimum, ignitable wastes must be disposed of in non-leaking containers which are carefully handled and placed so as to avoid heat, sparks, rupture, or any other condition that might cause ignition of the wastes; must be covered daily with soil or other non-combustible material to minimize the potential for ignition of the wastes; and must not be disposed of in cells that contain or will contain other wastes which may generate heat sufficient to cause ignition of the waste.

7. In § 264.316, paragraph (f) is added to read as follows:

§ 264.316 Disposal of small containers of hazardous waste in overpacked drums (lab packs).

* * * * *

(f) Such disposal is in compliance with the requirements of Part 268. Persons who incinerate lab packs according to the requirements in 40 CFR 268.42(c)(1) may use fiber drums in place of metal outer containers. Such fiber drums must meet the DOT specifications in 49 CFR 173.12 and be overpacked according to the requirements in paragraph (b) of this section.

PART 265—INTERIM STATUS STANDARDS FOR OWNERS AND OPERATORS OF HAZARDOUS WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES

1. The authority citation for part 265 continues to read as follows:

Authority: 42 U.S.C. 6905, 6912(a), 6924, 6925, and 6935.

Subpart A—General

2. Section 265.1(e) is revised to read as follows:

§ 265.1 Purpose, scope, and applicability.

* * * * *

(e) The requirements of this part apply to owners or operators of all facilities which treat, store or dispose of hazardous waste referred to in 40 CFR part 268, and the 40 CFR part 268 standards are considered material conditions or requirements of the part 265 interim status standards.

Subpart B—General Facility Standards

3. The comment at the end of paragraph (a) of § 265.13 is revised to read as follows:

§ 265.13 General waste analysis.

(a) * * *

(2) * * *

Comment: for example, the facility's records of analyses performed on the waste before the effective date of these regulations, or studies conducted on hazardous waste generated from processes similar to that which generated the waste to be managed at the facility, may be included in the data base required to comply with paragraph (a)(1) of this section. The owner or operator of an off-site facility may arrange for the generator of the hazardous waste to supply part of the information required by paragraph (a)(1) of this section, except as otherwise specified in 40 CFR 268.7 (b) and (c). If the generator does not supply the information, and the owner or operator chooses to accept a hazardous waste, the owner or operator is responsible for obtaining the information required to comply with this section.]

* * * * *

Subpart K—Surface Impoundments

4. The introductory text of § 265.229 is revised to read as follows:

§ 265.229 Special requirements for ignitable or reactive waste.

Ignitable or reactive waste must not be placed in a surface impoundment, unless the waste and impoundment satisfy all applicable requirements of 40 CFR part 268, and:

* * * * *

Subpart L—Waste Piles

5. Paragraph (a) introductory text of § 265.256 is revised to read as follows:

§ 265.256 Special requirements for ignitable or reactive waste.

(a) Ignitable or reactive waste must not be placed in a pile unless the waste and pile satisfy all applicable requirements of 40 CFR part 268, and:

* * * * *

Subpart M—Land Treatment

6. The introductory text of § 265.281 is revised to read as follows:

§ 265.281 Special requirements for ignitable or reactive waste.

The owner or operator must not apply ignitable or reactive waste to the treatment zone unless the waste and treatment zone meet all applicable requirements of 40 CFR part 268, and:

* * * * *

Subpart N—Landfills

7. Paragraphs (a) introductory text and (b) of § 265.312 are revised to read as follows:

§ 265.312 Special requirements for ignitable or reactive waste.

(a) Except as provided in paragraph (b) of this section, and in § 265.316, ignitable or reactive waste must not be placed in a landfill, unless the waste and landfill meets all applicable requirements of 40 CFR part 268, and:

* * * * *

(b) Except for prohibited wastes which remain subject to treatment standards in subpart D of part 268, ignitable wastes in containers may be landfilled without meeting the requirements of paragraph (a) of this section, provided that the wastes are disposed of in such a way that they are protected from any material or conditions which may cause them to ignite. At a minimum, ignitable wastes must be disposed of in non-leaking containers which are carefully handled and placed so as to avoid heat, sparks, rupture, or any other condition that might cause ignition of the wastes; must be covered daily with soil or other non-combustible material to minimize the potential for ignition of the wastes; and must not be disposed of in cells that contain or will contain other wastes which may generate heat sufficient to cause ignition of the waste.

8. In § 265.316, paragraph (f) is added to read as follows:

§ 265.316 Disposal of small containers of hazardous waste in overpacked drums (lab packs).

* * * * *

(f) Such disposal is in compliance with the requirements of 40 CFR part 268. Persons who incinerate lab packs according to the requirements in 40 CFR 268.42(c)(1) may use fiber drums in place of metal outer containers. Such fiber drums must meet the DOT specifications in 49 CFR 173.12 and be overpacked according to the requirements in paragraph (b) of this section.

PART 268—LAND DISPOSAL RESTRICTIONS

1. 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

2. In § 268.1, paragraph (c)(3) is added, and paragraph (c)(5) is removed, to read as follows:

§ 268.1 Purpose, scope, and applicability.

(c) * * *

(3) Wastes that are hazardous only because they exhibit a hazardous characteristic, and which are otherwise prohibited from land disposal under this part, are not prohibited from land disposal if the wastes:

(i) Are disposed into a nonhazardous or hazardous injection well as defined in 40 CFR 144.6(a); and

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

* * * * *

3. Section 268.2 is revised to read as follows:

§ 268.2 Definitions applicable in this part.

When used in this part the following terms have the meanings given below:

(a) *Halogenated organic compounds* or *HOCs* means those compounds having a carbon-halogen bond which are listed under appendix III to this part.

(b) *Hazardous constituent or constituents* means those constituents listed in appendix VIII to part 261 of this chapter.

(c) *Land disposal* means placement in or on the land and includes, but is not limited to, placement in a landfill, surface impoundment, waste pile, injection well, land treatment facility, salt dome formation, salt bed formation, underground mine or cave, or placement in a concrete vault or bunker intended for disposal purposes.

(d) *Nonwastewaters* are wastes that do not meet the criteria for wastewaters in paragraph (g)(6) of this section.

(e) *Polychlorinated biphenyls* or *PCBs* are halogenated organic compounds defined in accordance with 40 CFR 761.3.

(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), with the following exceptions:

(1) *F001, F002, F003, F004, F005 solvent-water mixtures* that contain less than 1% by weight TOC or less than 1% by weight total F001, F002, F003, F004, F005 solvent constituents listed in § 268.41, Table CCWE.

(2) *K011, K013, K014 wastewaters* (as generated) that contain less than 5% by weight TOC and less than 1% by weight TSS.

(3) *K103 and K104 wastewaters* contain less than 4% by weight TOC and less than 1% by weight TSS.

(g) *Inorganic Solid Debris* are nonfriable inorganic solids that are incapable of passing through a 9.5 mm standard sieve that require cutting, or crushing and grinding in mechanical sizing equipment prior to stabilization, limited to the following inorganic or metal materials:

(1) Metal slags (either dross or scoria).

(2) Glassified slag.

(3) Glass.

(4) Concrete (excluding cementitious or pozzolanic stabilized hazardous wastes).

(5) Masonry and refractory bricks.

(6) Metal cans, containers, drums, or tanks.

(7) Metal nuts, bolts, pipes, pumps, valves, appliances, or industrial equipment.

(8) Scrap metal as defined in 40 CFR 261.1(c)(6).

4. Section 268.3 is revised to read as follows:

§ 268.3 Dilution prohibited as a substitute for treatment.

(a) Except as provided in paragraph (b) of this section, 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) Dilution of wastes that are hazardous only because they exhibit a characteristic in a treatment system which treats wastes subsequently discharged to a water of the United States pursuant to a permit issued under section 402 of the Clean Water Act (CWA) or which treats wastes for purposes of pretreatment requirements under section 307 of the CWA is not impermissible dilution for purposes of this section unless a method has been specified as the treatment standard in § 268.42.

5. In § 268.7, paragraphs (a)(1)(ii), (a)(2)(i)(B), (a)(3)(ii), and (a)(4) are revised; new paragraphs (a)(7), (a)(8), and (a)(9) are added; paragraph (b)(4)(ii) is revised; the certification in paragraph (b)(5)(i) is revised; new paragraph (b)(5)(iii) is added; paragraph (b)(7) is removed and paragraph (b)(8) is redesignated as paragraph (b)(7); the

introductory text to paragraph (c) is revised; and paragraphs (c)(3) and (c)(4) are removed, to read as follows:

§ 268.7 Waste analysis and recordkeeping.

(a) * * *

(1) * * *

(ii) The corresponding treatment standards for wastes F001–F005, F039, and wastes prohibited pursuant to § 268.32 or RCRA Section 3004(d). Treatment standards for all other restricted wastes may be referenced by including on the notification the subcategory of the waste, the treatability group(s) of the waste(s), and the CFR section(s) and paragraphs where the treatment standards appear. Where the applicable treatment standards are expressed as specified technologies in § 268.42, the applicable five-letter treatment code found in Table 1 of § 268.42 (*e.g.*, INCIN, WETOX) also must be listed on the notification.

* * * * *

(2) * * *

(i) * * *

(B) The corresponding treatment standards for wastes F001–F005, F039, and wastes prohibited pursuant to § 268.32 or RCRA Section 3004(d). Treatment standards for all other restricted wastes may be referenced by including on the notification the subcategory of the waste, the treatability group(s) of the waste(s), and the CFR section(s) and paragraphs where the treatment standards appear. Where the applicable treatment standards are expressed as specified technologies in § 268.42, the applicable five-letter treatment code found in Table 1 § 268.42 (*e.g.*, INCIN, WETOX) also must be listed on the notification.

* * * * *

(3) * * *

(ii) The corresponding treatment standards for wastes F001–F005, F039, and wastes prohibited pursuant to § 268.32 or RCRA section 3004(d). Treatment standards for all other restricted wastes may be referenced by including on the notification the subcategory of the waste, the treatability group(s) of the waste(s), and the CFR section(s) and paragraphs where the treatment standards appear. Where the applicable treatment standards are expressed as specified technologies in § 268.42, the applicable five-letter treatment code found in Table 1 of § 268.42 (*e.g.*, INCIN, WETOX) also must be listed on the notification.

(4) If a generator is managing a prohibited waste in tanks or containers regulated under 40 CFR 262.34, and is treating such waste in such tanks or containers to meet applicable treatment standards under Subpart D of this part, the generator must develop and follow a written waste analysis plan which describes the procedures the generator will carry out to comply with the treatment standards. The plan must be kept on-site in the generator's records, and the following requirements must be met:

(i) The waste analysis plan must be based on a detailed chemical and physical analysis of a representative sample of the prohibited waste(s) being treated, and contain all information necessary to treat the waste(s) in accordance with the requirements of this Part, including the selected testing frequency.

(ii) Such plan must be filed with the EPA Regional Administrator (or his designated representative) or State authorized to implement Part 268 requirements a minimum of 30 days prior to the treatment activity, with delivery verified.

(iii) Wastes shipped off-site pursuant to this paragraph must comply with the notification requirements of § 268.7(a)(2).

* * * * *

(7) If a generator is managing a lab pack that contains wastes identified in Appendix IV of this part and wishes to use the alternative treatment standard under § 268.42, with each shipment of waste the generator must submit a notice to the treatment facility in accordance with paragraph (a)(1) of this section. The generator must also comply with the requirements in paragraphs (a)(5) and (a)(6) of this section, and must submit the following certification, which must be signed by an authorized representative:

I certify under penalty of law that I personally have examined and am familiar with the waste and that the lab pack contains only the wastes specified in appendix IV to part 268 or solid wastes not subject to regulation under 40 CFR part 261. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine or imprisonment.

(8) If a generator is managing a lab pack that contains organic wastes specified in Appendix V of this Part and wishes to use the alternate treatment standards under § 268.42, with each shipment of waste the generator must submit a notice to the treatment facility in accordance with paragraph (a)(1) of this section. The generator also must comply with the requirements in paragraphs (a)(5) and (a)(6) of this section, and must submit the following certification which must be signed by an authorized representative:

I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste and that the lab pack contains only organic waste specified in Appendix V to Part 268 or solid wastes not subject to regulation under 40 CFR Part 261. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine or imprisonment.

(9) Small quantity generators with tolling agreements pursuant to 40 CFR 262.20(e) must comply with the applicable notification and certification requirements of paragraph (a) of this section for the initial shipment of the waste subject to the agreement. Such generators must retain on-site a copy of the notification and certification, together with the tolling agreement, for at least three years after termination or expiration of the agreement. The three-year record retention period is automatically extended during the course of any unresolved enforcement action regarding the regulated activity or as requested by the Administrator.

(b) * * *

(4) * * *

(ii) The corresponding treatment standards for wastes F001–F005, F039, and wastes prohibited pursuant to § 268.32 or RCRA Section 3004(d). Treatment standards for all other restricted wastes may be referenced by including on the notification the subcategory of the waste, the treatability group(s) of the waste(s), and the CFR section(s) and paragraphs where the treatment standards appear. Where the applicable treatment standards are expressed as specified technologies in § 268.42, the applicable five-letter treatment code found in Table 1 of § 268.42 (*e.g.*, INCIN, WETOX) also must be listed on the notification.

(5) * * *

(i) * * *

I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and that, based on my inquiry of those individuals immediately responsible for obtaining this information, I believe that the treatment process has been operated and maintained properly so as to comply with the performance levels specified in 40 CFR part 268, subpart D, and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA section 3004(d) without impermissible dilution of the prohibited waste. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

* * * * *

(iii) For wastes with treatment standards expressed as concentrations in the waste pursuant to § 268.43, if compliance with the treatment standards in subpart D of this part is

based in part or in whole on the analytical detection limit alternative specified in § 268.43(c), the certification also must state the following:

I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and that, based on my inquiry of those individuals immediately responsible for obtaining this information, I believe that the nonwastewater organic constituents have been treated by incineration in units operated in accordance with 40 CFR part 264, subpart O) or 40 CFR part 265, subpart O, or by combustion in fuel substitution units operating in accordance with applicable technical requirements, and I have been unable to detect the nonwastewater organic constituents despite having used best good faith efforts to analyze for such constituents. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

* * * * *

(c) Except where the owner or operator is disposing of any waste that is a recyclable material used in a manner constituting disposal pursuant to 40 CFR 266.20(b), the owner or operator of any land disposal facility disposing any waste subject to restrictions under this part must:

* * * * *

6. Paragraph (a) of § 268.8 is revised to read as follows:

§ 268.8 Landfill and surface impoundment disposal restrictions.

(a) Prior to May 8, 1990, wastes which are otherwise prohibited from land disposal under § 268.33(f) of this part may be disposed in a landfill or surface impoundment which is in compliance with the requirements of § 268.5(h)(2) provided that the requirements of this section are met. As of May 8, 1990, this section is no longer in effect.

* * * * *

7. Section 268.9 is added to subpart A 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 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 a waste code designation for any applicable listing under 40 CFR part 261, subpart D, and also one or more waste code designations under 40 CFR part 261, subpart C where the waste exhibits the relevant characteristic.

(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. Otherwise, the waste must meet the treatment standards for all applicable listed and characteristic waste codes.

(c) In addition to any applicable standards determined from the initial point of generation, no prohibited waste which exhibits a characteristic under 40 CFR part 261, subpart C may be land disposed unless the waste complies with the treatment standards under subpart D of this part.

(d) Wastes that exhibit a characteristic are also subject to § 268.7 requirements, except that once the waste is no longer hazardous, for each shipment of such wastes to a subtitle D facility the initial generator or the treatment facility need not send a § 268.7 notification to such facility. In such circumstances, a notification and certification must be sent to the appropriate EPA Regional Administrator (or his delegated representative) or State authorized to implement part 268 requirements.

(1) The notification must include the following information:

(i) The name and address of the subtitle D facility receiving the waste shipment;

(ii) A description of the waste as initially generated, including the applicable EPA Hazardous Waste Number(s) and treatability group(s);

(iii) The treatment standards applicable to the waste at the initial point of generation.

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

Subpart C—Prohibitions on Land Disposal

8. Section 268.35 is added to read as follows:

§ 268.35 Waste specific prohibitions—Third Third wastes.

(a) Effective August 8, 1990, the following wastes specified in 40 CFR 261.31 as EPA Hazardous Waste Numbers F006 (wastewaters), F019, and F039 (wastewaters); the wastes specified in 40 CFR 261.32 as EPA Hazardous Waste Numbers K002; K003; K004 (wastewaters); K005 (wastewaters); K006; K008 (wastewaters); K011 (wastewaters); K013 (wastewaters), K014 (wastewaters); K017; K021 (wastewaters); K022 (wastewaters); K025 (wastewaters); K026; K029 (wastewaters); K031 (wastewaters); K032; K033; K034; K035; K041; K042; K046 (wastewaters); K048 (wastewaters); K049 (wastewaters); K050 (wastewaters); K051 (wastewaters); K052 (wastewaters); K060 (wastewaters); K061 (wastewaters); K069 (wastewaters); K073; K083 (wastewaters); K084 (wastewaters); K085; K095 (wastewaters); K096 (wastewaters); K097; K098; K100 (wastewaters); K101 (wastewaters); K102 (wastewaters); K105; and K106 (wastewaters); the wastes specified in 40 CFR 261.33(e) as EPA Hazardous Waste Numbers P001; P002; P003; P004; P005; P006; P007; P008; P009; P010 (wastewaters); P011 (wastewaters); P012 (wastewaters); P014; P015; P016; P017; P018 (wastewaters); P020; P022; P023; P024; P027; P028; P031; P033; P034; P036 (wastewaters); P037; P038 (wastewaters); P042; P045; P046; P047; P048; P049; P050; P051; P054; P056; P057; P058; P059; P060; P064; P065 (wastewaters); P066; P067; P068; P069; P070; P072; P073; P075; P076; P077; P078; P081; P082; P084; P088; P092 (wastewaters); P093; P095; P096; P101; P102; P103; P105; P108; P109; P110; P112; P113; P114; P115; P116; P118; P119; P120; P122; and P123; and the wastes specified in 40 CFR 261.33(f) as EPA Hazardous Waste Numbers U001; U002; U003; U004; U005; U006; U007; U008; U009; U010; U011; U012; U014; U015; U016; U017; U018; U019; U020; U021; U022; U023; U024; U025; U026; U027; U029; U030; U031; U032; U033; U034; U035; U036; U037; U038; U039; U041; U042; U043; U044; U045; U046; U047; U048; U049; U050; U051; U052; U053; U055; U056; U057; U059; U060; U061; U062; U063; U064; U066; U067; U068; U070; U071; U072; U073; U074; U075; U076; U077; U078; U079; U080; U081; U082; U083; U084; U085; U086; U089; U090; U091; U092; U093; U094; U095; U096; U097; U098; U099; U101; U103; U105; U106; U108; U109; U110; U111; U112; U113; U114; U115; U116; U117; U118; U119; U120 (wastewaters); U121; U122; U123; U124; U125; U126; U127; U128; U129; U130; U131; U132; U133; U134; U135; U136 (wastewaters); U137; U138; U140; U141; U142; U143; U144; U145; U146; U147; U148; U149; U150; U151 (wastewaters); U152; U153; U154; U155; U156; U157; U158; U159; U160; U161; U162; U163; U164; U165; U166; U167; U168; U169; U170; U171; U172; U173; U174; U176; U177; U178; U179; U180; U181; U182; U183; U184; U185; U186; U187; U188; U189; U191; U192; U193;

U194; U196; U197; U200; U201; U202; U203; U204; U205; U206; U207; U208; U209; U210; U211; U213; U214; U215; U216; U217; U218; U219; U220; U222; U225; U226; U227; U228; U234; U236; U237; U238; U239; U240; U243; U244; U246; U247; U248; U249; and the following wastes identified as hazardous based on a characteristic alone: D001; D002, D003, D004 (wastewaters), D005, D006; D007; D008 (except for lead materials stored before secondary smelting), D009 (wastewaters), D010, D011, D012, D013, D014, D015, D016, and D017 are prohibited from land disposal.

(b) Effective November 8, 1990, the following wastes specified in 40 CFR 261.32 as EPA Hazardous Waste Numbers K048 (nonwastewaters), K049 (nonwastewaters), K050 (nonwastewaters), K051 (nonwastewaters), and K052 (nonwastewaters) are prohibited from land disposal.

(c) Effective May 8, 1992, the following waste specified in 40 CFR 261.31 as EPA Hazardous Waste Numbers F039 (nonwastewaters); the wastes specified in 40 CFR 261.32 as EPA Hazardous Waste Numbers K031 (nonwastewaters); K084 (nonwastewaters); K101 (nonwastewaters); K102 (nonwastewaters); K106 (nonwastewaters); the wastes specified in 40 CFR 261.33(e) as EPA Hazardous Waste Numbers P010 (nonwastewaters); P011 (nonwastewaters); P012 (nonwastewaters); P036 (nonwastewaters); P038 (nonwastewaters); P065 (nonwastewaters); P087 (nonwastewaters); and P092 (nonwastewaters); the wastes specified in 40 CFR 261.33(f) as EPA Hazardous Waste Numbers U136 (nonwastewaters); and U151 (nonwastewaters); and the following wastes identified as hazardous based on a characteristic alone: D004 (nonwastewaters); D008 (lead materials stored before secondary smelting); and D009 (nonwastewaters); inorganic solids debris as defined in 40 CFR 268.2(a)(7) (which also applies to chromium refractory bricks carrying the EPA Hazardous Waste Numbers K048–K052); and RCRA hazardous wastes that contain naturally occurring radioactive materials are prohibited from land disposal.

(d) Effective May 8, 1992, hazardous wastes listed in 40 CFR 268.12 that are mixed radioactive/hazardous wastes are prohibited from land disposal.

(e) Effective May 8, 1992, the wastes specified in this section having a treatment standard in subpart D of this part based on incineration, mercury retorting, or vitrification, and which are contaminated soil or debris, are prohibited from land disposal.

(f) Between May 8, 1990 and August 8, 1990, the wastes included in paragraph (a) may be disposed of in a landfill or surface impoundment only if such unit is in compliance with the requirements specified in § 268.5(h)(2).

(g) Between May 8, 1990 and November 8, 1990, wastes included in paragraph (b) of this section may be disposed of in a landfill or surface impoundment only if such unit is in compliance with the requirements specified in § 268.5(h)(2).

(h) Between May 8, 1990, and May 8, 1992, wastes included in paragraphs (c), (d), and (e) of this section may be disposed of in a landfill or surface impoundment only if such unit is in compliance with the requirements specified in § 268.5(h)(2).

(i) The requirements of paragraphs (a), (b), (c), (d), and (e) of this section do not apply if:

(1) The wastes meet the applicable standards specified in subpart D of this part;

(2) Persons have been granted an exemption from a prohibition pursuant to a petition under § 268.6, with respect to those wastes and units covered by the petition;

(3) The wastes meet the applicable alternate standards established pursuant to a petition granted under § 268.44;

(4) Persons have been granted an extension to the effective date of a prohibition pursuant to § 268.5, with respect to these wastes covered by the extension.

(j) To determine whether a hazardous waste listed in § 268.10, 268.11, and 268.12 exceeds the applicable treatment standards specified in §§ 268.41 and 268.43, the initial generator must test a representative sample of the waste extract or the entire waste, depending on whether the treatment standards are expressed as concentrations in the waste extract or the waste, or the generator may use knowledge of the waste. If the waste contains constituents in excess of the applicable subpart D levels, the waste is prohibited from land disposal, and all requirements of part 268 are applicable, except as otherwise specified.

9. Section 268.40 is amended by revising paragraphs (a) and (c) to read as follows:

§ 268.40 Applicability of treatment standards.

(a) A restricted waste identified in § 268.41 may be land disposed only if an extract of the waste or of the treatment residue of the waste developed using the test method in appendix I of this part does not exceed the value shown in Table CCWE of § 268.41 for any hazardous constituent listed in Table CCWE for that waste, with the following exceptions: D004, D008, K031, K084, K101, K102, P010, P011, P012, P036, P038, and U136. Wastes D004, D008, K031, K084, K101, K102, P010, P011, P012, P036, P038, and U136 may be land disposed only if an extract of the waste or of the treatment residue of the waste developed using either the test method in Appendix I of this part or the test method in appendix II of part 261 does not exceed the value shown in Table CCW of § 268.41 for any hazardous constituent listed in Table CCWE for that waste.

* * * * *

(c) Except as otherwise specified in § 268.43(c), a restricted waste identified in § 268.43 may be land disposed only if the constituent concentrations in the waste or treatment residue of the waste do not exceed the value shown in Table CCW of § 268.43 for any hazardous constituents listed in Table CCW for that waste.

10. Section 268.41 is amended by revising paragraph (a) and Table CCWE—Constituent Concentrations in Waste Extract, to read as follows:

§ 268.41 Treatment standards expressed as concentrations in waste extract.

(a) Table CCWE identifies the restricted wastes and the concentrations of their associated constituents which may not be exceeded by the extract of a waste or waste treatment residual developed using the test method in Appendix I of this part for the allowable land disposal of such wastes, with the exception of wastes D004, D008, K031, K084, K101, K102, P010, P011, P012, P036, P038, and U136. Table CCWE identifies the restricted wastes D004, D008, K031, K084, K101, K102, P010, P011, P012, P036, P038, and U136 and the concentrations of their associated constituents which may not be exceeded by the extract of a waste or waste treatment residual developed using the test method in Appendix I of this part or appendix II of 40 CFR part 261 for the allowable land disposal of such wastes. (Appendix II of this part provides Agency guidance on treatment methods that have been shown to achieve the Table CCWE levels for the respective wastes. Appendix II of this part is not a regulatory requirement but is provided to assist generators and owners/operators in their selection of appropriate treatment methods.) Compliance with these concentrations is required based upon grab samples.

TABLE CCWE.—CONSTITUENT CONCENTRATIONS IN WASTE EXTRACT

Waste code	See also	Regulated hazardous constituent	CAS number for regulated hazardous constituent	Wastewaters concentration (mg/l)	Non-wastewaters concentration (mg/l)
D004	Table CCW in 268.43	Arsenic	7440-38-2	NA	5.0#
D005	Table CCW in 268.43	Barium	7440-39-3	NA	100
D006	Table CCW in 268.43	Cadmium	7440-43-9	NA	1.0
D007	Table CCW in 268.43	Chromium (Total)	7440-47-32	NA	5.0
D008	Table CCW in 268.43	Lead	7439-92-1	NA	5.0
D009 (Low Mercury Subcategory—less than 260 mg/kg Mercury).	Table 2 in 268.42 and Table CCW in 268.43.	Mercury	7439-97-6	NA	0.20
D010	Table CCW in 268.43	Selenium	7782-49-2	NA	5.7
D011	Table CCW in 268.43	Silver	7440-22-4	NA	5.0
F001-F005 spent solvents	Table 2 in 268.42 and Table CCW in 268.43.	Acetone	67-64-1	0.05	0.59
		n-Butyl alcohol	71-36-3	5.0	5.0
		Carbon disulfide	75-15-0	1.05	4.81
		Carbon tetrachloride	56-23-5	0.05	0.96
		Chlorobenzene	108-90-7	0.15	0.05
		Cresols (and cresylic acid)		2.82	0.75
		Cyclohexanone	108-94-1	0.125	0.75
		1,2-Dichlorobenzene	95-50-1	0.65	0.125
		Ethyl acetate	141-78-6	0.05	0.75
		Ethylbenzene	100-41-4	0.05	0.053
		Ethyl ether	60-29-7	0.05	0.75
		Isobutanol	78-83-1	5.0	5.0
		Methanol	67-56-1	0.25	0.75
		Methylene chloride	75-9-2	0.20	0.96
		Methyl ethyl ketone	78-93-3	0.05	0.75
		Methyl isobutyl ketone	108-10-1	0.05	0.33
		Nitrobenzene	98-95-3	0.66	0.125
		Pyridine	110-86-1	1.12	0.33
		Tetrachloroethylene	127-18-4	0.079	0.05
		Toluene	108-88-3	1.12	0.33
		1,1,1-Trichloroethane	71-55-6	1.05	0.41
		1,1,2-Trichloro-1,2,2-Tetrifluorethane	76-13-1	1.05	0.96
		Trichloroethylene	79-01-6	0.062	0.091
		Trichlorofluoromethane	75-69-4	0.05	0.96
		Xylene		0.05	0.15
F006	Table CCW in 268.43	Cadmium	7440-43-9	NA	0.066
		Chromium (Total)	7440-47-32	NA	5.2
		Lead	7439-92-1	NA	0.51
		Nickel	7440-02-0	NA	0.32
		Silver	7440-22-4	NA	0.072
F007	Table CCW in 268.43	Cadmium	7440-43-9	NA	0.066
		Chromium (Total)	7440-47-32	NA	5.2
		Lead	7439-92-1	NA	0.51
		Nickel	7440-02-0	NA	0.32
		Silver	7440-22-4	NA	0.072
F008	Table CCW in 268.43	Cadmium	7440-43-9	NA	0.066
		Chromium (Total)	7440-47-32	NA	5.2
		Lead	7439-92-1	NA	0.51
		Nickel	7440-02-0	NA	0.32
		Silver	7440-22-4	NA	0.072
F009	Table CCW in 268.43	Cadmium	7440-43-9	NA	0.066
		Chromium (Total)	7440-47-32	NA	5.2
		Lead	7439-92-1	NA	0.51
		Nickel	7440-02-0	NA	0.32
		Silver	7440-22-4	NA	0.072
F011	Table CCW in 268.43	Cadmium	7440-43-9	NA	0.066
		Chromium (Total)	7440-47-32	NA	5.2
		Lead	7439-92-1	NA	0.51
		Nickel	7440-02-0	NA	0.32
		Silver	7440-22-4	NA	0.072
F012	Table CCW in 268.43	Cadmium	7440-43-9	NA	0.066
		Chromium (Total)	7440-47-32	NA	5.2
		Lead	7439-92-1	NA	0.51
		Nickel	7440-02-0	NA	0.32
		Silver	7440-22-4	NA	0.072
F019	Table CCW in 268.43	Chromium (Total)	7440-47-32	NA	5.2
F020-F023 and F026-F028 dioxin containing wastes.*.		HxCDD-All Hexachlorodibenzo-p-dioxins.		<1 ppb	<1 ppb
		HxCDF-All Hexachlorodibenzofurans		<1 ppb	<1 ppb
		PeCDD-All Pentachlorodibenzo-p-dioxins.		<1 ppb	<1 ppb
		PeCDF-All Pentachlorodibenzofurans		<1 ppb	<1 ppb
		TCDD-All Tetrachlorodibenzo-p-dioxins.		<1 ppb	<1 ppb
		TCDF-All Tetrachlorodibenzofurans		<1 ppb	<1 ppb
		2,4,5-Trichlorophenol	95-95-4	<0.05 ppm	<0.05 ppm
		2,4,6-Trichlorophenol	88-06-2	<0.05 ppm	<0.05 ppm

TABLE CCWE.—CONSTITUENT CONCENTRATIONS IN WASTE EXTRACT—Continued

Waste code	See also	Regulated hazardous constituent	CAS number for regulated hazardous constituent	Wastewaters concentration (mg/l)	Non-wastewaters concentration (mg/l)
		2,3,4,6-Tetrachlorophenol	58-90-2	<0.05 ppm	<0.05 ppm
		Pentachlorophenol	87-86-5	<0.01 ppm	<0.01 ppm
F024	Table CCW in 268.43	Chromium (Total)	7440-47-32	NA	0.073
		Lead	7439-92-1	NA	0.021
		Nickel	7440-02-0	NA	0.088
F039	Table CCW in 268.43	Antimony	7440-36-0	NA	0.23
		Arsenic	7440-38-2	NA	5.0
		Barium	7440-39-3	NA	52
		Cadmium	7440-43-9	NA	0.066
		Chromium (Total)	7440-47-32	NA	5.2
		Lead	7439-92-1	NA	0.51
		Mercury	7439-97-6	NA	0.025
		Nickel	7440-02-0	NA	0.32
		Selenium	7782-49-2	NA	5.7
		Silver	7440-22-4	NA	0.072
K001	Table CCW in 268.43	Lead	7439-92-1	NA	0.51
K002	Table CCW in 268.43	Chromium (Total)	7440-47-32	NA	0.094
		Lead	7439-92-1	NA	0.37
K003	Table CCW in 268.43	Chromium (Total)	7440-47-32	NA	0.094
		Lead	7439-92-1	NA	0.37
K004	Table CCW in 268.43	Chromium (Total)	7440-47-32	NA	0.094
		Lead	7439-92-1	NA	0.37
K005	Table CCW in 268.43	Chromium (Total)	7440-47-32	NA	0.094
		Lead	7439-92-1	NA	0.37
K006 (anhydrous)	Table CCW in 268.43	Chromium (Total)	7440-47-32	NA	0.094
		Lead	7439-92-1	NA	0.37
K006 (hydrated)	Table CCW in 268.43	Chromium (Total)	7440-47-32	NA	5.2
K007	Table CCW in 268.43	Chromium (Total)	7440-47-32	NA	0.094
		Lead	7439-92-1	NA	0.37
K008	Table CCW in 268.43	Chromium (Total)	7440-47-32	NA	0.094
		Lead	7439-92-1	NA	0.37
K015	Table CCW in 268.43	Chromium (Total)	7440-47-32	NA	1.7
		Lead	7439-92-1	NA	0.2
K021	Table CCW in 268.43	Antimony	7440-36-0	NA	0.23#
K022	Table CCW in 268.43	Chromium (Total)	7440-47-32	NA	5.2
		Nickel	7440-02-2	NA	0.32
K028	Table CCW in 268.43	Chromium (Total)	7440-47-32	NA	0.073
		Lead	7439-92-1	NA	0.021
		Nickel	7440-02-0	NA	0.088
K031	Table CCW in 268.43	Arsenic	7440-38-2	NA	5.6#
K046	Table CCW in 268.43	Lead	7439-92-1	NA	0.18
K048	Table CCW in 268.43	Chromium (Total)	7440-47-32	NA	1.7
		Nickel	7440-02-0	NA	0.20
K049	Table CCW in 268.43	Chromium (Total)	7440-47-32	NA	1.7
		Nickel	7440-02-0	NA	0.20
K050	Table CCW in 268.43	Chromium (Total)	7440-47-32	NA	1.7
		Nickel	7440-02-0	NA	0.20
K051	Table CCW in 268.43	Chromium (Total)	7440-47-32	NA	1.7
		Nickel	7440-02-0	NA	0.20
K052	Table CCW in 268.43	Chromium (Total)	7440-47-32	NA	1.7
		Nickel	7440-02-0	NA	0.20
K061 (Low Zinc Subcategory—less than 15% Total Zinc).	Table CCW in 268.43	Cadmium	7440-43-9	NA	0.14
		Chromium (Total)	7440-47-32	NA	5.2
		Lead	7439-92-1	NA	0.24
		Nickel	7440-02-0	NA	0.32
K062	Table CCW in 268.43	Chromium (Total)	7440-47-32	NA	0.094
		Lead	7439-92-1	NA	0.37
K069 (Calcium Sulfate Subcategory)	Table 2 in 268.42 and Table CCW in 268.43.	Cadmium	7440-43-9	NA	0.14
		Lead	7439-92-1	NA	0.24
K071 (Low Mercury Subcategory—less than 16 mg/kg Mercury).	Table CCW in 268.43	Mercury	7439-97-6	NA	0.025
K083	Table CCW in 268.43	Nickel	7440-02-0	NA	0.088
K084	Table CCW in 268.43	Arsenic	7440-38-2	NA	5.6#
K086	Table CCW in 268.43	Chromium (Total)	7440-47-32	NA	0.094
		Lead	7439-92-1	NA	0.37
K087	Table CCW in 268.43	Lead	7439-92-1	NA	0.51
K100	Table CCW in 268.43	Cadmium	7440-43-9	NA	0.066
		Chromium (Total)	7440-47-32	NA	5.2
		Lead	7439-92-1	NA	0.51
K101	Table CCW in 268.43	Arsenic	7440-38-2	NA	5.6#
K102	Table CCW in 268.43	Arsenic	7440-38-2	NA	5.6#
K106 (Low Mercury Subcategory—less than 260 mg/kg Mercury—residues from RMERC).	Table 2 in 268.42 and Table CCW in 268.43.	Mercury	7439-97-6	NA	0.20
K106 (Low Mercury Subcategory—less than 260 mg/kg Mercury—that are not residues from RMERC).	Table 2 in 268.42 and Table CCW in 268.43.	Mercury	7439-97-6	NA	0.025

TABLE CCWE.—CONSTITUENT CONCENTRATIONS IN WASTE EXTRACT—Continued

Waste code	See also	Regulated hazardous constituent	CAS number for regulated hazardous constituent	Wastewaters concentration (mg/l)	Non-wastewaters concentration (mg/l)
K115	Table CCW	Nickel	7440-02-0	NA	0.32

#—These treatment standards have been based on EP Leachate analysis but this does not preclude the use of TCLP analysis.
*—These waste codes are not subcategorized into wastewaters and nonwastewaters.
NA—Not Applicable.

TABLE CCWE.—CONSTITUENT CONCENTRATIONS FOR WASTE EXTRACTS

Waste code	See also	Commercial chemical name	Regulated hazardous constituent	CAS number for regulated hazardous constituent	Wastewaters concentration (mg/l)	Non-wastewaters concentration (mg/l)
P010	Table CCW in 268.43	Arsenic acid	Arsenic	7440-38-2	NA	5.6
P011	Table CCW in 268.43	Arsenic pentoxide	Arsenic	7440-38-2	NA	5.6
P012	Table CCW in 268.43	Arsenic trioxide	Arsenic	7440-38-2	NA	5.6
P013	Table CCW in 268.43	Barium cyanide	Barium	7440-39-3	NA	52
P036	Table CCW in 268.43	Dichlorophenylarsine	Arsenic	7440-38-2	NA	5.6
P038	Table CCW in 268.43	Diethylarsine	Arsenic	7440-38-2	NA	5.6
P065 (Low Mercury Subcategory—less than 260 mg/kg Mercury-residues from RMERC).	Table 2 in 268.42 and Table CCW in 268.43.	Mercury fulminate	Mercury	7439-97-6	NA	0.20
P065 (Low Mercury Subcategory—less than 260 mg/kg Mercury-incinerator residues (and are not residues from RMERC)).	Table 2 in 268.42 and Table CCW in 268.43.	Mercury fulminate	Mercury	7439-97-6	NA	0.025
P073	Table CCW in 268.43	Nickel carbonyl	Nickel	7440-02-0	NA	0.32
P074	Table CCW in 268.43	Nickel cyanide	Nickel	7440-02-0	NA	0.32
P092 (Low Mercury Subcategory—less than 260 mg/kg Mercury residues from RMERC).	Table 2 in 268.42 and Table CCW in 268.43.	Phenyl mercury acetate	Mercury	7439-97-6	NA	0.20
P092 (Low Mercury Subcategory—less than 260 mg/kg Mercury-incinerator residues (and are not residues from RMERC)).	Table 2 in 268.42 and Table CCW in 268.43.	Phenyl mercury acetate	Mercury	7439-97-6	NA	0.025
P099	Table CCW in 268.43	Potassium silver cyanide	Silver	7440-22-4	NA	0.072
P103	Table CCW in 268.43	Selenourea	Selenium	7782-49-2	NA	5.7
P104	Table CCW in 268.43	Silver cyanide	Silver	7440-22-4	NA	0.072
P110	Table CCW in 268.43	Tetraethyl lead	Lead	7439-92-1	NA	0.51
P114	Table CCW in 268.43	Thallium selenite	Selenium	7782-49-2	NA	5.7
U032	Table CCW in 268.43	Calcium chromate	Chromium (Total)	7440-47-32	NA	0.094
U051	Table CCW in 268.43	Creosote	Lead	7439-92-1	NA	0.51
U136	Table CCW in 268.43	Cacodylic acid	Arsenic	7440-38-2	NA	5.6
U144	Table CCW in 268.43	Lead acetate	Lead	7439-92-1	NA	0.51
U145	Table CCW in 268.43	Lead phosphate	Lead	7439-92-1	NA	0.51
U146	Table CCW in 268.43	Lead subacetate	Lead	7439-92-1	NA	0.51
U151 (Low Mercury Subcategory—less than 260 mg/kg Mercury—residues from RMERC).	Table CCW in 268.43 and in Table 2 in 268.42.	Mercury	Mercury	7439-97-6	NA	0.20
U151 (Low Mercury Subcategory—less than 260 mg/kg Mercury—that are not residues from RMERC).	Table CCW in 268.43 and Table 2 in 268.42.	Mercury	Mercury	7439-97-6	NA	0.025
U204	Table CCW in 268.43	Selenium dioxide	Selenium	7782-49-2	NA	5.7
U205	Table CCW in 268.43	Selenium sulfide	Selenium	7782-49-2	NA	5.7

—These treatment standards have been based on EP Leachate analysis but this does not preclude the use of TCLP analysis.
*—These waste codes are not subcategorized into wastewaters and nonwastewaters.
NA—Not Applicable.

* * * * *

Section 268.42 is amended by revising paragraphs (a) introductory text and (a)(2), by removing paragraphs (a)(3) and (a)(4), by revising paragraph (b), and by adding paragraphs (c), (d), and (e) to read as follows:

§ 268.42 Treatment standards expressed as specified technologies.

(a) The following wastes in paragraphs (a)(1) and (a)(2) of this section and in Table 2 and Table 3 of this section must be treated using the technology or technologies specified in paragraphs (a)(1) and (a)(2) and Table 1 of this section.

* * * * *

(2) Nonliquid hazardous wastes containing halogenated organic compounds (HOCs) in total concentration greater than or equal to 1,000 mg/kg and liquid HOC-containing

wastes that are prohibited under § 268.32(e)(1) of this part must be incinerated in accordance with the requirements of 40 CFR part 264, subpart O or 40 CFR part 265, subpart O. These treatment standards do not apply where the waste is subject to a part 268, subpart C treatment standard for specific HOC (such as a hazardous waste chlorinated solvent for which a treatment standard is established under § 268.41(a)).

TABLE 1.—TECHNOLOGY CODES AND DESCRIPTION OF TECHNOLOGY-BASED STANDARDS

Technology code	Description of technology-based standard
ADGAS	Venting of compressed gases into an absorbing or reacting media (i.e., solid or liquid)—venting can be accomplished through physical release utilizing values/piping; physical penetration of the container; and/or penetration through detonation.
AMLGM	Amalgamation of liquid, elemental mercury contaminated with radioactive materials utilizing inorganic reagents such as copper, zinc, nickel, gold, and sulfur that result in a nonliquid, semi-solid amalgam and thereby reducing potential emissions of elemental mercury vapors to the air.
BIODG	Biodegradation of organics or non-metallic inorganics (i.e., degradable inorganics that contain the elements of phosphorus, nitrogen, and sulfur) in units operated under either aerobic or anaerobic conditions such that a surrogate compound or indicator parameter has been substantially reduced in concentration in the residuals (e.g., Total Organic Carbon can often be used as an indicator parameter for the biodegradation of many organic constituents that cannot be directly analyzed in wastewater residues).
CARBN	Carbon adsorption (granulated or powdered) of non-metallic inorganics, organo-metallics, and/or organic constituents, operated such that a surrogate compound or indicator parameter has not undergone breakthrough (e.g., Total Organic Carbon can often be used as an indicator parameter for the adsorption of many organic constituents that cannot be directly analyzed in wastewater residues). Breakthrough occurs when the carbon has become saturated with the constituent (or indicator parameter) and substantial change in adsorption rate associated with that constituent occurs.
CHOXD	Chemical or electrolytic oxidation utilizing the following oxidation reagents (or waste reagents) or combinations or reagents: (1) Hypochlorite (e.g. bleach); (2) chlorine; (3) chlorine dioxide; (4) ozone or UV (ultraviolet light) assisted ozone; (5) peroxides; (6) persulfates; (7) perchlorates; (8) permangantes; and/or (9) other oxidizing reagents of equivalent efficiency, performed in units operated such that a surrogate compound or indicator parameter has been substantially reduced in concentration in the residuals (e.g., Total Organic Carbon can often be used as an indicator parameter for the oxidation of many organic constituents that cannot be directly analyzed in wastewater residues). Chemical oxidation specifically includes what is commonly referred to as alkaline chlorination.
CHRED	Chemical reduction utilizing the following reducing reagents (or waste reagents) or combinations of reagents: (1) Sulfur dioxide; (2) sodium, potassium, or alkali salts of sulfites, bisulfites, metabisulfites, and polyethylene glycols (e.g., NaPEG and KPEG); (3) sodium hydrosulfide; (4) ferrous salts; and/or (5) other reducing reagents of equivalent efficiency, performed in units operated such that a surrogate compound or indicator parameter has been substantially reduced in concentration in the residuals (e.g., Total Organic Halogens can often be used as an indicator parameter for the reduction of many halogenated organic constituents that cannot be directly analyzed in wastewater residues). Chemical reduction is commonly used for the reduction of hexavalent chromium to the trivalent state.
DEACT	Deactivation to remove the hazardous characteristics of a waste due to its ignitability, corrosivity, and/or reactivity.
FSUBS	Fuel substitution in units operated in accordance with applicable technical operating requirements.
HLVIT	Vitrification of high level mixed radioactive wastes in units in compliance with all applicable radioactive protection requirements under control of the Nuclear Regulatory Commission.
IMERC	Incineration of wastes containing organics and mercury in units operated in accordance with the technical operating requirements of 40 CFR part 264, subpart O and 40 CFR part 265, subpart O. All wastewater and nonwastewater residues derived from this process must then comply with the corresponding treatment standards per waste code with consideration of any applicable subcategories (e.g., High or Low Mercury Subcategories).
INCIN	Incineration in units operated in accordance with the technical operating requirements of 40 CFR part 264, subpart O and 40 CFR part 265, subpart O.
LLEXT	Liquid-liquid extraction (often referred to as solvent extraction) of organics from liquid wastes into an immiscible solvent for which the hazardous constituents have a greater solvent affinity, resulting in an extract high in organics that must undergo either incineration, reuse as a fuel, or other recovery/reuse and a raffinate (extracted liquid waste) proportionately low in organics that must undergo further treatment as specified in the standard.
MACRO	Macroencapsulation with surface coating materials such as polymeric organics (e.g. resins and plastics) or with a jacket of inert inorganic materials to substantially reduce surface exposure to potential leaching media. Macroencapsulation specifically does not include any material that would be classified as a tank or container according to 40 CFR 260.10.
NEUTR	Neutralization with the following reagents (or waste reagents) or combinations of reagents: (1) Acids; (2) bases; or (3) water (including wastewaters) resulting in a pH greater than 2 but less than 12.5 as measured in the aqueous residuals.
NLDBR	No land disposal based on recycling.
PRECP	Chemical precipitation of metals and other inorganics as insoluble precipitates of oxides, hydroxides, carbonates, sulfides, sulfates, chlorides, flourides, or phosphates. The following reagents (or waste reagents) are typically used alone or in combination: (1) Lime (i.e., containing oxides and/or hydroxides of calcium and/or magnesium; (2) caustic (i.e., sodium and/or potassium hydroxides; (3) soda ash (i.e., sodium carbonate); (4) sodium sulfide; (5) ferric sulfate or ferric chloride; (6) alum; or (7) sodium sulfate. Additional flocculating, coagulation, or similar reagents/processes that enhance sludge dewatering characteristics are not precluded from use.
RBERY	Thermal recovery of Beryllium.
RCGAS	Recovery/reuse of compressed gases including techniques such as reprocessing of the gases for reuse/resale; filtering/adsorption of impurities; remixing for direct reuse of resale; and use of the gas as a fuel source.
RCORR	Recovery of acids or bases utilizing one or more of the following recovery technologies: (1) Distillation (i.e., thermal concentration); (2) ion exchange; (3) resin or solid adsorption; (4) reverse osmosis; and/or (5) incineration for the recovery of acid—Note: this does not preclude the use of other physical phase separation or concentration techniques such as decantation, filtration (including ultrafiltration), and centrifugation, when used in conjunction with the above listed recovery technologies.
RLEAD	Thermal recovery of lead in secondary lead smelters.
RMERC	Retorting or roasting in a thermal processing unit capable of volatilizing mercury and subsequently condensing the volatilized mercury for recovery. The retorting or roasting unit (or facility) must be subject to one or more of the following: (a) A National Emissions Standard for Hazardous Air Pollutants (NESHAP) for mercury; (b) a Best Available Control Technology (BACT) or a Lowest Achievable Emission Rate (LAER) standard for mercury imposed pursuant to a Prevention of Significant Deterioration (PSD) permit; or (c) a state permit that establishes emission limitations (within meaning of Section 302 of the Clean Air Act) for mercury. All wastewater and nonwastewater residues derived from this process must then comply with the corresponding treatment standards per waste code with consideration of any applicable subcategories (e.g., High or Low Mercury Subcategories).
RMETL	Recovery of metals or inorganics utilizing one or more of the following direct physical/removal technologies: (1) Ion exchange; (2) resin or solid (i.e., zeolites) adsorption; (3) reverse osmosis; (4) chelation/solvent extraction; (5) freeze crystalization; (6) ultrafiltration; and/or 6 simple precipitation (i.e., crystalization)—Note: this does not preclude the use of other physical phase separation or concentration techniques such as decantation, filtration (including ultrafiltration), and centrifugation, when used in conjunction with the above listed recovery technologies.
RORGS	Recovery of organics utilizing one or more of the following technologies: (1) Distillation; (2) thin film evaporation; (3) steam stripping; (4) carbon adsorption; (5) critical fluid extraction; (6) liquid-liquid extraction; (7) precipitation/crystallization (including freeze crystallization); or (8) chemical phase separation techniques (i.e., addition of acids, bases, demulsifiers, or similar chemicals); Note: This does not preclude the use of other physical phase separation techniques such as decantation, filtration (including ultrafiltration), and centrifugation, when used in conjunction with the above listed recovery technologies.
RTHRM	Thermal recovery of metals or inorganics from nonwastewaters in units defined in 40 CFR 260.10, paragraphs (1), (6), (7), (11), and (12), under the definition of "industrial furnaces".

TABLE 1.—TECHNOLOGY CODES AND DESCRIPTION OF TECHNOLOGY-BASED STANDARDS—Continued

Technology code	Description of technology-based standard
RZINC	Resmelting in for the purpose of recovery of zinc high temperature metal recovery units.
STABI.	Stabilization with the following reagents (or waste reagents) or combinations of reagents: (1) Portland cement; or (2) lime/pozzolans (e.g., fly ash and cement kiln dust)—this does not preclude the addition of reagents (e.g., iron salts, silicates, and clays) designed to enhance the set/cure time and/or compressive strength, or to overall reduce the leachability of the metal or inorganic.
SSTRP	Steam stripping of organics from liquid wastes utilizing direct application of steam to the wastes operated such that liquid and vapor flow rates, as well as, temperature and pressure ranges have been optimized, monitored, and maintained. These operating parameters are dependent upon the design parameters of the unit such as, the number of separation stages and the internal column design. Thus, resulting in a condensed extract high in organics that must undergo either incineration, reuse as a fuel, or other recovery/reuse and an extracted wastewater that must undergo further treatment as specified in the standard.
WETOX	Wet air oxidation performed in units operated such that a surrogate compound or indicator parameter has been substantially reduced in concentration in the residuals (e.g., Total Organic Carbon can often be used as an indicator parameter for the oxidation of many organic constituents that cannot be directly analyzed in wastewater residues).
WTRRX	Controlled reaction with water for highly reactive inorganic or organic chemicals with precautionary controls for protection of workers from potential violent reactions as well as precautionary controls for potential emissions of toxic/ignitable levels of gases released during the reaction.

NOTE 1: When a combination of these technologies (i.e., a treatment train) is specified as a single treatment standard, the order of application is specified in § 268.42, Table 2 by indicating the five letter technology code that must be applied first, then the designation "fb." (an abbreviation for "followed by"), then the five letter technology code for the technology that must be applied next, and so on.

NOTE 2: When more than one technology (or treatment train) are specified as *alternative* treatment standards, the five letter technology codes (or the treatment trains) are separated by a semicolon (;) with the last technology preceded by the word "OR". This indicates that any one of these BDAT technologies or treatment trains can be used for compliance with the standard.

TABLE 2.—TECHNOLOGY-BASED STANDARDS BY RCRA WASTE CODE

Waste code	See also	Waste descriptions and/or treatment subcategory	CAS No. for regulated hazardous constituents	Technology code	
				Wastewaters	Nonwastewaters
D001		Ignitable Liquids based on 261.21(a)(1)—Wastewaters.	NA	DEACT	NA.
D001		Ignitable Liquids based on 261.21(a)(1)—Low TOC Ignitable Liquids Subcategory—Less than 10% total organic carbon.	NA	NA	DEACT.
D001		Ignitable Liquids based on 261.21(a)(1)—High TOC Ignitable Liquids Subcategory—Greater than or equal to 10% total organic carbon.	NA	NA	FSUBS; RORGS; or INCIN.
D001		Ignitable compressed gases based on 261.21(a)(3).	NA	NA	DEACT**.
D001		Ignitable reactives 261.21(a)(2)	NA	NA	DEACT.
D001		Oxidizers based on 261.21(a)(4)	NA	DEACT	DEACT.
D002		Acid subcategory based on 261.22(a)(1)	NA	DEACT	DEACT.
D002		Alkaline subcategory based on 261.22(a)(1)	NA	DEACT	DEACT.
D002		Other corrosives based on 261.22(a)(2)	NA	DEACT	DEACT.
D003		Reactive sulfides based on 261.23(a)(5)	NA	DEACT	DEACT.
D003		Explosives based on 261.23(a) (6), (7), and (8)	NA	DEACT	DEACT.
D003		Water reactives based on 261.23(a) (2), (3), and (4).	NA	NA	DEACT.
D003		Other reactives based on 261.23(a)(1)	NA	DEACT	DEACT.
D006		Cadmium containing batteries	7440-43-9	NA	RTHRM.
D008		Lead acid batteries (Note: This standard only applies to lead acid batteries that are identified as RCRA hazardous wastes and that are not excluded elsewhere from regulation under the land disposal restrictions of 40 CFR 268 or exempted under other EPA regulations (see 40 CFR 266.80).).	7439-92-1	NA	RLEAD.
D009	Table CCWE in 268.41 and Table CCW in 268.43.	Mercury: (High Mercury Subcategory—greater than or equal to 260 mg/kg total Mercury—contains mercury and organics (and are not incinerator residues)).	7439-97-6	NA	IMERC; or RMERC.
D009	Table CCWE in 268.41 and Table CCW in 268.43.	Mercury: (High Mercury Subcategory—greater than or equal to 260 mg/kg total Mercury—inorganics (including incinerator residues and residues from RMERC)).	7439-97-6	NA	RMERC.
D012	Table CCW in 268.43	Endrin	72-20-8	BIODG; or INCIN	NA.
D013	Table CCW in 268.43	Lindane	58-89-9	CARBN; or INCIN	NA.
D014	Table CCW in 268.43	Methoxychlor	72-43-5	WETOX; or INCIN	NA.
D015	Table CCW in 268.43	Toxaphene	8001-35-1	BIODG; or INCIN	NA.
D016	Table CCW in 268.43	2,4-D	94-75-7	CHOXD; BIODG; or INCIN	NA.
D017	Table CCW in 268.43	2,4,5-TP	93-72-1	CHOXD; or INCIN	NA.
F005	Table CCWE in 268.41 and Table CCW in 268.43.	2-Nitropropane	79-46-9	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.

TABLE 2.—TECHNOLOGY-BASED STANDARDS BY RCRA WASTE CODE—Continued

Waste code	See also	Waste descriptions and/or treatment subcategory	CAS No. for regulated hazardous constituents	Technology code	
				Wastewaters	Nonwastewaters
F005	Table CCWE in 268.41 and Table CCW in 268.43.	2-Ethoxyethanol	110-80-5	BIODG: or INCIN	INCIN.
F024	Table CCWE in 268.41 and Table CCW in 268.43.		NA	INCIN	INCIN.
K025		Distillation bottoms from the production of nitrobenzene by the nitration of benzene.	NA	LLEXT fb SSTRP fb CARBN; or INCIN	INCIN.
K026		Stripping still tails from the production of methyl ethyl pyridines.	NA	INCIN	INCIN.
K027		Centrifuge and distillation residues from toluene diisocyanate production.	NA	CARBN; or INCIN	FSUBS; or INCIN.
K039		Filter cake from the filtration of diethylphosphorodithioc acid in the production of phorate.	NA	CARBN; or INCIN	FSUBS; or INCIN.
K044		Wastewater treatment sludges from the manufacturing and processing of explosives.	NA	DEACT	DEACT.
K045		Spent carbon from the treatment of wastewater containing explosives.	NA	DEACT	DEACT.
K047		Pink/red water from TNT operations	NA	DEACT	DEACT.
K061	Table CCW in 268.43.	Emission control dust/sludge from the primary production of steel in electric furnaces (High Zinc Subcategory—greater than or equal to 15% total Zinc).	NA	NA	NLDBR.
K069	Table CCWE in 268.41 and Table CCW in 268.43.	Emission control dust/sludge from secondary lead smelting: Non-Calcium Sulfate Subcategory.	NA	NA	RLEAD.
K106	Table CCWE in 268.41 and Table CCW in 268.43.	Wastewater treatment sludge from the mercury cell process in chlorine production: (High Mercury Subcategory-greater than or equal to 260 mg/kg total mercury).	NA	NA	RMERC.
K113		Condensed liquid light ends from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene.	NA	CARBN; or INCIN	FSUBS; or INCIN.
K114		Vicinals from the purification of toluenediame in the production of toluenediamine via hydrogenation of dinitrotoluene.	NA	CARBN; or INCIN	FSUBS; or INCIN.
K115		Heavy ends from the purification of toluenediame in the production of toluenediamine via hydrogenation of dinitrotoluene.	NA	CARBN; or INCIN	FSUBS; or INCIN.
K116		Organic condensate from the solvent recovery column in the production of toluene diisocyanate via phosgenation of toluenediamine.	NA	CARBN; or INCIN	FSUBS; or INCIN.
P001		Warfarin (>0.3%)	81-81-2	(WETOX or CHOXD) fb CARBN; or INCIN	FSUBS; or INCIN.
P002		1-Acetyl-2-thiourea	591-08-2	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
P003		Acrolein	107-02-8	(WETOX or CHOXD) fb CARBN; or INCIN	FSUBS; or INCIN.
P005		Allyl alcohol	107-18-6	(WETOX or CHOXD) fb CARBN; or INCIN	FSUBS; or INCIN.
P006		Aluminum phosphide	20859-73-8	CHOXD; CHRED; or INCIN	CHOXD; CHRED; or INCIN.
P007		5-Aminoethyl 3-isoxazolol	2763-96-4	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
P008		4-Aminopyridine	504-24-5	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
P009		Ammonium picrate	131-74-8	CHOXD; CHRED; CARBN; BIODG; or INCIN	FSUBS; CHOXD; CHRED; or INCIN.
P014		Thiophenol (Benzene thiol)	108-98-5	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
P015		Beryllium dust	7440-41-7	NA	RMETL; or RTHRM.
P016		Bis(chloromethyl)ether	542-88-1	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
P017		Bromoacetone	598-31-2	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
P018		Brucine	357-57-3	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
P022	Table CCW in 268.43.	Carbon disulfide	75-15-0	NA	INCIN.
P023		Chloroacetaldehyde	107-20-0	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
P026		1-(o-Chlorophenyl) thiourea	5344-82-1	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
P027		3-Chloropropionitrile	542-76-7	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
P028		Bensyl chloride	100-44-7	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.

TABLE 2.—TECHNOLOGY-BASED STANDARDS BY RCRA WASTE CODE—Continued

Waste code	See also	Waste descriptions and/or treatment subcategory	CAS No. for regulated hazardous constituents	Technology code	
				Wastewaters	Nonwastewaters
P031		Cyanogen	460-19-5	CHOXD; WETOX; or INCIN	CHOXD; WETOX; or INCIN.
P033		Cyanogen chloride	506-77-4	CHOXD; WETOX; or INCIN	CHOXD; WETOX; or INCIN.
P034		2-Cyclohexyl-4,6-dinitrophenol	131-89-5	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
P040		0,0-Diethyl 0-pyrazinyl phosphorothioate	297-97-2	CARBN; or INCIN	FSUBS; or INCIN.
P041		Diethyl-p-nitrophenyl phosphate	311-45-5	CARBN; or INCIN	FSUBS; or INCIN.
P042		Epinephrine	51-43-4	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
P043		Diisopropylfluorophosphate (DFP)	55-91-4	CARBN; or INCIN	FSUBS; or INCIN.
P044		Dimethoate	60-51-5	CARBN; or INCIN	FSUBS; or INCIN.
P045		Thiofanox	39196-18-4	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
P046		alpha, alpha-Dimethylphenethylamine	122-09-8	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
P047		4,6-Dinitro-o-cresol salts	534-52-1	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
P049		2,4-Dithiobiuret	541-53-7	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
P054		Aziridine	151-56-4	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
P056	Table CCW in 268.43	Fluorine	7782-41-4	NA	ADGAS fb NEUTR.
P057		Fluoroacetamide	640-19-7	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
P058		Fluoroacetic acid, sodium salt	62-74-8	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
P062		Hexaethyltetraphosphate	757-58-4	CARBN; or INCIN	FSUBS; or INCIN.
P064		Isocyanic acid, ethyl ester	624-83-9	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
P065	Table CCWE in 268.41 and Table CCW in 268.43.	Mercury fulminate: (High Mercury Subcategory—greater than or equal to 260 mg/kg total Mercury—either incinerator residues or residues from RMERC).	628-86-4	NA	RMERC.
P065	Table CCWE in 268.41 and Table CCW in 268.43.	Mercury fulminate: (All nonwastewaters that are not incinerator residues from RMERC; regardless of Mercury Content).	628-86-4	NA	IMERC.
P066		Methomyl	16752-77-5	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
P067		2-Methylaziridine	75-55-8	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
P068		Methyl hydrazine	60-34-4	CHOXD; CHRED; CARBN; BIODG; or INCIN	FSUBS; CHOXD; CHRED; or INCIN.
P069		Methyllactonitrile	75-86-5	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
P070		Aldicarb	116-06-3	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
P072		1-Naphthyl-2-thiourea	86-88-4	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
P075		Nicotine and salts	54-11-5*	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
P076		Nitric oxide	10102-43-9	ADGAS	ADGAS.
P078		Nitrogen dioxide	10102-44-0	ADGAS	ADGAS.
P081		Nitroglycerin	55-63-0	CHOXD; CHRED; CARBN; BIODG; or INCIN	FSUBS; CHOXD; CHRED; or INCIN.
P082	Table CCW in 268.43	N-Nitrosodimethylamine	62-75-9	NA	INCIN.
P084		N-Nitrosomethylvinylamine	4549-40-0	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
P085		Octamethylpyrophosphoramide	152-16-9	CARBN; or INCIN	FSUBS; or INCIN.
P087		Osmium tetroxide	20816-12-0	NA	RMETL; or RTHRM.
P088		Endothall	145-73-3	(WETOX or CHOXD) fb CARBN; or INCIN	FSUBS; or INCIN.
P092	Table CCWE in 268.41 and Table CCW in 268.43.	Phenyl mercury acetate: (High Mercury Subcategory—greater than or equal to 260 mg/kg total Mercury—either incinerator residues or residues from RMERC).	62-38-4	NA	RMERC.
P092	Table CCWE in 268.41 and Table CCW in 268.43.	Phenyl mercury acetate: (All nonwastewaters that are not incinerator residues and are not residues from RMERC: regardless of Mercury Content).	62-38-4	NA	IMERC; or RMERC.
P093		N-Phenylthiouea	103-85-5	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
P095		Phosgene	75-44-5	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
P096		Phosphine	7803-51-2	CHOXD; CHRED; or INCIN	CHOXD; CHRED; or INCIN.

TABLE 2.—TECHNOLOGY-BASED STANDARDS BY RCRA WASTE CODE—Continued

Waste code	See also	Waste descriptions and/or treatment subcategory	CAS No. for regulated hazardous constituents	Technology code	
				Wastewaters	Nonwastewaters
P102		Propargyl alcohol	107-19-7	(WETOX or CHOXD) fb CARBN; or INCIN	FSUBS; or INCIN.
P105		Sodium azide	26628-22-8	CHOXD; CHRED; CARBN; BIODG; or INCIN	FSUBS; CHOXD; CHRED; or INCIN.
P108		Strychnine and salts	57-24-9*	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
P109		Tetraethyldithiopyrophosphate	3689-24-5	CARBN; or INCIN	FSUBS; or INCIN.
P112		Tetranitromethane	509-14-8	CHOXD; CHRED; CARBN; BIODG; or INCIN	FSUBS; CHOXD; CHRED; or INCIN.
P113	Table CCW in 268.43	Thallic oxide	1314-32-5	NA	RTHRM; or STABL.
P115	Table CCW in 268.43	Thallium (I) sulfate	7446-18-6	NA	RTHRM; or STABL.
P116		Thiosemicarbazide	79-19-6	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
P118		Trichloromethanethiol	75-70-7	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
P119	Table CCW in 268.43	Ammonium vanadate	7803-55-6	NA	STABL.
P120	Table CCW in 268.43	Vanadium pentoxide	1314-62-1	NA	STABL.
P122		Zinc Phosphide (<10%)	1314-84-7	CHOXD; CHRED; or INCIN	CHOXD; CHRED; or INCIN.
U001		Acetaldehyde	75-07-0	(WETOX or CHOXD) fb CARBN; or INCIN	FSUBS; or INCIN.
U003	Table CCW in 268.43	Acetonitrile	75-05-8	NA	INCIN.
U006		Acetyl Chloride	75-36-5	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U007		Acrylamide	79-06-1	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U008		Acrylic acid	79-10-7	(WETOX or CHOXD) fb CARBN; or INCIN	FSUBS; or INCIN.
U010		Mitomycin C	50-07-7	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U011		Amitrole	61-82-5	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U014		Auramine	492-80-8	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U015		Azaserine	115-02-6	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U016		Benz(c)acridine	225-51-4	(WETOX or CHOXD) fb CARBN; or INCIN	FSUBS; or INCIN.
U017		Benzal chloride	98-87-3	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U020		Benzenesulfonyl chloride	98-09-9	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U021		Benzidine	92-87-5	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U023		Benzotrichloride	98-07-7	CHOXD; CHRED; CARBN; BIODG; or INCIN	FSUBS; CHOXD; CHRED; or INCIN.
U026		Chlornaphazin	494-03-1	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U033		Carbonyl fluoride	353-50-4	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U034		Trichloroacetaldehyde (Chloral)	75-87-6	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U035		Chlorambucil	305-03-3	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U038	Table CCW in 268.43	Chlorobenzilate	510-15-6	NA	INCIN.
U041		1-Chloro-2,3-epoxypropane (Epichlorohydrin)	106-89-8	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U042	Table CCW in 268.43	2-Chloroethyl vinyl ether	110-75-8	NA	INCIN.
U046		Chloromethyl methyl ether	107-30-2	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U049		4-Chloro-o-toluidine hydrochloride	3165-93-3	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U053		Crotonaldehyde	4170-30-3	(WETOX or CHOXD) fb CARBN; or INCIN	FSUBS; or INCIN.
U055		Cumene	98-82-8	(WETOX or CHOXD) fb CARBN; or INCIN	FSUBS; or INCIN.
U056		Cyclohexane	110-82-7	(WETOX or CHOXD) fb CARBN; or INCIN	FSUBS; or INCIN.
U057	Table CCW in 268.43	Cyclohexanone	108-94-1	NA	FSUBS; or INCIN.
U058		Cyclophosphamide	50-18-0	CARBN; or INCIN	FSUBS; or INCIN.
U059		Daunomycin	20830-81-3	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U062		Diallate	2303-16-4	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U064		1,2,7,8-Dibenzopyrene	189-55-9	(WETOX or CHOXD) fb CARBN; or INCIN	FSUBS; or INCIN.

TABLE 2.—TECHNOLOGY-BASED STANDARDS BY RCRA WASTE CODE—Continued

Waste code	See also	Waste descriptions and/or treatment subcategory	CAS No. for regulated hazardous constituents	Technology code	
				Wastewaters	Nonwastewaters
U073		3,3'-Dichlorobenzidine	91-94-1	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U074		cis-1,4-Dichloro-2-butene	1476-11-5	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN
		trans-1,4-Dichloro-2-butene		(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U085		1,2:3,4-Diepoxybutane	1464-53-5	(WETOX or CHOXD) fb CARBN; or INCIN	FSUBS; or INCIN.
U086		N,N-Diethylhydrazine	1615-80-1	CHOXD; CHRED; CARBN; BIODG; or INCIN	FSUBS; CHOXD; CHRED; or INCIN.
U087		0,0-Diethyl S-methyldithiophosphate	3288-58-2	CARBN; or INCIN	FSUBS; or INCIN.
U089		Diethyl stilbestrol	56-53-1	(WETOX or CHOXD) fb CARBN; or INCIN	FSUBS; or INCIN.
U090		Dihydrosafrole	94-58-6	(WETOX or CHOXD) fb CARBN; or INCIN	FSUBS; or INCIN.
U091		3,3'-Dimethoxybenzidine	119-90-4	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U092		Dimethylamine	124-40-3	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U093	Table CCW in 268.43	p-Dimethylaminoazobenzene	621-90-9	NA	INCIN.
U094		7,12-Dimethyl benz(a)anthracene	57-97-6	(WETOX or CHOXD) fb CARBN; or INCIN	FSUBS; or INCIN.
U095		3,3'-Dimethylbenzidine	119-93-7	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U096		a,a-Dimethyl benzyl hydroperoxide	80-15-9	CHOXD; CHRED; CARBN; BIODG; or INCIN	FSUBS; CHOXD; CHRED; or INCIN.
U097		Dimethylcarbomyl chloride	79-44-7	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U098		1,1-Dimethylhydrazine	57-14-7	CHOXD; CHRED; CARBN; BIODG; or INCIN	FSUBS; CHOXD; CHRED; or INCIN.
U099		1,2-Dimethylhydrazine	540-73-8	CHOXD; CHRED; CARBN; BIODG; or INCIN	FSUBS; CHOXD; CHRED; or INCIN.
U103		Dimethyl sulfate	77-78-1	CHOXD; CHRED; CARBN; BIODG; or INCIN	FSUBS; CHOXD; CHRED; or INCIN.
U109		1,2-Diphenylhydrazine	122-66-7	CHOXD; CHRED; CARBN; BIODG; or INCIN	FSUBS; CHOXD; CHRED; or INCIN.
U110		Dipropylamine	142-84-7	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U113		Ethyl acrylate	140-88-5	(WETOX or CHOXD) fb CARBN; or INCIN	FSUBS; or INCIN.
U114		Ethylene bis-dithiocarbamic acid	111-54-6	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U115		Ethylene oxide	75-21-8	(WETOX or CHOXD) fb CARBN; or INCIN	CHOXD; or INCIN.
U116		Ethylene thiourea	96-45-7	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U119		Ethyl methane sulfonate	62-50-0	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U122		Formaldehyde	50-00-0	(WETOX or CHOXD) fb CARBN; or INCIN	FSUBS; or INCIN.
U123		Formic acid	64-18-6	(WETOX or CHOXD) fb CARBN; or INCIN	FSUBS; or INCIN.
U124		Furan	110-00-9	(WETOX or CHOXD) fb CARBN; or INCIN	FSUBS; or INCIN.
U125		Furfural	98-01-1	(WETOX or CHOXD) fb CARBN; or INCIN	FSUBS; or INCIN.
U126		Glycidaldehyde	765-34-4	(WETOX or CHOXD) fb CARBN; or INCIN	FSUBS; or INCIN.
U132		Hexachlorophenene	70-30-4	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U133		Hydrazine	302-01-2	CHOXD; CHRED; CARBN; BIODG; or INCIN	FSUBS; CHOXD; CHRED; or INCIN.
U134	Table CCW in 268.43	Hydrogen Flouride	7664-39-3	NA	ADGAS fb NEUTR; or NEUTR.
U135		Hydrogen Sulfide	7783-06-4	CHOXD; CHRED, or INCIN	CHOXD; CHRED; or INCIN.
U143		Lasiocarpine	303-34-4	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U147		Maleic anhydride	108-31-6	(WETOX or CHOXD) fb CARBN; or INCIN	FSUBS; or INCIN.
U148		Maleic hydrazide	123-33-1	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U149		Malononitrile	109-77-3	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U150		Melphalan	148-82-3	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.

TABLE 2.—TECHNOLOGY-BASED STANDARDS BY RCRA WASTE CODE—Continued

Waste code	See also	Waste descriptions and/or treatment subcategory	CAS No. for regulated hazardous constituents	Technology code	
				Wastewaters	Nonwastewaters
U151	Table CCWE in 268.41 and Table CCW in 268.43.	Mercury: (High Mercury Subcategory—greater than or equal to 260 mg/kg total Mercury).	7439-97-6	NA	RMERC.
U153		Methane thiol	74-93-1	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U154		Methanol	67-56-1	(WETOX or CHOXD) fb CARBN; or INCIN	FSUBS; or INCIN.
U156		Methyl chlorocarbonate	79-22-1	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U160		Methyl ethyl ketone peroxide	1338-23-4	CHOXD; CHRED; CARBN; BIODG; or INCIN	FSUBS; CHOXD; CHRED; or INCIN.
U163		N-Methyl N'-nitro N-Nitrosoguanidine	70-25-7	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U164		Methylthiouracil	56-04-2	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U166		1,4-Naphthoquinone	130-15-4	(WETOX or CHOXD) fb CARBN; or INCIN	FSUBS; or INCIN.
U167		1-Naphthlyamine	134-32-7	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U168	Table CCW in 268.43	2-Naphthlyamine	91-59-8	NA	INCIN.
U171		2-Nitropropane	79-46-9	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U173		N-Nitroso-di-n-ethanolamine	1116-54-7	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U176		N-Nitroso-N-ethylurea	759-73-9	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U177		N-Nitroso-N-methylurea	684-93-5	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U178		N-Nitroso-N-methylurethane	615-53-2	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U182		Paraldehyde	123-63-7	(WETOX or CHOXD) fb CARBN; or INCIN	FSUBS; or INCIN.
U184		Pentachloroethane	76-01-7	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U186		1,3-Pentadiene	504-60-9	(WETOX or CHOXD) fb CARBN; or INCIN	FSUBS; or INCIN.
U189		Phosphorus sulfide	1314-80-3	CHOXD; CHRED; or INCIN	CHOXD; CHRED; or INCIN.
U191		2-Picoline	109-06-8	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U193		1,3-Propane sultone	1120-71-4	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U194		n-Propylamine	107-10-8	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U197		p-Benzoquinone	106-51-4	(WETOX or CHOXD) fb CARBN; or INCIN	FSUBS; or INCIN.
U200		Reserpine	50-55-5	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U201		Resorcinol	108-46-3	(WETOX or CHOXD) fb CARBN; or INCIN	FSUBS; or INCIN.
U202		Saccharin and salts	81-07-2*	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U206		Streptozatocin	18883-66-4	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U213		Tetrahydrofuran	109-99-9	(WETOX or CHOXD) fb CARBN; or INCIN	FSUBS; or INCIN.
U214	Table CCW in 268.43	Thallium (I) acetate	563-68-8	NA	RTHRM; or STABL.
U215	Table CCW in 268.43	Thallium (I) carbonate	6533-73-9	NA	RTHRM; or STABL.
U216	Table CCW in 268.43	Thallium (I) chloride	7791-12-0	NA	RTHRM; or STABL.
U217	Table CCW in 268.43	Thallium (I) nitrate	10102-45-1	NA	RTHRM; or STABL.
U218		Thioacetamide	62-55-5	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U219		Thiourea	62-56-6	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U221		Toluenediamine	25376-45-8	CARBN; or INCIN	FSUBS; or INCIN.
U222		o-Toluidine hydrochloride	636-21-5	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U223		Toluene diisocyanate	26471-62-5	CARBN; or INCIN	FSUBS; or INCIN.
U234		sym-Trinitrobenzene	99-35-4	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U236		Trypan Blue	72-57-1	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U237		Uracil mustard	66-75-1	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U238		Ethyl carbamate	51-79-6	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.

TABLE 2.—TECHNOLOGY-BASED STANDARDS BY RCRA WASTE CODE—Continued

Waste code	See also	Waste descriptions and/or treatment subcategory	CAS No. for regulated hazardous constituents	Technology code	
				Wastewaters	Nonwastewaters
U240		2,4-Dichlorophenoxyacetic (salts and esters)	94-75-7*	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U244		Thiram	137-26-8	(WETOX or CHOXD) fb CARBN; or INCIN	INCIN.
U246		Cyanogen bromide	506-68-3	CHOXD; WETOX; or INCIN	CHOXD; WETOX; or INCIN.
U248		Warfarin (greater than or equal to 3%)	81-81-2	(WETOX or CHOXD) fb CARBN; or INCIN	FSUBS; or INCIN.
U249		Zinc Phosphide (<10%)	1314-84-7	CHOXD; CHRED; or INCIN	CHOXD; CHRED; or INCIN.

* CAS Number given for parent compound only.
** This waste code exists in gaseous form and is not categorized as wastewater or nonwastewater forms.
NA—Not Applicable.

TABLE 3.—TECHNOLOGY-BASED STANDARDS FOR SPECIFIC RADIOACTIVE HAZARDOUS MIXED WASTE

Waste code	Waste descriptions and/or treatment subcategory	CAS Number	Technology code	
			Wastewaters	Nonwastewaters
D002	Radioactive High Level Wastes Generated During the Reprocessing of Fuel Rods Subcategory.	NA	NA	HLVIT
D004	Radioactive High Level Wastes Generated During the Reprocessing of Fuel Rods Subcategory.	NA	NA	HLVIT
D005	Radioactive High Level Wastes Generated During the Reprocessing of Fuel Rods Subcategory.	NA	NA	HLVIT
D006	Radioactive High Level Wastes Generated During the Reprocessing of Fuel Rods Subcategory.	NA	NA	HLVIT
D007	Radioactive High Level Wastes Generated During the Reprocessing of Fuel Rods Subcategory.	NA	NA	HLVIT
D008	Radioactive Lead Solids Subcategory (Note: these lead solids include, but are not limited to, all forms of lead shielding, and other elemental forms of lead. These lead solids do not include treatment residuals such as hydroxide sludges, other wastewater treatment residuals, or incinerator ashes that can undergo conventional pozzolanic stabilization, nor do they include organo-lead materials that can be incinerated and stabilized as ash.).	7439-92-1	NA	MACRO
D008	Radioactive High Level Wastes Generated During the Reprocessing of Fuel Rods Subcategory.	NA	NA	HLVIT
D009	Elemental mercury contaminated with radioactive materials	7439-97-6	NA	AMLGM
D009	Hydraulic oil contaminated with Mercury Radioactive Materials Subcategory	7439-97-6	NA	INCIN
D009	Radioactive High Level Wastes Generated During the Reprocessing of Fuel Rods Subcategory.	NA	NA	HLVIT
D010	Radioactive High Level Wastes Generated During the Reprocessing of Fuel Rods Subcategory.	NA	NA	HLVIT
D011	Radioactive High Level Wastes Generated During the Reprocessing of Fuel Rods Subcategory.	NA	NA	HLVIT
U151	Mercury: Elemental mercury contaminated with radioactive materials	7439-97-6	NA	AMLGM

NA—Not Applicable.

(b) Any person may submit an application to the Administrator demonstrating that an alternative treatment method can achieve a measure of performance equivalent to that achievable by methods specified in paragraphs (a), (c), and (d) of this section. The applicant must submit information demonstrating that his treatment method is in compliance with federal, state, and local requirements and is protective of human health and the environment. On the basis of such information and any other available information, the Administrator may approve the use of the alternative treatment method if he finds that the alternative treatment method provides a measure of performance equivalent to that achieved by methods specified in paragraphs (a), (c), and (d) of this section. Any approval must be stated in writing and may contain such provisions and conditions as the Administrator deems appropriate. The person to whom such approval is issued must comply with all limitations contained in such a determination.

(c) As an alternative to the otherwise applicable subpart D treatment standards, lab packs are eligible for land disposal provided the following requirements are met:

(1) The lab packs comply with the applicable provisions of 40 CFR 264.316 and 40 CFR 265.316;

(2) All hazardous wastes contained in such lab packs are specified in appendix IV or appendix V to part 268;

(3) The lab packs are incinerated in accordance with the requirements of 40 CFR part 264, subpart O or 40 CFR part 265, subpart O; and

(4) Any incinerator residues from lab packs containing D004, D005, D006, D007, D008, D010, and D011 are treated in compliance with the applicable treatment standards specified for such wastes in subpart D of this part.

(d) Radioactive hazardous mixed wastes with treatment standards specified in Table 3 of this section are not subject to any treatment standards specified in § 268.41, § 268.43, or Table 2 of this section. Radioactive hazardous mixed wastes not subject to treatment standards in Table 3 of this section remain subject to all applicable treatment standards specified in

§ 268.41, § 268.43, and Table 2 of this section.

12. Section 268.43 is amended by revising paragraph (a) and Table CCW—Constituent Concentrations in Wastes, and by adding paragraph (c) to read as follows:

§ 268.43 Treatment standards expressed as waste concentrations.

(a) Table CCW identifies the restricted wastes and the concentrations of their associated hazardous constituents which may not be exceeded by the waste or treatment residual (not an extract of such waste or residual) for the allowable land disposal of such waste or residual. Compliance with these concentrations is required based upon grab samples, unless otherwise noted in the following Table CCW.

TABLE CCW.—CONSTITUENT CONCENTRATIONS IN WASTES

Waste code	See also	Regulated hazardous constituent	CAS No. for regulated hazardous constituent	Wastewaters concentration (mg/l)	Non-wastewaters concentration (mg/kg)
D003 (Reactive cyanides subcategory—based on 261.23(a)(5)).		Cyanides (Total)	57-12-5	Reserved	# 590
		Cyanides (Amenable)	57-12-5	0.86	30
D004	Table CCWE in 268.41	Arsenic	7440-38-2	5.0	NA
D005	Table CCWE in 268.41	Barium	7440-39-3	100	NA
D006	Table CCWE in 268.41	Cadmium	7440-43-9	1.0	NA
D007	Table CCWE in 268.41	Chromium (Total)	7440-47-32	5.0	NA
D008	Table CCWE in 268.41	Lead	7439-92-1	5.0	NA
D009	Table CCWE in 268.41	Mercury	7439-97-6	0.20	NA
D010	Table CCWE in 268.41	Selenium	7782-49-2	1.0	NA
D011	Table CCWE in 268.41	Silver	7440-22-4	5.0	NA
D012	Table 2 in 268.42	Endrin	720-20-8	NA	0.13
D013	Table 2 in 268.42	Lindane	58-89-9	NA	0.066
D014	Table 2 in 268.42	Methoxychlor	72.43-5	NA	0.18
D015	Table 2 in 268.42	Toxaphene	8001-35-1	NA	1.3
D016	Table 2 in 268.42	2,4-D	94-75-7	NA	10.0
D017	Table 2 in 268.42	2,4,5-TP Silvex	93-76-5	NA	7.9
F001–F005 spent solvents	Table CCWE in 268.41 and Table 2 in 268.42.	1,1,2-Trichloroethane	71-55-6	0.030	[e] 7.6
		Benzene	71-43-2	0.070	[e] 3.7
F001–F005 spent solvents (Pharmaceutical industry wastewater subcategory).		Methylene chloride	75-09-2	0.44	NA
F006	Table CCWE in 268.41	Cyanides (Total)	57-12-5	1.2	590
		Cyanides (Amenable)	57-12-5	0.86	30
		Cadmium	7440-43-9	1.6	NA
		Chromium	7440-47-32	0.32	NA
		Lead	7439-92-1	0.040	NA
		Nickel	7440-02-0	0.44	NA
F007	Table CCWE in 268.41	Cyanides (Total)	57-12-5	1.9	590
		Cyanides (Amenable)	57-12-5	0.1	30
		Chromium (Total)	7440-47-32	0.32	NA
		Lead	7439-92-1	0.04	NA
		Nickel	7440-02-0	0.44	NA
F008	Table CCWE in 268.41	Cyanides (Total)	57-12-5	1.9	590
		Cyanides (Amenable)	57-12-5	0.1	30
		Chromium	7440-47-32	0.32	NA
		Lead	7439-92-1	0.04	NA
		Nickel	7440-02-0	0.44	NA
F009	Table CCWE in 268.41	Cyanides (Total)	57-12-5	1.9	590
		Cyanides (Amenable)	57-12-5	0.1	30
		Chromium	7440-47-32	0.32	NA
		Lead	7439-92-1	0.04	NA
		Nickel	7440-02-0	0.44	NA
F010		Cyanides (Total)	57-12-5	1.9	1.5
		Cyanides (Amenable)	57-12-5	0.1	NA
F011	Table CCWE in 268.41	Cyanides (Total)	57-12-5	1.9	110
		Cyanides (Amenable)	57-12-5	0.1	9.1
		Chromium (Total)	7440-47-32	0.32	NA
		Lead	7439-92-1	0.04	NA
		Nickel	7440-02-0	0.44	NA
F012	Table CCWE in 268.41	Cyanides (Total)	57-12-5	1.9	110
		Cyanides (Amenable)	57-12-5	0.1	9.1
		Chromium (Total)	7440-47-32	0.32	NA
		Lead	7439-92-1	0.04	NA
		Nickel	7440-02-0	0.44	NA
F019	Table CCWE in 268.41	Cyanides (Total)	57-12-5	1.2	# 590
		Cyanides (Amenable)	57-12-5	0.86	# 30
		Chromium (Total)	7440-47-32	0.32	NA
F024	Table CCWE in 268.41 and Table 2 in 268.42 (Note: F024 organic standards must be treated via incineration (INCIN)).	2-Chloro-1,3-butadiene	126-99-8	[e] 0.28	[e] 0.28
		3-Chloropropene	107-05-1	[e] 0.28	[e] 0.28
		1,1-Dichloroethane	75-34-3	[e] 0.014	[e] 0.014
		1,2-Dichloroethane	107-06-2	[e] 0.014	[e] 0.014
		1,2-Dichloropropane	78-87-5	[e] 0.014	[e] 0.014
		cis-1,3-Dichloropropene	10061-01-5	[e] 0.014	[e] 0.014
		trans-1,3-Dichloropropene	10061-02-6	[e] 0.014	[e] 0.014

TABLE CCW.—CONSTITUENT CONCENTRATIONS IN WASTES—Continued

Waste code	See also	Regulated hazardous constituent	CAS No. for regulated hazardous constituent	Wastewaters concentration (mg/l)	Non-wastewaters concentration (mg/kg)
		Bis(2-ethylhexyl)phthalate	117-81-7	[e] 0.036	[e] 1.8
		Hexachloroethane	67-72-1	[e] 0.036	[e] 1.8
		Chromium (Total	7440-47-32	0.35	NA
		Nickel	7440-02-0	0.47	NA
F025 (Light ends subcategory)		Chloroform	67-66-3	[e] 0.046	[e] 6.2
		1,2-Dichloroethane	107-06-2	[e] 0.21	[e] 6.2
		1,1-Dichloroethylene	75-35-4	[e] 0.025	[e] 6.2
		Methylene chloride	75-9-2	[e] 0.089	[e] 31
		Carbon tetrachloride	56-23-5	[e] 0.057	[e] 6.2
		1,1,2-Trichloroethane	79-00-5	[e] 0.054	[e] 6.2
		Trichloroethylene	79-01-6	[e] 0.054	[e] 5.6
		Vinyl chloride	75-01-4	[e] 0.27	[e] 33
F025 (Spent filters/aids and desiccants subcategory).		Chloroform	67-66-3	[e] 0.046	[e] 6.2
		Methylene chloride	75-9-2	[e] 0.089	[e] 31
		Carbon tetrachloride	56-23-5	[e] 0.057	[e] 6.2
		1,1,2-Trichloroethane	79-00-5	[e] 0.054	[e] 6.2
		Trichloroethylene	79-01-6	[e] 0.054	[e] 5.6
		Vinyl chloride	75-01-4	[e] 0.27	[e] 33
		Hexachlorobenzene	118-74-1	[e] 0.055	[e] 37
		Hexachlorobutadiene	87-68-3	[e] 0.055	[e] 28
		Hexachloroethane	67-72-1	[e] 0.055	[e] 30
F039	Table CCWE in 268.41	Acetone	67-64-1	[e] 0.28	[e] 160
		Acenaphtalene	208-96-8	[e] 0.059	[e] 3.4
		Acenaphthene	83-32-9	[e] 0.059	[e] 4.0
		Acetonitrile	75-05-8	[e] 0.17	NA
		Acetophenone	96-86-2	[e] 0.010	[e] 9.7
		2-Acetylaminofluorene	53-96-3	[e] 0.059	[e] 140
		Acrylonitrile	107-13-1	[e] 0.24	[e] 84
		Aldrin	309-00-2	[e] 0.021	[e] 0.066
		4-Aminobiphenyl	92-67-1	[e] 0.13	NA
		Aniline	62-53-3	[e] 0.81	[e] 14
		Anthracene	120-12-7	[e] 0.059	[e] 4.0
		Aroclor 1016	12674-11-2	[e] 0.013	[e] 0.92
		Aroclor 1221	11104-28-2	[e] 0.014	[e] 0.92
		Aroclor 1232	11141-16-5	[e] 0.013	[e] 0.92
		Aroclor 1242	53469-21-9	[e] 0.017	[e] 0.92
		Aroclor 1248	12672-29-6	[e] 0.013	[e] 0.92
		Aroclor 1254	11097-69-1	[e] 0.014	[e] 1.8
		Aroclor 1260	11096-82-5	[e] 0.014	[e] 1.8
		alpha-BHC	319-84-6	[e] 0.00014	[e] 0.066
		beta-BHC	319-85-7	[e] 0.00014	[e] 0.066
		delta-BHC	319-86-8	[e] 0.023	[e] 0.066
		gamma-BHC	58-89-9	[e] 0.0017	[e] 0.066
		Benzene	71-43-2	[e] 0.14	[e] 36
		Benzo(a)anthracene	56-55-3	[e] 0.059	[e] 8.2
		Benzo(b)fluoranthene	205-99-2	[e] 0.055	[e] 3.4
		Benzo(k)fluoranthene	207-08-9	[e] 0.059	[e] 3.4
		Benzo(g,h,i)perylene	191-24-2	[e] 0.0055	[e] 1.5
		Benzo(a)pyrene	50-32-8	[e] 0.061	[e] 8.2
		Bromodichloromethane	75-27-4	[e] 0.35	[e] 15
		Bromoform	75-25-2	[e] 0.63	[e] 15
		Bromomethane (methyl bromide)	74-83-9	[e] 0.11	[e] 15
		4-Bromophenyl phenyl ether	101-55-3	[e] 0.055	[e] 15
		n-Butyl alcohol	71-36-3	[e] 5.6	[e] 2.6
		Butyl benzyl phthalate	85-68-7	[e] 0.017	[e] 7.9
		2-sec-Butyl-4,6-dinitrophenol	88-85-7	[e] 0.066	[e] 2.5
		Carbon tetrachloride	56-23-5	[e] 0.057	[e] 5.6
		Carbon disulfide	75-15-0	[e] 0.014	NA
		Chlordane	57-74-9	[e] 0.0033	[e] 0.13
		p-Chloroaniline	106-47-8	[e] 0.46	[e] 16
		Chlorobenzene	108-90-7	[e] 0.057	[e] 5.7
		Chlorobenzilate	510-15-6	[e] 0.10	[e] NA
		Chlorodibromomethane	124-48-1	[e] 0.057	[e] 16
		Chloroethane	75-00-3	[e] 0.27	[e] 6.0
		bis(2-Chloroethoxy) methane	111-91-1	[e] 0.036	[e] 7.2
		bis(2-Chloroethyl) ether	111-44-4	[e] 0.033	[e] 7.2
		2-Chloroethyl vinyl ether		[e] 0.057	NA
		Chloroform	67-66-3	[e] 0.046	[e] 5.6
		bis(2-Chloroisopropyl) ether	39638-32-9	[e] 0.055	[e] 7.2
		p-Chloro-m-cresol	59-50-7	[e] 0.018	[e] 14
		Chloromethane (Methyl chloride)	74-87-3	[e] 0.19	[e] 33
		2-Chloronaphthalene	91-8-7	[e] 0.055	[e] 5.6
		2-Chlorophenol	95-57-8	[e] 0.044	[e] 5.7
		3-Chloropropene	107-05-1	[e] 0.036	[e] 28
		Chrysene	218-01-9	[e] 0.059	[e] 8.2
		o-Cresol	95-48-7	[e] 0.11	[e] 5.6

TABLE CCW.—CONSTITUENT CONCENTRATIONS IN WASTES—Continued

Waste code	See also	Regulated hazardous constituent	CAS No. for regulated hazardous constituent	Wastewaters concentration (mg/l)	Non-wastewaters concentration (mg/kg)
		Cresol (m- and p-isomers)		[1] 0.77	[2] 3.2
		Cyclohexanone	108-94-1	[1] 0.36	NA
		1,2-Dibromo-3-chloropropane	96-12-8	[1] 0.11	[2] 15
		1,2-Dibromoethane (Ethylene dibromide).	106-93-4	[1] 0.028	[2] 15
		Dibromomethane	74-95-3	[1] 0.11	[2] 15
		2,4-Dichlorophenoxyacetic acid (2,4-D).	94-75-7	[1] 0.72	[2] 10
		o,p'-DDD	53-19-0	[1] 0.023	[2] 0.087
		p,p'-DDD	72-54-8	[1] 0.023	[2] 0.087
		o,p'-DDE	3424-82-6	[1] 0.031	[2] 0.087
		p,p'-DDE	72-55-9	[1] 0.031	[2] 0.087
		o,p'-DDT	789-02-6	[1] 0.0039	[2] 0.087
		p,p'-DDT	50-29-3	[1] 0.0039	[2] 0.087
		Dibenzo(a,h)anthracene	53-70-3	[1] 0.055	[2] 8.2
		m-Dichlorobenzene	541-73-1	[1] 0.036	[2] 6.2
		o-Dichlorobenzene	95-50-1	[1] 0.088	[2] 6.2
		p-Dichlorobenzene	106-46-7	[1] 0.090	[2] 6.2
		Dichlorodifluoromethane	75-71-8	[1] 0.23	[2] 7.2
		1,1-Dichloroethane	75-34-3	[1] 0.059	[2] 7.2
		1,2-Dichloroethane	107-06-2	[1] 0.21	[2] 7.2
		1,1-Dichloroethylene	75-35-4	[1] 0.025	[2] 33
		trans-1,2-Dichloroethene		[1] 0.054	[2] 33
		2,4-Dichlorophenol	120-83-2	[1] 0.044	[2] 14
		2,6-Dichlorophenol	87-65-0	[1] 0.044	[2] 14
		1,2-Dichloropropane	78-87-5	[1] 0.85	[2] 18
		cis-1,3-Dichloropropene	10061-01-5	[1] 0.036	[2] 18
		trans-1,3-Dichloropropene	10061-02-6	[1] 0.036	[2] 18
		Dieldrin	60-57-1	[1] 0.017	[2] 0.13
		Diethyl phthalate	84-66-2	[1] 0.20	[2] 28
		p-Dimethylaminoazobenzene	60-11-3	[1] 0.13	NA
		2,4-Dimethyl phenol	105-67-9	[1] 0.036	[2] 14
		Dimethyl phthalate	131-11-3	[1] 0.047	[2] 28
		Di-n-butyl phthalate	84-74-2	[1] 0.057	[2] 28
		1,4-Dinitrobenzene	100-25-4	[1] 0.32	[2] 2.3
		4,6-Dinitro-o-cresol	534-52-1	[1] 0.28	[2] 160
		2,4-Dinitrophenol	51-28-5	[1] 0.12	[2] 160
		2,4-Dinitrotoluene	121-14-2	[1] 0.32	[2] 140
		2,6-Dinitrotoluene	606-20-2	[1] 0.55	[2] 28
		Di-n-octyl phthalate	117-84-0	[1] 0.017	[2] 28
		Di-n-propylnitrosoamine	621-64-7	[1] 0.40	[2] 14
		1,2-Diphenyl hydrazine		[1] 0.087	NA
		1,4-Dioxane	123-91-1	[1] 0.12	[2] 170
		Disulfoton	298-04-4	[1] 0.017	[2] 6.2
		Endosulfan I	939-98-8	[1] 0.023	[2] 0.066
		Endosulfan II	33213-6-5	[1] 0.029	[2] 0.13
		Endosulfan sulfate	1-31-07-8	[1] 0.029	[2] 0.13
		Endrin	7-20-8	[1] 0.0028	[2] 0.13
		Endrin aldehyde	7421-93-4	[1] 0.025	[2] 0.13
		Ethyl acetate	141-78-6	[1] 0.34	[2] 33
		Ethyl cyanide		[1] 0.24	NA
		Ethyl benzene	100-41-4	[1] 0.057	[2] 6.0
		Ethyl ether	60-29-7	[1] 0.12	[2] 160
		bis(2-Ethylhexyl) phthalate	117-81-7	[1] 0.28	[2] 28
		Ethyl methacrylate	97-63-2	[1] 0.14	[2] 160
		Ethylene oxide	75-21-8	[1] 0.12	NA
		Famphur	52-85-7	[1] 0.017	[2] 15
		Fluoranthene	206-44-0	[1] 0.068	[2] 8.2
		Fluorene	86-73-7	[1] 0.059	[2] 4.0
		Fluorotrichloromethane	75-69-4	[1] 0.020	[2] 33
		Heptachlor	76-44-8	[1] 0.0012	[2] 0.066
		Heptachlor epoxide	1024-57-3	[1] 0.016	[2] 0.066
		Hexachlorobenzene	118-74-1	[1] 0.055	[2] 37
		Hexachlorobutadiene	87-68-3	[1] 0.055	[2] 28
		Hexachlorocyclopentadiene	77-47-4	[1] 0.057	[2] 3.6
		Hexachlorodibenzo-furans		[1] 0.000063	[2] 0.001
		Hexachlorodibenzo-p-dioxins		[1] 0.000063	[2] 0.001
		Hexachloroethane	67-72-1	[1] 0.055	[2] 28
		Hexachloropropene	1888-71-7	[1] 0.035	[2] 28
		Indeno(1,2,3,-c,d)pyrene	193-39-5	[1] 0.0055	[2] 8.2
		Iodomethane	74-88-4	[1] 0.019	[2] 65
		Isobutanol	78-83-1	[1] 5.6	[2] 170
		Isodrin	465-73-6	[1] 0.021	[2] 0.066
		Isosafrole	120-58-1	[1] 0.081	[2] 2.6
		Kepone	143-50-8	[1] 0.0011	[2] 0.13
		Methacrylonitrile	126-98-7	[1] 0.24	[2] 84
		Methapyrilene	91-80-5	[1] 0.081	[2] 1.5

TABLE CCW.—CONSTITUENT CONCENTRATIONS IN WASTES—Continued

Waste code	See also	Regulated hazardous constituent	CAS No. for regulated hazardous constituent	Wastewaters concentration (mg/l)	Non-wastewaters concentration (mg/kg)
		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	●35
		Methylene chloride	75-09-2	*0.089	●33
		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		*0.018	NA
		Methyl parathion	298-00-0	*0.014	●4.6
		Naphthalene	91-20-3	*0.059	●3.1
		2-Naphtylamine	91-59-8	*0.52	NA
		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
		4-Nitrophenol	100-02-7	*0.12	●29
		N-Nitrosodiethylamine	55-18-5	*0.40	●28
		N-Nitrosodimethylamine	62-75-9	*0.40	NA
		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	*0.017	●4.6
		Pentachlorobenzene	608-93-5	*0.055	●37
		Pentachlorodibenzo-furans		*0.000035	●0.001
		Pentachlorodibenzo-p-dioxins		*0.000063	●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	●3.1
		Phenol	108-95-2	*0.039	●6.2
		Phorate	298-02-2	*0.021	●4.6
		Propanenitrile (ethyl cyanide)	107-12-0	*0.24	●360
		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	●19
		Tetrachlorodibenzo-furans		*0.000063	●0.001
		Tetrachlorodibenzo-p-dioxins		*0.000063	●0.001
		2,3,7,8-Tetrachlorodibenzo-p-dioxin		*0.000063	NA
		1,1,1,2-Tetrachloroethane	630-20-6	*0.057	●42
		1,1,2,2-Tetrachloroethane	79-34-6	*0.057	●42
		Tetrachloroethene	127-18-4	*0.056	●5.6
		2,3,4,6-Tetrachlorophenol	58-90-2	*0.030	●37
		Toluene	108-88-3	*0.080	●28
		Toxaphene	8001-35-1	*0.0095	●1.3
		1,2,4-Trichlorobenzene	120-82-1	*0.055	●19
		1,1,1-Trichloroethane	71-55-6	*0.054	●5.6
		1,1,2-Trichloroethane	79-00-5	*0.054	●5.6
		Trichloroethylene	79-01-6	*0.054	●5.6
		2,4,5-Trichlorophenol	95-95-4	*0.18	●37
		2,4,6-Trichlorophenol	88-06-2	*0.035	●37
		1,2,3-Trichloropropane	96-18-4	*0.85	●28
		1,1,2-Trichloro-1,2,2-trifluoro-ethane	76-13-1	*0.057	●28
		Vinyl chloride	75-01-4	*0.27	●33
		Xylene(s)		*0.32	●28
		Cyanides (Total)	57-12-5	*1.2	●1.8
		Cyanides (Amenable)	57-12-5	*0.86	NA
		Fluoride	16964-48-8	*35	NA
		Sulfide	8496-25-8	*14	NA
		Antimony	7440-36-0	*1.9	NA
		Arsenic	7440-38-2	*5.0	NA
		Barium	7440-39-3	*1.2	NA
		Beryllium	7440-41-7	*0.82	NA
		Cadmium	7440-43-9	*0.20	NA
		Chromium (Total)	7440-47-32	*0.37	NA
		Copper	7440-50-8	*1.3	NA
		Lead	7439-92-1	*0.28	NA
		Mercury	7439-97-6	*0.15	NA
		Nickel	7440-02-0	*0.55	NA
		Selenium	7782-49-2	*0.82	NA
		Silver	7440-22-4	*0.29	NA
		Vanadium	7440-62-2	*0.042	NA
K001	Table CCWE in 268.41	Naphthalene	91-20-3	●0.031	●1.5

TABLE CCW.—CONSTITUENT CONCENTRATIONS IN WASTES—Continued

Waste code	See also	Regulated hazardous constituent	CAS No. for regulated hazardous constituent	Wastewaters concentration (mg/l)	Non-wastewaters concentration (mg/kg)
		Pentachlorophenol	87-86-5	● 0.031	● 1.5
		Phenanthrene	85-01-8	● 0.031	● 1.5
		Pyrene	129-00-0	● 0.028	● 1.5
		Toluene	108-88-3	● 0.028	● 28
		Xylenes (Total)		● 0.032	● 33
		Lead	7439-92-1	● 0.037	NA
K002	Table CCWE in 268.41	Chromium (Total)	7440-47-32	* 2.9	NA
		Lead	7439-92-1	* 3.4	NA
K003	Table CCWE in 268.41	Chromium (Total)	7440-47-32	* 2.9	NA
		Lead	7439-92-1	* 3.4	NA
K004	Table CCWE in 268.41	Chromium (Total)	7440-47-32	* 2.9	NA
		Lead	7439-92-1	* 3.4	NA
K005	Table CCWE in 268.41	Chromium (Total)	7440-47-32	* 2.9	NA
		Lead	7439-92-1	* 3.4	NA
		Cyanides (Total)	57-12-5	* 0.74	(*)
K006	Table CCWE in 268.41	Chromium (Total)	7440-47-32	* 2.9	NA
		Lead	7439-92-1	* 3.4	NA
K007	Table CCWE	Chromium (Total)	7440-47-32	* 2.9	NA
		Lead	7439-92-1	* 3.4	* NA
		Cyanides (Total)	57-12-5	* 0.74	
K008	Table CCWE in 268.41	Chromium (Total)	7440-47-32	* 2.9	NA
		Lead	7439-92-1	* 3.4	NA
K009		Chloroform	67-66-3	0.1	● 6.0
K010		Chloroform	67-66-3	0.1	6.0
K011		Acetonitrile	75-05-8	38	1.8
		Acrylonitrile	107-13-1	0.06	1.4
		Acrylamide	79-06-1	19	23
		Benzene	71-43-2	0.02	0.03
		Cyanide (Total)	57-12-5	21	57
K013		Acetonitrile	75-05-8	38	● 1.8
		Acrylonitrile	107-13-1	0.06	● 1.4
		Acrylamide	79-06-1	19	● 23
		Benzene	71-43-2	0.02	● 0.03
		Cyanide (Total)	57-12-5	21	57
K014		Acetonitrile	75-05-8	38	● 1.8
		Acrylonitrile	107-13-1	0.06	● 1.4
		Acrylamide	79-06-1	19	● 23
		Benzene	71-43-2	0.02	● 0.03
		Cyanide (Total)	57-12-5	21	57
K015	Table CCWE in 268.41	Anthracene	120-12-7	1.0	● 3.4
		Benzal chloride	98-87-3	0.28	● 6.2
		Sum of Benzo(b)fluoranthene and Benzo(k)fluoranthene.	205-99-2 207-08-9	0.029	3.4
		Phenanthrene	85-01-8	0.27	● 3.4
		Toluene	108-88-3	0.15	● 6.0
		Chromium (Total)	7440-47-32	0.32	NA
		Nickel	7440-02-0	0.44	NA
K016		Hexachlorobenzene	118-74-1	● 0.033	● 28
		Hexachlorobutadiene	87-68-3	● 0.007	● 5.6
		Hexachlorocyclopentadiene	77-47-4	● 0.007	● 5.6
		Hexachloroethane	67-72-1	● 0.033	● 28
		Tetrachloroethene	127-18-4	● 0.007	● 6.0
K017		1,2-Dichloropropane	78-87-5	*,@ 0.85	● 18
		1,2,3-Trichloropropane	96-18-4	*,@ 0.85	● 28
		Bis(2-chloroethyl)ether	111-44-4	*,@ 0.033	● 7.2
K018		Chloroethane	75-00-3	● 0.007	● 6.0
		1,1-Dichloroethane	75-34-3	● 0.007	● 6.0
		1,2-Dichloroethane	107-06-2	● 0.007	● 6.0
		Hexachloroethane	67-72-1	● 0.007	● 28
		Hexachlorobutadiene	87-68-3	● 0.033	● 5.6
		Hexachloroethane	67-72-1	● 0.007	● 28
		Pentachloroethane	76-01-7	● 0.007	● 5.6
		1,1,1-Trichloroethane	71-55-6	● 0.007	● 6.0
K019		Bis(2-chloroethyl)ether	111-44-4	● 0.007	● 5.6
		Chlorobenzene	108-90-7	● 0.006	● 6.0
		Chloroform	67-66-3	● 0.007	● 6.0
		p-Dichlorobenzene	106-46-7	● 0.008	NA
		1,2-Dichloroethane	107-06-2	● 0.007	● 6.0
		Fluorene	86-73-7	● 0.007	NA
		Hexachloroethane	67-72-1	● 0.033	● 28
		Naphthalene	91-20-3	● 0.007	● 5.6
		Phenanthrene	85-01-8	● 0.007	● 5.6
		1,2,4,5-Tetrachlorobenzene	95-94-3	● 0.017	NA
		Tetrachloroethene	127-18-4	● 0.007	● 6.0
		1,2,4-Trichlorobenzene	120-82-1	● 0.023	● 19
		1,1,1-Trichloroethane	71-55-6	● 0.007	● 6.0
K020		1,2-Dichloroethane	106-93-4	● 0.007	● 6.0

TABLE CCW.—CONSTITUENT CONCENTRATIONS IN WASTES—Continued

Waste code	See also	Regulated hazardous constituent	CAS No. for regulated hazardous constituent	Wastewaters concentration (mg/l)	Non-wastewaters concentration (mg/kg)
		1,1,2,2-Tetrachloroethane	79-34-6	[e] 0.007	[e] 5.6
		Tetrachloroethene	127-18-4	[e] 0.007	[e] 6.0
K021	Table CCWE in 268.41	Chloroform	67-66-3	[*] 0.046	[e] 6.2
		Carbon tetrachloride	56-23-5	[*] 0.057	[e] 6.2
		Antimony	7440-36-0	[*] 0.60	NA
K022	Table CCWE in 268.41	Toluene	108-88-3	[*] 0.080	[e] 0.034
		Acetophenone	96-86-2	0.010	[e] 19
		Diphenylamine	22-39-4	[*] 0.52	NA
		Diphenylnitrosamine	86-30-6	[*] 0.40	NA
		Sum of Diphenylamine and Diphenylnitrosamine.		NA	[e] 13
		Phenol	108-95-2	0.039	[e] 12
		Chromium (Total)	7440-47-32	0.35	NA
		Nickel	7440-02-0	0.47	NA
K023		Phthalic anhydride (measured as Phthalic acid).	85-44-9	[e] 0.54	[e] 28
K024		Phthalic anhydride (measured as Phthalic acid).	85-44-9	[e] 0.54	[e] 28
K028	Table CCWE in 268.41	1,1-Dichloroethane	75-34-3	[e] 0.007	[e] 6.0
		trans-1,2-Dichloroethane		[e] 0.033	[e] 6.0
		Hexachlorobutadiene	87-68-3	[e] 0.007	[e] 5.6
		Hexachloroethane	67-72-1	[e] 0.033	[e] 28
		Pentachloroethane	76-01-7	[e] 0.033	[e] 5.6
		1,1,1,2-Tetrachloroethane	630-20-6	[e] 0.007	[e] 5.6
		1,1,2,2-Tetrachloroethane	79-34-6	[e] 0.007	[e] 5.6
		1,1,1-Trichloethane	71-55-6	[e] 0.007	[e] 6.0
		1,1,2-Trichlorethane	79-00-5	[e] 0.007	[e] 6.0
		Tetrachloroethylene	127-18-4	[e] 0.007	[e] 6.0
		Cadmium	7440-43-9	6.4	NA
		Chromium (Total)	7440-47-32	0.35	NA
		Lead	7439-92-1	0.037	NA
		Nickel	7440-02-0	0.47	NA
K029		Chloroform	67-66-3	0.46	[e] 6.0
		1,2-Dichloroethane	107-06-2	0.21	[e] 6.0
		1,1-Dichloroethylene	75-35-4	0.025	[e] 6.0
		1,1,1-Trichloroethane	71-55-6	0.054	[e] 6.0
		Vinyl chloride	75-01-4	0.27	[e] 6.0
K030		o-Dichlorobenzene	95-50-1	[e] 0.008	NA
		p-Dichlorobenzene	106-46-7	[e] 0.008	NA
		Hexachlorobutadiene	87-68-3	[e] 0.007	[e] 5.6
		Hexachlorobutadiene	67-72-1	[e] 0.033	[e] 28
		Hexachloropropene	1888-71-7	NA	[e] 19
		Pentachlorobenzene	608-93-5	NA	[e] 28
		Pentachloroethane	76-01-7	[e] 0.007	[e] 5.6
		1,2,4,5-Tetrachlorobenzene	95-94-3	[e] 0.017	[e] 14
		Tetrachloroethane	127-18-4	[e] 0.007	[e] 6.0
		1,2,4-Trichlorobenzene	120-82-1	[e] 0.023	[e] 19
K031	Table CCWE in 268.41	Arsenic	7440-38-2	0.79	NA
K032		Hexachloropentadiene	77-47-4	[*] 0.057	[e] 2.4
		Chlordane	57-74-9	[*] 0.0033	[e] 0.26
		Heptachlor	76-44-8	[*] 0.012	[e] 0.066
		Heptachlor epoxide	1024-57-3	[*] 0.016	[e] 0.066
K033		Hexachlorocyclopentadiene	77-47-4	[*] 0.057	[e] 2.4
K034		Hexachlorocyclopentadiene	77-47-4	[*] 0.057	[e] 2.4
K035		Acenaphthene	83-32-9	NA	[e] 3.4
		Anthracene	120-12-7	NA	[e] 3.4
		Benz(a)anthracene	56-55-3	[*] 0.059	[e] 3.4
		Benzo(a)pyrene	50-32-8	NA	[e] 3.4
		Chrysene	218-01-9	[*] 0.059	[e] 3.4
		Dibenz(a,h)anthracene	53-70-3	NA	[e] 3.4
		Fluoranthene	206-44-0	[*] 0.068	[e] 3.4
		Fluorene	86-73-7	NA	[e] 3.4
		Indeno(1,2,3-cd)pyrene	193-39-5	NA	[e] 3.4
		Cresols (m- and p-isomers)		[*] 0.77	NA
		Naphthalene	91-20-3	[*] 0.059	[e] 3.4
		o-cresol	95-48-7	[*] 0.11	NA
		Phenanthrene	85-01-8	[*] 0.059	[e] 3.4
		Phenol	108-95-2	0.039	NA
		Pyrene	129-00-0	[*] 0.067	[e] 8.2
K036		Disulfoton	298-04-4	[*] 0.025	[e] 0.1
K037		Disulfoton	298-04-4	[*] 0.025	[e] 0.1
		Toluene	108-88-3	[*] 0.080	[e] 28
K038		Phorate	298-02-2	0.025	[e] 0.1
K040		Phorate	298-02-2	0.025	[e] 0.1
K041		Toxaphene	8001-35-1	[*] 0.0095	[e] 2.6
K042		1,2,4,5-Tetrachlorobenzene	95-94-3	[*] 0.055	[e] 4.4
		o-Dichlorobenzene	95-50-1	[*] 0.088	[e] 4.4

TABLE CCW.—CONSTITUENT CONCENTRATIONS IN WASTES—Continued

Waste code	See also	Regulated hazardous constituent	CAS No. for regulated hazardous constituent	Wastewaters concentration (mg/l)	Non-wastewaters concentration (mg/kg)
		p-Dichlorobenzene	106-46-7	[1] 0.090	[2] 4.4
		Pentachlorobenzene	608-93-5	[1] 0.055	[2] 4.4
		1,2,4-Trichlorobenzene	120-82-1	[1] 0.055	[2] 4.4
K043		2,4-Dichlorophenol	120-83-2	[2] 0.049	[2] 0.38
		2,6-Dichlorophenol	87-65-0	[2] 0.013	[2] 0.34
		2,4,5-Trichlorophenol	95-95-4	[2] 0.016	[2] 8.2
		2,4,6-Trichlorophenol	88-06-2	[2] 0.039	[2] 7.6
		Tetrachlorophenols (Total)		[2] 0.018	[2] 0.68
		Pentachlorophenol	87-86-5	[2] 0.22	[2] 1.9
		Tetrachloroethene	79-01-6	[2] 0.006	[2] 1.7
		Hexachlorodibenzo-p-dioxins		[2] 0.001	[2] 0.001
		Hexachlorodibenzo-furans		[2] 0.001	[2] 0.001
		Pentachlorodibenzo-p-dioxins		[2] 0.001	[2] 0.001
		Pentachlorodibenzo-furans		[2] 0.001	[2] 0.001
		Tetrachlorodibenzo-p-dioxins		[2] 0.001	[2] 0.001
		Tetrachlorodibenzo-furans		[2] 0.001	[2] 0.001
K046	Table CCWE in 268.41	Lead	7439-92-1	0.037	NA
K048	Table CCWE in 268.41	Benzene	71-43-2	[2] 0.011	[2] 14
		Benzo(a)pyrene	50-32-8	[2] 0.047	[2] 12
		Bis(2-ethylhexyl)phthalate	117-81-7	[2] 0.043	[2] 7.3
		Chrysene	218-01-9	[2] 0.043	[2] 15
		Di-n-butyl phthalate	84-74-2	[2] 0.06	[2] 3.6
		Ethylbenzene	100-41-4	[2] 0.011	[2] 14
		Fluorene	86-73-7	[2] 0.05	NA
		Naphthalene	91-20-3	[2] 0.033	[2] 42
		Phenanthrene	85-01-8	[2] 0.039	[2] 34
		Phenol	108-95-2	[2] 0.047	[2] 3.6
		Pyrene	129-00-0	[2] 0.045	[2] 36
		Toluene	108-88-3	[2] 0.011	[2] 14
		Xylene(s)		[2] 0.011	[2] 22
		Cyanides (Total)	57-12-5	[2] 0.028	[2] 1.8
		Chromium (Total)	7440-47-32	0.2	NA
		Lead	7439-92-1	0.037	NA
K049	Table CCWE in 268.41	Anthracene	120-12-7	[2] 0.039	[2] 28
		Benzene	71-43-2	[2] 0.011	[2] 14
		Benzo(a)pyrene	50-32-8	[2] 0.047	[2] 12
		Bis(2-ethylhexyl)phthalate	117-81-7	[2] 0.043	[2] 7.3
		Carbon disulfide	75-15-0	[2] 0.011	NA
		Chrysene	2218-01-9	[2] 0.043	[2] 15
		2,4-Dimethylphenol	105-67-9	[2] 0.033	NA
		Ethylbenzene	100-41-4	[2] 0.011	[2] 14
		Naphthalene	91-20-3	[2] 0.033	[2] 42
		Phenanthrene	85-01-8	[2] 0.039	[2] 34
		Phenol	108-95-2	[2] 0.047	[2] 3.6
		Pyrene	129-00-0	[2] 0.045	[2] 36
		Toluene	108-88-3	[2] 0.011	[2] 14
		Xylene(s)		[2] 0.011	[2] 22
		Cyanides (Total)	57-12-5	[2] 0.028	[2] 1.8
		Chromium (Total)	7440-47-32	0.2	NA
		Lead	7439-92-1	0.037	NA
K050	Table CCWE in 268.41	Benzo(a)pyrene	50-32-8	[2] 0.047	[2] 12
		Phenol	108-95-2	[2] 0.047	[2] 3.6
		Cyanides (Total)	57-12-5	[2] 0.028	[2] 1.8
		Chromium (Total)	7440-47-32	0.2	NA
		Lead	7439-92-1	0.037	NA
K051	Table CCWE in 268.41	Acenaphthene	208-96-8	[2] 0.05	NA
		Anthracene	120-12-7	[2] 0.039	[2] 28
		Benzene	71-43-2	[2] 0.011	[2] 14
		Benzo(a)anthracene	50-32-8	[2] 0.043	[2] 20
		Benzo(a)pyrene	117-81-7	[2] 0.047	[2] 12
		Bis(2-ethylhexyl)phthalate	75-15-0	[2] 0.043	[2] 7.3
		Chrysene	2218-01-9	[2] 0.043	[2] 15
		Di-n-butyl phthalate	105-67-9	[2] 0.06	[2] 3.6
		Ethylbenzene	100-41-4	[2] 0.011	[2] 14
		Fluorene	86-73-7	[2] 0.05	[2] NA
		Naphthalene	91-20-3	[2] 0.033	[2] 42
		Phenanthrene	85-01-8	[2] 0.039	[2] 34
		Phenol	108-95-2	[2] 0.047	[2] 3.6
		Pyrene	129-00-0	[2] 0.045	[2] 36
		Toluene	108-88-3	[2] 0.011	[2] 14
		Xylene(s)		[2] 0.011	[2] 22
		Cyanides (Total)	57-12-5	[2] 0.028	[2] 1.8
		Chromium (Total)	7440-47-32	0.2	NA
		Lead	7439-92-1	0.037	NA
K052	Table CCWE in 268.41	Benzene	71-43-2	[2] 0.011	[2] 14
		Benzo(a)pyrene	50-32-8	[2] 0.047	[2] 12
		o-Cresol	95-48-7	[2] 0.011	[2] 6.2

TABLE CCW.—CONSTITUENT CONCENTRATIONS IN WASTES—Continued

Waste code	See also	Regulated hazardous constituent	CAS No. for regulated hazardous constituent	Wastewaters concentration (mg/l)	Non-wastewaters concentration (mg/kg)
		p-Cresol	106-44-5	●0.011	●6.2
		2,4-Dimethylphenol	105-67-9	●0.033	●NA
		Ethylbenzene	100-41-4	●0.011	●14
		Naphthalene	91-20-3	●0.033	●42
		Phenanthrene	85-01-8	●0.039	●34
		Phenol	108-95-2	●0.047	●3.6
		Toluene	108-88-3	●0.011	●14
		Xylenes		●0.011	●22
		Cyanides (Total)	57-12-5	●0.028	●1.8
		Chromium (Total)	7440-47-32	0.2	NA
		Lead	7439-92-1	0.037	NA
K060		Benzene	71-43-2	*,●0.17	●0.071
		Benzo(a)pyrene	50-32-8	*,●0.035	●3.6
		Naphthalene	91-20-3	*,●0.028	●3.4
		Phenol	108-95-2	*,●0.042	●3.4
		Cyanides (Total)	57-12-5	1.9	1.2
K061	Table CCWE in 268.41 and Table 2 in 268.42.	Cadmium	7440-43-9	1.61	NA
		Chromium (Total)	7440-47-32	0.32	NA
		Lead	7439-92-1	0.51	NA
		Nickel	7440-02-0	0.44	NA
K062	Table CCWE in 268.41	Chromium (Total)	7440-47-32	0.32	NA
		Lead	7439-92-1	0.04	NA
		Nickel	7440-02-0	0.44	NA
K069	Table CCWE in 268.41 and Table 2 in 268.42.	Cadmium	7440-43-9	1.6	NA
		Lead	7439-92-1	0.51	NA
K071	Table CCWE in 268.41	Mercury	7439-97-6	0.030	NA
K073		Carbon tetrachloride	56-23-5	*0.057	●6.2
		Chloroform	67-66-3	*0.046	●6.2
		Hexachloroethane	67-72-1	*0.055	●30
		Tetrachloroethene	127-18-4	*0.056	●6.2
		1,1,1-Trichloroethane	71-55-6	*0.054	●6.2
K083	Table CCWE in 268.41	Benzene	71-43-2	*0.14	●6.6
		Aniline	62-53-3	*0.81	●14
		Diphenylamine	22-39-4	*0.52	NA
		Diphenylnitrosamine	86-30-6	*0.40	NA
		Sum of Diphenylamine and Diphenylnitrosamine.		NA	●14
		Nitrobenzene	98-95-3	*0.068	●14
		Phenol	108-95-2	0.039	●5.6
		Cyclohexanone	108-94-1	0.36	●30
		Nickel	7440-02-0	0.47	NA
K084		Arsenic	7440-38-2	0.79	NA
K085		Benzene	71-43-2	*0.14	●4.4
		Chlorobenzene	108-90-7	*0.057	●4.4
		o-Dichlorobenzene	95-50-1	*0.088	●4.4
		m-Dichlorobenzene	541-73-1	*0.036	●4.4
		p-Dichlorobenzene	106-46-7	*0.090	●4.4
		1,2,4-Trichlorobenzene	120-82-1	*0.055	●4.4
		1,2,4,5-Tetrachlorobenzene	95-94-3	*0.055	●4.4
		Pentachlorobenzene	608-93-5	0.055	●4.4
		Hexachlorobenzene	118-74-1	*0.055	●4.4
		Aroclor 1016	12674-1, 2	*0.013	●0.92
		Aroclor 1221	11104-28-2	*0.014	●0.92
		Aroclor 1232	11141-16-5	*0.013	●0.92
		Aroclor 1242	53469-21-9	*0.017	●0.92
		Aroclor 1248	12672-29-6	*0.013	●0.92
		Aroclor 1254	11097-69-1	*0.014	●1.8
		Aroclor 1260	11096-82-5	*0.014	●1.8
K086	Table CCWE in 268.41	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
		Butylbenzylphthalate	85-68-7	*0.017	●7.9
		cyclohexanone	108-94-1	0.36	NA
		1,2-Dichlorobenzene	95-50-1	0.088	●6.2
		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	●6.0
		Methanol	67-56-1	*5.6	NA
		Methyl isobutyl ketone	108-10-1	0.14	●33
		Methyl ethyl ketone	78-93-3	0.28	●36
		Methylene chloride	75-09-2	*0.089	●33

TABLE CCW.—CONSTITUENT CONCENTRATIONS IN WASTES—Continued

Waste code	See also	Regulated hazardous constituent	CAS No. for regulated hazardous constituent	Wastewaters concentration (mg/l)	Non-wastewaters concentration (mg/kg)
		Naphthalene	91-20-3	[1] 0.059	[2] 3.1
		Nitrobenzene	98-95-3	[1] 0.068	[2] 14
		Toluene	108-88-3	[1] 0.080	[2] 28
		1,1,1-Trichloroethane	71-55-6	[1] 0.054	[2] 5.6
		Trichloroethylene	79-01-6	[1] 0.054	[2] 5.6
		Xylenes (Total)		[1] 0.32	[2] 28
		Cyanides (Total)	57-12-5	1.9	1.5
		Chromium (Total)	7440-47-32	0.32	NA
		Lead	7439-92-1	0.037	NA
K087	Table CCWE in 268.41	Acenaphthalene	208-96-8	[2] 0.028	3.4
		Benzene	71-43-2	[2] 0.014	[2] 0.071
		Chrysene	218-01-9	[2] 0.028	[2] 3.4
		Fluoranthene	206-44-0	[2] 0.028	[2] 3.4
		Indeno(1,2,3-cd)pyrene	193-39-5	[2] 0.028	[2] 3.4
		Naphthalene	91-20-3	[2] 0.028	[2] 3.4
		Phenanthrene	85-01-8	[2] 0.028	[2] 3.4
		Toluene	108-88-3	[2] 0.008	[2] 0.65
		Xylenes		[2] 0.014	[2] 0.07
		Lead	7439-92-1	0.037	NA
K093		Phthalic anhydride (measured as Phthalic acid).	85-44-9	[2] 0.54	[2] 28
K094		Phthalic anhydride (measured as Phthalic acid).	85-44-9	[2] 0.54	[2] 28
K095		1,1,1,2-Tetrachloroethane	630-20-6	0.057	[2] 5.6
		1,1,2,2-Tetrachloroethane	79-34-6	0.057	[2] 5.6
		Tetrachloroethene	127-18-4	0.056	[2] 6.0
		1,1,2-Trichloroethane	79-00-5	0.054	[2] 6.0
		Trichloroethylene	79-01-6	0.054	[2] 5.6
		Hexachloroethane	67-72-1	0.055	[2] 28
		Pentachloroethane	76-01-7	0.055	[2] 5.6
K096		1,1,1,2-Tetrachloroethane	630-20-6	0.057	[2] 5.6
		1,1,2,2-Tetrachloroethane	79-34-6	0.057	[2] 5.6
		Tetrachloroethene	127-18-4	0.056	[2] 6.0
		1,1,2-Trichloroethane	79-00-5	0.054	[2] 6.0
		Trichloroethene	79-01-6	0.054	[2] 5.6
		1,3-Dichlorobenzene	541-73-1	0.036	[2] 5.6
		Pentachloroethane	76-01-7	0.055	[2] 5.6
		1,2,4-Trichlorobenzene	120-82-1	0.055	[2] 19
K097		Hexachlorocyclopentadiene	77-47-4	[1] 0.057	2.4
		Chlordane	57-74-9	[1] 0.0033	[2] 0.26
		Heptachlor	76-44-8	[1] 0.0012	[2] 0.066
		Heptachlor epoxide	1024-57-3	[1] 0.016	[2] 0.066
K098		Toxaphene	8001-35-1	[1] 0.0095	[2] 2.6
K099		2,4-Dichlorophenoxyacetic acid	94-75-7	[2] 1	[2] 1
		Hexachlorodibenzo-p-dioxins		[2] 0.001	[2] 0.001
		Hexachlorodibenzofurans		[2] 0.001	[2] 0.001
		Pentachlorodibenzo-p-dioxins		[2] 0.001	[2] 0.001
		Pentachlorodibenzofurans		[2] 0.001	[2] 0.001
		Tetrachlorodibenzo-p-dioxins		[2] 0.001	[2] 0.001
		Tetrachlorodibenzofurans		[2] 0.001	[2] 0.001
K100	Table CCWE in 268.41	Cadmium	7440-43-9	1.6	NA
		Chromium (Total)	7440-47-32	0.32	NA
		Lead	7439-92-1	0.51	NA
K101		o-Nitroaniline		[2] 0.27	[2] 14
		Arsenic	7440-38-2	0.79	NA
		Cadmium	7440-43-9	0.24	NA
		Lead	7439-92-1	0.17	NA
		Mercury	7439-97-6	0.082	NA
K102	Table CCWE in 268.41	o-Nitrophenol		[2] 0.028	[2] 13
		Arsenic	7440-38-2	0.79	NA
		Cadmium	7440-43-9	0.24	NA
		Lead	7439-92-1	0.17	NA
		Mercury	7439-97-6	0.082	NA
K103		Aniline	62-53-3	[2] 4.5	5.6
		Benzene	71-43-2	[2] 0.15	[2] 6.0
		2,4-Dinitrophenol	51-28-5	[2] 0.61	[2] 5.6
		Nitrobenzene	98-95-3	[2] 0.07	[2] 5.6
		Phenol	108-95-2	[2] 1.4	[2] 5.6
K104		Aniline	62-53-3	[2] 4.5	[2] 5.6
		Benzene	71-43-2	[2] 0.15	[2] 6
		2,4-Dinitrophenol	51-28-5	[2] 0.61	5.6
		Nitrobenzene	98-95-3	[2] 0.073	[2] 5.6
		Phenol	108-95-2	[2] 1.4	[2] 5.6
		Cyanides (Total)	57-12-5	2.7	[2] 1.8
K105		Benzene	71-43-2	0.14	[2] 4.4
		Chlorobenzene	108-90-7	0.057	[2] 4.4
		o-Dichlorobenzene	95-50-1	0.088	[2] 4.4

TABLE CCW.—CONSTITUENT CONCENTRATIONS IN WASTES—Continued

Waste code	See also	Regulated hazardous constituent	CAS No. for regulated hazardous constituent	Wastewaters concentration (mg/l)	Non-wastewaters concentration (mg/kg)
		p-Dichlorobenzene	106-46-7	0.090	● 4.4
		2,4,5-Trichlorophenol	95-95-4	0.18	● 4.4
		2,4,6-Trichlorophenol	88-06-2	0.035	● 4.4
		2-Chlorophenol	95-57-8	0.044	● 4.4
		Phenol	108-95-2	0.039	● 4.4
K106	Table CCWE in 268.41 and Table 2 in 268.42.	Mercury	7439-97-6	0.030	NA
K115	Table CCWE in 268.41	Nickel	7440-02-0	0.47	NA

● Treatment standards for this organic constituent were established 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 certify compliance with these treatment standards according to provisions in 40 CFR Section 268.7.

* Based on analysis of composite samples.

As analyzed using SW-846 Method 9010; sample size: 0.5-10; distillation time: one hour to one hour and fifteen minutes.

NA—Not Applicable.

TABLE CCW.—CONSTITUENT CONCENTRATIONS IN WASTES

Waste code	Commercial chemical name	See also	Regulated hazardous constituent	CAS No. for regulated hazardous constituent	Wastewaters concentration (mg/l)	Non-wastewaters concentration (mg/kg)
P004	Aldrin		Aldrin	309-00-2	* 0.21	0.066
P010	Arsenic acid	Table CCWE in 268.41	Arsenic	7440-38-2	0.79	NA
P011	Arsenic pentoxide	Table CCWE in 268.41	Arsenic	7440-38-2	0.79	NA
P012	Arsenic trioxide	Table CCWE in 268.41	Arsenic	7440-38-2	0.79	NA
P013	Barium cyanide	Table CCWE in 268.41	Cyanides (Total)	57-12-5	1.9	110
			Cyanides (Amenable)	57-12-5	0.1	9.1
P020	2-sec-Butyl-4,6-dinitrophenol (Dinoseb)		2-sec-Butyl-4,6-dinitrophenol (Dinoseb)	88-85-7	0.066	● 2.5
P021	Calcium cyanide		Cyanides (Total)	57-12-5	1.9	110
			Cyanides (Amenable)	57-12-5	0.1	9.1
P022	Carbon disulfide	Table 2 in 268.42	Carbon disulfide	75-15-0	0.014	NA
P024	p-Chloroaniline		p-Chloroaniline	106-47-8	0.46	● 16
P029	Copper cyanide		Cyanides (Total)	57-12-5	1.9	110
			Cyanides (Amenable)	57-12-5	0.1	9.1
P030	Cyanides (soluble salts and complexes)		Cyanides (Total)	57-12-5	1.9	110
			Cyanides (Amenable)	57-12-5	0.1	9.1
P036	Dichlorophenylarsine	Table CCWE in 268.41	Arsenic	7440-38-2	0.79	NA
P037	Dieldrin		Dieldrin	60-57-1	* 0.017	● 0.13
P038	Diethylarsine	Table CCWE in 268.41	Arsenic	7740-38-2	0.79	NA
P039	Disulfoton		Disulfoton	298-04-4	0.017	● 0.1
P047	4,6-Dinitro-o-cresol		4,6-Dinitro-o-cresol	534-52-1	* 0.28	● 160
P048	2,4-Dinitrophenol		2,4-Dinitrophenol	51-28-5	* 0.12	● 160
P050	Endosulfan		Endosulfan I	939-98-8	* 0.023	● 0.066
			Endosulfan II	33213-6-5	* 0.029	● 0.13
			Endosulfan sulfate	1031-07-8	* 0.029	● 0.13
P051	Endrin		Endrin	72-20-8	* 0.0028	● 0.13
			Endrin aldehyde	7421-93-4	* 0.025	● 0.13
P056	Fluoride	Table 2 in 268.42	Fluoride	16964-48-8	35	NA
P059	Heptachlor		Heptachlor	76-44-8	* 0.0012	● 0.066
			Heptachlor epoxide	1024-57-3	* 0.016	● 0.066
P060	Isodrin		Isodrin	465-73-6	* 0.021	● 0.066
P063	Hydrogen cyanide		Cyanides (Total)	57-12-5	1.9	110
			Cyanides (Amenable)	57-12-5	0.10	9.1
P065	Mercury fulminate	Table CCWE in 268.41 and Table 2 in 268.42.	Mercury	7439-97-6	0.030	NA
P071	Methyl parathion		Methyl parathion	298-00-0	0.025	● 0.1
P073	Nickel carbonyl	Table CCWE in 268.41	Nickel	7440-02-0	0.44	NA
P074	Nickel cyanide	Table CCWE in 268.41	Cyanides (Table)	57-12-5	1.9	110
			Cyanides (Amenable)	57-12-5	0.10	9.1
			Nickel	7440-02-0	0.44	NA
P077	p-Nitroaniline		p-Nitroaniline	100-01-6	* 0.028	● 28
P082	N-Nitrosodimethylamine	Table 2 in 268.42	N-Nitrosodimethylamine	62-75-9	* 0.40	NA
P089	Parathion		Parathion	56-38-2	0.025	● 0.1
P092	Phenylmercury acetate	Table CCWE in 268.41 and Table 2 in 268.42.	Mercury	7439-97-6	0.030	NA
P094	Phorate		Phorate	298-02-2	0.025	● 0.1
P097	Famphur		Famphur	52-85-7	0.025	● 0.1
P098	Potassium cyanide		Cyanides (Total)	57-12-5	1.9	110
			Cyanides (Amenable)	57-12-5	0.10	9.1
P099	Potassium silver cyanide	Table CCWE in 268.41	Cyanides (Total)	57-12-5	1.9	110
			Cyanides (Amenable)	57-12-5	0.1	9.1
			Silver	7440-22-4	0.29	NA
P101	Ethyl cyanide (Propanenitrile)		Ethyl cyanide (Propanenitrile)	107-12-0	* 0.24	# 360
P103	Selenourea	Table CCWE in 268.41	Selenium	7782-49-2	* 1 0	NA

TABLE CCW.—CONSTITUENT CONCENTRATIONS IN WASTES—Continued

Waste code	Commercial chemical name	See also	Regulated hazardous constituent	CAS No. for regulated hazardous constituent	Wastewaters concentration (mg/l)	Non-wastewaters concentration (mg/kg)
P104	Silver cyanide	Table CCWE in 268.41	Cyanides (Total)	57-12-5	1.9	110
			Cyanides (Amenable)	57-12-5	0.10	9.1
			Silver	7440-22-4	0.29	NA
P106	Sodium cyanide		Cyanides (Total)	57-12-5	1.9	110
			Cyanides (Amenable)	57-12-5	0.10	9.1
P110	Tetraethyl lead	Table CCWE in 268.41 and Table 2 in 268.42	Lead	7439-92-1	0.040	NA
P113	Thallic oxide	Table 2 in 268.42	Thallium	7440-28-0	[a] 0.14	NA
P114	Thallium selenite	Table CCWE in 268.41	Selenium	7782-49-2	1.0	NA
P115	Thallium(I)sulfate	Table 2 in 268.42	Thallium	7440-28-0	[a] 0.14	NA
P119	Ammonia vanadate	Table 2 in 268.42	Vanadium	7440-62-2	[a] 28	NA
P120	Vanadium pentoxide	Table 2 in 268.42	Vanadium	7440-62-2	[a] 28	NA
P121	Zinc cyanide		Cyanides (Total)	57-12-5	1.9	110
			Cyanides (Amenable)	57-12-5	0.10	9.1
P123	Toxaphene		Toxaphene	8001-35-1	[a] 0.0095	[c] 1.3
U002	Acetone		Acetone	67-64-1	0.28	[c] 160
U003	Acetonitrile	Table 2 in 268.42	Acetonitrile	75-05-8	017	NA
U004	Acetophenone		Acetophenone	98-86-2	[c] 0.010	[c] 9.7
U005	2-Acetylaminofluorene		2-Acetylaminofluorene	53-96-3	[a] 0.059	[c] 140
U009	Acrylonitrile		Acrylonitrile	107-13-1	[a] 0.24	[c] 84
U012	Aniline		Aniline	62-53-3	0.81	[c] 14
U018	Benz(a)anthracene		Benz(a)anthracene	56-55-3	[a] 0.059	[c] 8.2
U019	Benzene		Benzene	71-43-2	[a] 0.14	[c] 36
U022	Benzo(a)pyrene		Benzo(a)pyrene	50-32-8	[a] 0.061	[c] 8.2
U024	Bis(2-chloroethoxy)methane		Bis(2-chloroethoxy)methane	111-91-1	0.036	[c] 7.2
U025	Bis(2-chloroethyl)ether		Bis(2-chloroethyl)ether	111-44-4	0.033	[c] 7.2
U027	Bis(2-chloroisopropyl) ether		Bis(2-chloroisopropyl) ether	39638-32-9	[a] 0.055	[c] 7.2
U028	Bis(2-ethylhexyl) phthalate		Bis(2-ethylhexyl) phthalate	117-81-7	[c] 0.54	[c] 28
U029	Bromomethane (Methyl bromide)		Bromomethane (Methyl bromide)	74-83-9	[a] 0.11	[c] 15
U030	4-Bromophenyl phenyl ether		4-Bromophenyl phenyl ether	101-55-3	[a] 0.055	[c] 15
U031	n-Butyl alcohol		n-Butyl alcohol	71-36-3	5.6	[c] 2.6
U032	Calcium chromate	Table CCWE in 268.41	Chromium (Total)	7440-47-32	0.32	NA
U036	Chlordane (alpha and gamma)		Chlordane (alpha and gamma)	57-74-9	[a] 0.0033	[c] 0.13
U037	Chlorobenzene		Chlorobenzene	108-90-7	[a] 0.057	[c] 5.7
U038	Chlorobenzilate	Table 2 in 268.42	Chlorobenzilate	510-15-6	[a] 0.10	NA
U039	p-Chloro-m-cresol		p-Chloro-m-cresol	59-50-7	[a] 0.018	[c] 14
U042	2-Chloroethyl vinyl	Table 2 in 268.42	2-Chloroethyl vinyl	110-75-8	0.057	NA
U043	Vinyl chloride		Vinyl chloride	75-01-4	[a] 0.27	[c] 33
U044	Chloroform		Chloroform	67-66-3	[a] 0.046	[c] 5.6
U045	Chloromethane (Methyl chloride)		Chloromethane (Methyl chloride)	74-87-3	[a] 0.19	[c] 33
U047	2-Chloronaphthalene		2-Chloronaphthalene	91-58-7	[a] 0.055	[c] 5.6
U048	2-Chlorophenol		2-Chlorophenol	95-57-8	[a] 0.044	[c] 5.7
U050	Chrysene		Chrysene	218-01-9	[a] 0.059	[c] 8.2
U051	Creosote	Table CCWE in 268.41	Naphthalene	91-20-3	[c] 0.031	[c] 1.5
			Pentachlorophenol	87-86-5	[c] 0.18	[c] 7.4
			Phenanthrene	85-01-8	[c] 0.031	[c] 1.5
			Pyrene	129-00-0	[c] 0.028	[c] 28
			Toluene	108-88-3	[c] 0.028	[c] 33
			Xylenes (Total)	7439-92-1	[c] 0.032	NA
			Lead		[c] 0.037	
U052	Cresols (Cresylic acid)		o-Cresol	95-48-7	[a] 0.11	[c] 5.6
			Cresols (m- and p- isomers)		[a] 0.77	[c] 3.2
U057	Cyclohexanone	Table 2 in 268.42	Cyclohexanone	108-94-1	0.36	NA
U060	DDD		o,p'-DDD	53-19-0	0.023	[c] 0.087
			p,p'-DDD	72-54-8	0.023	[c] 0.087
U061	DDT		o,p'-DDT	789-02-6	[a] 0.0039	[c] 0.087
			p,p'-DDT	50-29-3	[a] 0.0039	[c] 0.087
			o,p'-DDD	53-19-0	[a] 0.023	[c] 0.087
			p,p'-DDD	72-54-8	[a] 0.023	[c] 0.087
			o,p'-DDE	3424-82-6	[a] 0.031	[c] 0.087
			p,p'-DDE	72-55-9	[a] 0.031	[c] 0.087
U063	Dibenzo(a,h)anthracene		Dibenzo(a,h)anthracene	53-70-3	[a] 0.055	[c] 8.2
U066	1,2-Dibromo-3-chloropropane		1,2-Dibromo-3-chloropropane	96-12-8	[a] 0.11	[c] 15
U067	1,2-Dibromoethane (Ethylenedibromide)		1,2-Dibromoethane (Ethylene dibromide)	106-93-4	[a] 0.028	15
U068	Dibromomethane		Dibromomethane	74-95-3	[a] 0.11	15
U069	Di-n-butyl phthalate		Di-n-butyl phthalate	84-74-2	[c] 0.54	[c] 28
U070	o-Dichlorobenzene		o-Dichlorobenzene	95-50-1	[a] 0.088	[c] 6.2
U071	m-Dichlorobenzene		m-Dichlorobenzene	541-73-1	0.036	6.2
U072	p-Dichlorobenzene		p-Dichlorobenzene	104-46-7	[a] 0.090	[c] 6.2
U075	Dichlorodifluoromethane		Dichlorodifluoromethane	75-71-8	[a] 0.23	[c] 7.2
U076	1,1-Dichloroethane		1,1-Dichloroethane	75-34-3	[a] 0.059	7.2
U077	1,2-Dichloroethane		1,2-Dichloroethane	107-06-2	[a] 0.21	[c] 7.2
U078	1,1-Dichloroethylene		1,1-Dichloroethylene	75-35-4	[a] 0.025	[c] 33
U079	1,2-Dichloroethylene		trans-1,2-Dichloroethylene	156-60-5	[a] 0.054	[b] 33
U080	Methylene chloride		Methylene chloride	75-09-2	[d] 0.089	[b] 33
U081	2,4-Dichlorophenol		2,4-Dichlorophenol	120-83-2	[d] 0.044	[b] 14
U082	2,6-Dichlorophenol		2,6-Dichlorophenol	87-65-0	[d] 0.044	[b] 14

TABLE CCW.—CONSTITUENT CONCENTRATIONS IN WASTES—Continued

Waste code	Commercial chemical name	See also	Regulated hazardous constituent	CAS No. for regulated hazardous constituent	Wastewaters concentration (mg/l)	Non-wastewaters concentration (mg/kg)
U083	1,2-Dichloropropane		1,2-Dichloropropane	78-87-5	[2] 0.85	[1] 18
U084	1,3-Dichloropropene		cis-1,3-Dichloropropylene	10061-01-5	[2] 0.036	[1] 18
			trans-1,3-Dichloropropylene	10061-02-6	[2] 0.036	[1] 18
U088	Diethyl phthalate		Diethyl phthalate	84-66-2	[1] 0.54	[1] 28
U093	p-Dimethylaminoazobenzene	Table 2 in 268.42	p-Dimethylaminoazobenzene	60-11-7	[2] 0.13	NA
U101	2,4-Dimethylphenol		2,4-Dimethylphenol	105-67-9	[2] 0.036	[1] 14
U102	Dimethyl phthalate		Dimethyl phthalate	131-11-3	[1] 0.54	[1] 28
U105	2,4-Dinitrotoluene		2,4-Dinitrotoluene	121-14-2	[2] 0.32	[1] 140
U106	2,6-Dinitrotoluene		2,6-Dinitrotoluene	606-20-2	[2] 0.55	[1] 28
U107	Di-n-octyl phthalate		Di-n-octyl phthalate	117-84-0	[1] 0.54	[1] 28
U108	1,4-Dioxane		1,4-Dioxane	123-91-1	[2] 0.12	[1] 170
U111	Di-n-propylnitrosoamine		Di-n-propylnitrosoamine	621-64-7	[2] 0.40	[1] 14
U112	Ethyl acetate		Ethyl acetate	141-78-6	[2] 0.34	[1] 33
U117	Ethyl ether		Ethyl ether	60-29-7	[2] 0.12	[1] 160
U118	Ethyl methacrylate		Ethyl methacrylate	97-63-2	[2] 0.14	[1] 160
U120	Fluoranthene		Fluoranthene	206-44-0	[2] 0.068	[1] 8.2
U121	Trichloromonofluoromethane		Trichloromonofluoromethane	75-69-4	[2] 0.020	[1] 33
U127	Hexachlorobenzene		Hexachlorobenzene	118-74-1	[2] 0.055	[1] 37
U128	Hexachlorobutadiene		Hexachlorobutadiene	87-68-3	[2] 0.055	[1] 28
U129	Lindane		alpha-BHC	319-84-6	[2] 0.00014	[1] 0.066
			beta-BHC	319-85-7	0.00014	[1] 0.066
			Delta-BHC	319-86-8	0.023	[1] 0.066
			gamma-BHC (Lindane)	58-89-9	0.0017	[1] 0.066
U130	Hexachlorocyclopentadiene		Hexachlorocyclopentadiene	77-47-7	[2] 0.057	[1] 3.6
U131	Hexachloroethane		Hexachloroethane	67-72-1	[2] 0.055	[1] 28
U134	Hydrogen fluoride	Table 2 in 268.42	Fluoride	16964-48-8	35	NA
U136	Cacodylic acid	Table CCWE in 268.41	Arsenic	7440-38-2	0.79	NA
U137	Indeno(1,2,3-c,d)pyrene		Indeno(1,2,3-c,d)pyrene	193-39-5	[2] 0.0055	[1] 8.2
U138	Iodomethane		Iodomethane	74-88-4	[2] 0.19	[1] 65
U140	Isobutyl alcohol		Isobutyl alcohol	78-83-1	5.6	[1] 170
U141	Isosafrole		Isosafrole	120-58-1	0.081	[1] 2.6
U142	Kepone		Kepone	143-50-8	0.0011	[1] 0.13
U144	Lead acetate	Table CCWE in 268.41	Lead	7439-92-1	0.040	NA
U145	Lead phosphate	Table CCWE in 268.41	Lead	7439-92-1	0.040	NA
U146	Lead subacetate	Table CCWE in 268.41	Lead	7439-92-1	0.040	NA
U151	Mercury	Table CCWE in 268.41 and Table 2 in 268.42.	Mercury	7439-97-6	0.030	NA
U152	Methacrylonitrile		Methacrylonitrile	126-98-7	[2] 0.24	[1] 84
U155	Methapyrilene		Methapyrilene	91-80-5	0.081	[1] 1.5
U157	3-Methylcholanthrene		3-Methylcholanthrene	56-49-5	[2] 0.0055	[1] 15
U158	4,4'-Methylenebis(2-chloroaniline)		4,4'-Methylenebis(2-chloroaniline)	101-14-4	[2] 0.50	[1] 35
U159	Methyl ethyl ketone		Methyl ethyl ketone	78-93-3	0.28	[1] 36
U161	Methyl isobutyl ketone		Methyl isobutyl ketone	108-10-1	0.14	[1] 33
U162	Methyl methacrylate		Methyl methacrylate	80-62-6	0.14	[1] 160
U165	Naphthalene		Naphthalene	91-20-3	[2] 0.059	[1] 3.1
U168	2-Naphthylamine	Table 2 in 268.42	2-Naphthylamine	91-59-8	[2] 0.52	NA
U169	Nitrobenzene		Nitrobenzene	98-95-3	[2] 0.068	[1] 14
U170	4-Nitrophenol		4-Nitrophenol	100-02-7	[2] 0.12	[1] 29
U172	n-Nitrosodi-n-butylamine		n-Nitrosodi-n-butylamine	924-16-3	[2] 0.40	[1] 17
U174	N-Nitrosodiethylamine		n-Nitrosodiethylamine	55-18-5	[2] 0.40	[1] 28
U179	N-Nitrosopiperidine		n-Nitrosopiperidine	100-75-4	[2] 0.013	[1] 35
U180	N-Nitrosopyrrolidine		n-Nitrosopyrrolidine	930-55-2	[2] 0.013	[1] 35
U181	5-Nitro-o-toluidine		5-Nitro-o-toluidine	99-55-8	[2] 0.32	[1] 28
U183	Pentachlorobenzene		Pentachlorobenzene	608-93-5	[2] 0.055	[1] 37
U185	Pentachloronitrobenzene		Pentachloronitrobenzene	82-68-8	[2] 0.055	[1] 4.8
U187	Phenacetin		Phenacetin	62-44-2	0.081	[1] 16
U188	Phenol		Phenol	108-95-2	0.039	[1] 6.2
U190	Phthalic anhydride (measured as Phthalic acid).		Phthalic anhydride (measured as Phthalic acid).	85-44-9	[1] 0.54	[1] 28
U192	Pronamide		Pronamide	23950-58-5	0.093	[1] 1.5
U196	Pyridine		Pyridine	110-86-1	[2] 0.014	[1] 16
U203	Safrole		Safrole	94-59-7	0.081	[1] 22
U204	Selenium dioxide	Table CCWE in 268.41	Selenium	7782-49-2	1.0	NA
U205	Selenium sulfide	Table CCWE in 268.41	Selenium	7782-49-2	1.0	NA
U207	1,2,4,5-Tetrachlorobenzene		1,2,4,5-Tetrachlorobenzene	95-94-3	[2] 0.055	[1] 19
U208	1,1,1,2-Tetrachloroethane		1,1,1,2-Tetrachloroethane	630-20-6	0.057	[1] 42
U209	1,1,2,2-Tetrachloroethane		1,1,2,2-Tetrachloroethane	79-34-5	[2] 0.057	[1] 42
U210	Tetrachloroethylene		Tetrachloroethylene	127-18-4	[2] 0.056	[1] 5.6
U211	Carbon tetrachloride		Carbon tetrachloride	56-23-5	[2] 0.057	[1] 5.6
U214	Tallium(I)acetate	Table 2 in 268.42	Thallium	7440-28-0	[2] 0.14	NA
U215	Thallium(I)carbonate	Table 2 in 268.42	Thallium	7440-28-0	[2] 0.14	NA
U216	Thallium(I)chloride	Table 2 in 268.42	Thallium	7440-28-0	[2] 0.14	NA
U217	Thallium(I)nitrate	Table 2 in 268.42	Thallium	7440-28-0	[2] 0.14	NA
U220	Toluene		Toluene	108-88-3	[2] 0.080	[1] 28
U225	Tribromomethane (Bromoform)		Tribromomethane (Bromoform)	75-25-2	[2] 0.63	[1] 15
U226	1,1,1-Trichloroethane		1,1,1-Trichloroethane	71-55-6	[2] 0.054	[1] 5.6
U227	1,1,2-Trichloroethane		1,1,2-Trichloroethane	79-00-5	[2] 0.054	[1] 5.6

TABLE CCW.—CONSTITUENT CONCENTRATIONS IN WASTES—Continued

Waste code	Commercial chemical name	See also	Regulated hazardous constituent	CAS No. for regulated hazardous constituent	Wastewaters concentration (mg/l)	Non-wastewaters concentration (mg/kg)
U228	Trichloroethylene		Trichloroethylene	79-01-6	[2] 0.054	[1] 5.6
U235	tris-(2,3-Dibromopropyl)-phosphate		tris-(2,3-Dibromopropyl)-phosphate	126-72-7	0.025	[1] 0.10
U239	Xylenes		Xylenes		[2] 0.32	[1] 28
U240	2,4-Dichlorophenoxyacetic acid		2,4-Dichlorophenoxyacetic acid	94-75-7	0.72	[1] 10
U243	Hexachloropropene		Hexachloropropene	1888-71-7	[2] 0.035	28
U247	Methoxychlor		Methoxychlor	72-43-5	[2] 0.25	[1] 0.18

[1] Treatment standards for this organic constituent were established 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 certify compliance with these treatment standards according to provisions in 40 CFR Section 268.7.
[2] Based on analysis of composite samples.
[3] As analyzed using SW-846 Method 9010; sample size: 0.5-10; distillation time: one hour to one hour fifteen minutes.
NA—Not Applicable.

* * * * *

(c) Notwithstanding the prohibitions specified in paragraph (a) of this section, treatment and disposal facilities may demonstrate (and certify pursuant to § 268.7(b)(5)) compliance with the treatment standards for organic constituents specified in this section provided the following conditions are satisified:

(1) The treatment for the organic constituents were established based on incineration in units operated in accordance with the technical requirements of 40 CFR part 264, subpart O or 40 CFR part 265, subpart O, or based on combustion in fuel substitution units operating in accordance with applicable technical requirements;

(2) The organic constituents have been treated using the methods referenced in paragraph (c)(1) of this section; and

(3) The treatment or disposal facility has been unable to detect the organic constituents despite using its best good-faith efforts as defined by applicable Agency guidance or standards. Until such guidance or standards are developed, such good-faith efforts may be demonstrated where the treatment or disposal facility has detected the organic constituents at levels within an order of magnitude of the treatment standard specified in this section.

13. Appendix IV is added to part 268 to read as follows:

Appendix IV—Organometallic Lab Packs

Hazardous waste with the following EPA waste codes may be placed in an "organometallic" or "Appendix IV lab pack:"

P001, P002, P003, P004, P005, P006, P007, P008, P009, P013, P014, P015, P016, P017, P018, P020, P022, P023, P024, P025, P026, P027, P028, P031, P034, P036, P037, P038, P039, P040, P041, P042, P043, P044, P045, P047, P048, P049, P050, P051, P054, P056, P057, P058, P059, P060, P062, P063, P064, P065, P066, P067, P068, P069, P070, P071, P072, P073, P074, P075, P077, P081, P082, P084, P085, P087, P088, P089, P092, P093, P094, P095, P096, P097, P098, P099, P101, P102, P103, P104, P105, P108, P109, P110, P112, P113, P114, P115, P116, P118, P119, P120, P122, P123

U001, U002, U003, U004, U005, U006, U007, U008, U009, U010, U011, U012, U014, U015, U016, U017, U018, U019, U020, U021, U022, U023, U024, U025, U026, U027, U028, U029, U030, U031, U032, U033, U034, U035, U036, U037, U038, U039, U041, U042, U043, U044, U045, U046, U047, U048, U049, U050, U051, U052, U053, U055, U056, U057, U058, U059, U060, U061, U062, U063, U064, U066, U067, U068, U069, U070, U071, U072, U073, U074, U075, U076, U077, U078, U079, U080, U081, U082, U083, U084, U085, U086, U087, U088, U089, U090, U091, U092, U093, U094, U095, U096, U097, U098, U099, U101, U102, U103, U105, U106, U107, U108, U109, U110, U111, U112, U113, U114, U115, U116, U117, U118, U119, U120, U121, U122, U123, U124, U125, U126, U127, U128, U129, U130, U131, U132, U133, U134, U135, U136, U137, U136, U137, U138, U139, U140, U141, U142, U143, U144, U145, U146, U147, U148, U149, U150, U152, U154, U153, U154, U155, U156, U157, U158, U159, U160, U161, U162, U164, U165, U166, U167, U168 U169, U170, U171, U172, U173, U174, U176, U177, U178, U179, U180, U181, U182, U183, U184, U185, U186 U187, U188, U189, U190, U191, U192, U193, U194, U196, U197, U200, U201, U202, U203, U204, U205, U206, U207, U208, U209, U210, U211, U213, U214, U215, U216, U217, U218, U219, U220, U221, U222, U223, U225, U226, U227, U228, U234, U235, U236, U237, U238, U239, U240, U243, U244, U246, U247, U248, U249, U328, U353, U359

F001, F002, F003, F004, F005, F006, F010, F020, F021, F023, F024, F026, F027, F028

K001, K002, K008, K009, K010, K011, K013, K014, K015, K016, K017, K018, K019, K020, K021, K022, K023, K024, K025, K026, K027, K028, K029, K030, K031, K032, K033, K034, K035, K036, K037, K038, K039, K040, K041, K042, K043, K044, K045, K046, K047, K048, K049, K050, K051, K052, K054, K060, K061, K064, K065, K066, K069, K071, K073, K083, K084, K085, K086, K087, K093, K094, K095, K096, K097, K098, K099, K101, K102, K103, K104, K105, K111, K112, K113, K114, K115, K116, K117, K118, K123, K124, K125, K126, K136

D001, D002, D003, D004, D005, D006, D007, D008, D010, D011, D012, D013, D014, D015, D016, D017

U032, U136, U144, U145, U146, U163, U214, U215, U216, U217

14. Appendix V is added to part 268 to read as follows:

Appendix V—Organic Lab Packs

Hazardous wastes with the following EPA Hazardous Waste Code No. may be placed in an "organic" or "Appendix V:"

P001, P002, P003, P004, P005, P006, P007, P008, P009, P013, P014, P015, P016, P017, P018, P020, P022, P023, P025, P024, P026, P027, P028, P031, P034, P036, P037, P038, P039, P040, P041, P042, P043, P044, P045, P046, P047, P048, P049, P050, P051, P054, P057, P058, P059, P060, P062, P063, P064, P064, P065, P066, P067, P068, P069, P070, P071, P072, P073, P074, P075, P077, P081, P082, P084, P085, P087, P088, P089, P092, P093, P094, P095, P096, P097, P098, P099, P101, P102, P103, P104, P105, P108, P109, P110, P111, P112, P113, P114, P115, P116, P118, P119, P120, P122, P123

U001, U002, U003, U004, U005, U006, U007, U008, U009, U010, U011, U012, U014, U015, U016, U017, U018, U019, U020, U021, U022, U023, U024, U025, U026, U027, U028, U029, U030, U031, U033, U034, U035, U036, U037, U038,

U039, U041, U042, U043, U044, U045, U046, U047, U048, U049, U050, U051, U052, U053, U055, U056, U057, U058, U059, U060, U061, U062, U063, U064, U066, U067, U068, U069, U070, U071, U072, U073, U074, U075, U076, U077, U078, U079, U080, U081, U082, U083, U084, U085, U086, U087, U088, U089, U090, U091, U092, U093, U094, U095, U096, U097, U098, U099, U101, U102, U103, U105, U106, U107, U108, U109, U110, U111, U112, U113, U114, U115, U116, U117, U118, U119, U120, U121, U122, U123, U124, U125, U126, U127, U128, U129, U130, U131, U132, U133, U135, U137, U138, U139, U140, U141, U142, U143, U147, U148, U149, U150, U153, U154, U155, U156, U157, U158, U159, U160, U161, U162, U163, U164, U165, U166, U167, U168 U169, U170, U171, U172, U173, U174, U176, U177, U178, U179, U180, U181, U182, U183, U184, U185, U186 U187, U188, U189, U190, U191, U192, U193, U194, U196, U197, U200, U201, U202, U203, U205, U206, U207, U208, U209, U210, U211, U213, U214, U218, U219, U220, U221, U222, U223, U225, U226, U227, U228, U234, U235, U236, U237, U238, U239, U240, U243, U244, U246, U247, U248, U249, U328, U353, U359

F001, F002, F003, F004, F005, F010, F020, F021, F023, F024, F026, F027, F028

K001, K009, K010, K011, K013, K014, K015, K016, K017, K018, K019, K020, K021, K022, K023, K024, K025, K026, K027, K029, K030, K031, K032, K033, K034, K035, K036, K037, K038, K039, K040, K041, K042, K043, K044, K045, K046, K047, K048, K049, K050, K051, K052, K054, K060, K065, K073, K083, K084, K085, K086, K087, K093, K094, K095, K096, K097, K098, K099, K101, K102, K103, K104, K105, K111, K112, K113, K114, K115, K116, K117, K118, K123, K124, K125, K126, K136

D001, D012, D013, D014, D015, D016, D017

15. Appendix VI is added to part 268, to read as follows:

Appendix VI—Recommended Technologies to Achieve Deactivation of Characteristics in Section 268.42

The treatment standard for many subcategories of D001, D002, and D003 wastes as well as for K044, K045, and K047 wastes is listed in 268.42 simply as "Deactivation to remove the characteristics of ignitability, corrosivity, and reactivity". EPA has determined that many technologies, when used alone or in combination, can achieve this standard. The following appendix presents a partial list of these technologies, utilizing the five letter technology codes established in 40 CFR 268.42 Table 1. Use of these specific technologies is not mandatory and does not preclude direct reuse, recovery, and/or the use of other pretreatment technologies provided deactivation is achieved and these alternative methods are not performed in units designated as land disposal.

Waste code/subcategory	Nonwastewaters	Wastewaters
D001 Ignitable Liquids based on 261.21(a)(1)—Low TOC Nonwastewater Subcategory (containing 1% to <10% TOC).	RORGS	n.a.
	INCIN	
	WETOX	
	CHOXD	
	BIODG	
D001 Ignitable Liquids based on 261.21(a)(1)—Ignitable Wastewater Subcategory (containing <1% TOC)	n.a.	RORGS
		INCIN
		WETOX
		CHOXD
		BIODG
D001 Compressed Gases based on 261.21(A)(3)	RCGAS	n.a.
	INCIN	
	FSUBS	
	ADGAS fb. INCIN	
	ADGAS fb. (CHOXD; or CHRED)	
D001 Ignitable Reactives based on 261.21(a)(2)	WTRRX	n.a.
	CHOXD	
	CHRED	
	STABL	
	INCIN	
D001 Ignitable Oxidizers based on 261.21(a)(4)	CHRED	CHRED
	INCIN	INCIN
D002 Acid Subcategory based on 261.22(a)(1) with pH less than or equal to 2	RCORR	NEUTR
	NEUTR	INCIN
	INCIN	
D002 Alkaline Subcategory based on 261.22(a)(1) with pH greater than or equal to 12.5	NEUTR	NEUTR
	INCIN	INCIN
D002 Other Corrosives based on 261.22(a)(2)	CHOXD	CHOXD
	CHRED	CHRED
	INCIN	INCIN
	STABL	
D003 Water Reactives based on 261.23(a) (2), (3), and (4)	INCIN	n.a.
	WTRRX	
	CHOXD	
	CHRED	
D003 Reactive Sulfides based on 261.23(a)(5)	CHOXD	CHOXD
	CHRED	CHRED
	INCIN	BIODG
	STABL	INCIN
D003 Explosives based on 261.23(a) (6), (7), and (8)	INCIN	INCIN
	CHOXD	CHOXD
	CHRED	CHRED
		BIODG
		CARBN
D003 Other Reactives based on 261.23(a)(1)	INCIN	INCIN
	CHOXD	CHOXD
	CHRED	CHRED
		BIODG
		CARBN

Waste code/subcategory	Nonwastewaters	Wastewaters
K044 Wastewater treatment sludges from the manufacturing and processing of explosives	CHOXD	CHOXD
	CHRED	CHRED
	INCIN	BIODG
		CARBN
		INCIN
K045 Spent carbon from the treatment of wastewaters containing explosives	CHOXD	CHOXD
	CHRED	CHRED
	INCIN	BIODG
		CARBN
		INCIN
K047 Pink/red water from TNT operations	CHOXD	CHOXD
	CHRED	CHRED
	INCIN	BIODG
		CARBN
		INCIN

Note: "n.a." stands for "not applicable"; "fb." stands for "followed by".

16. Appendix VII is added to part 268, to read as follows:

APPENDIX VII.—EFFECTIVE DATES OF SURFACE DISPOSED WASTES REGULATED IN THE LDRs [a]

[Comprehensive List]

Waste code	Waste category	Effective date
California list ...	Liquid hazardous wastes, including free liquids associated with solid or sludge, containing free cyanides at concentrations greater than or equal to 1,000 mg/l or certain metals or compounds of these metals greater than or equal to the prohibition levels.	July 8, 1987.
California list ...	Liquid (aqueous) hazardous wastes having a pH less than or equal to 2.	July 8, 1987.
California list ...	Dilute HOC wastewaters, defined as HOC-waste mixtures that are primarily water and that contain greater than or equal to 1,000 mg/l but less than 10,000 mg/l.	July 8, 1987.
California list ...	Liquid hazardous waste containing PCBs greater than or equal to 50 ppm.	July 8, 1987.
California list ...	Other liquid and non-liquid hazardous wastes containing HOCs in total concentration greater than or equal to 1,000 mg.	Nov. 8, 1988.
California list ...	Soil and debris HOCs not from CERCLA/RCRA corrective actions.	July 8, 1989.
California list ...	Soil and debris HOCs from CERCLA/RCRA corrective actions.	Nov. 8, 1990.
D001	All	Aug. 8, 1990.
D002	All	Aug. 8, 1990.
D003	All	Aug. 8, 1990.
D004	Inorganic solid debris.	May 8, 1992.
D004	Nonwastewater ...	May 8, 1992.
D004	Wastewater	Aug. 8, 1990.
D005	Inorganic solid debris.	May 8, 1992.
D005	All others	Aug. 8, 1990.
D006	Inorganic solid debris.	May 8, 1992.
D006	All others	Aug. 8, 1990.
D007	Inorganic solid debris.	May 8, 1992.
D007	All others	Aug. 8, 1990.
D008	Inorganic solid debris.	May 8, 1992.
D008	Lead acid batteries.	May 8, 1992.
D008	All others	Aug. 8, 1990.
D009	Inorganic solid debris.	May 8, 1992.
D009	High mercury non-wastewater.	May 8, 1992.
D009	Low mercury non-wastewater.	May 8, 1992.
D009	All others	Aug. 8, 1990.
D010	Inorganic solid debris.	May 8, 1992.
D010	All others	Aug. 8, 1990.
D011	Inorganic solid debris.	May 8, 1992.
D011	All others	Aug. 8, 1990.
D012	All	Aug. 8, 1990.
D013	All	Aug. 8, 1990.
D0014	All	Aug. 8, 1990.
D0015	All	Aug. 8, 1990.
D0016	All	Aug. 8, 1990.
D0017	All	Aug. 8, 1990.
F001–F005	All, except:	Nov. 8, 1986.
F001–F005	Small quantity generators, CERCLA/RCRA corrective action, initial generator's solvent-water mixtures, solvent-containing sludges and solids, and non CERCLA/RCRA corrective action soils with less than 1 percent total solvent constituents.	Nov. 8, 1988.
F001–F005	Soil and debris	Nov. 8, 1990.
F002 [b]	All	Aug. 8, 1990.
F005 [c]	All	Aug. 8, 1990.
F006	Wastewater	Aug. 8, 1990.
F006	Nonwastewater ...	Aug. 8, 1988.
F006 (cyanides).	Nonwastewater ...	July 8, 1989.
F007	All	July 8, 1989.
F008	All	July 8, 1989.
F009	All	July 8, 1989.
F010	Soil and debris	June 8, 1991.
F010	All others	June 8, 1989.
F011	All	July 8, 1989.
F012	All	July 8, 1989.
F019	All	Aug. 8, 1990.
F020	Soil and debris	Nov. 8, 1990.
F020	All others	Nov. 8, 1988.
F021	Soil and debris	Nov. 8, 1990.

APPENDIX VII.—EFFECTIVE DATES OF SURFACE DISPOSED WASTES REGULATED IN THE LDRs [a]—Continued

[Comprehensive List]

Waste code	Waste category	Effective date
F021	All others	Nov. 8, 1988.
F022	Soil and debris	Nov. 8, 1990.
F022	All others	Nov. 8, 1988.
F023	Soil and debris	Nov. 8, 1990.
F023	All others	Nov. 8, 1988.
F024	Soil and debris	June 8, 1991.
F024 (metals)	Nonwastewater	Aug. 8, 1990.
F024 (dioxins/furans)	All	Aug. 8, 1990.
F024	All others	June 8, 1989.
F025	All	Aug. 8, 1990.
F026	Soil and debris	Nov. 8, 1990.
F026	All others	Nov. 8, 1988.
F027	Soil and debris	Nov. 8, 1990.
F027	All others	Nov. 8, 1988.
F028	Soil and debris	Nov. 8, 1990.
F028	All others	Nov. 8, 1988.
F039	Wastewater	Aug. 8, 1990.
F039	Nonwastewater	May. 8, 1992.
K001	Soil and debris	Aug. 8, 1990.
K001 (lead/organics)	All	Aug. 8, 1990.
K001	All others	Aug. 8, 1988.
K002	All	Aug. 8, 1990.
K003	All	Aug. 8, 1990.
K004	All	Aug. 8, 1990.
K005 [d]	All	Aug. 8, 1990.
K006	All	Aug. 8, 1990.
K007 [d]	All	Aug. 8, 1990.
K008	All	Aug. 8, 1990.
K009	Soil and debris	June 8, 1991.
K009	All others	June 8, 1989.
K010	Soil and debris	June 8, 1991.
K010	All others	June 8, 1989.
K011	Wastewater	Aug. 8, 1990.
K011	Nonwastewater	June 8, 1989.
K011	Soil and debris	June 8, 1991.
K013	Wastewater	Aug. 8, 1990.
K013	Nonwastewater	June 8, 1989.
K013	Soil and debris	June 8, 1991.
K014	Wastewater	Aug. 8, 1990.
K014	Nonwastewater	June 8, 1989.
K014	Soil and debris	June 8, 1991.
K015	Wastewater	Aug. 8, 1988.
K015	Nonwastewater	Aug. 8, 1990.
K016	Soil and debris	Aug. 8, 1990.
K016	All others	Aug. 8, 1988.
K017	All	Aug. 8, 1990.
K018	Soil and debris	Aug. 8, 1990.
K018	All others	Aug. 8, 1988.
K019	Soil and debris	Aug. 8, 1990.
K019	All others	Aug. 8, 1988.
K020	Soil and debris	Aug. 8, 1990.
K020	All others	Aug. 8, 1988.
K021 [e]	All	Aug. 8, 1990.
K022	Wastewater	Aug. 8, 1990.
K022	Nonwastewater	Aug. 8, 1988.
K022	Soil and debris	Aug. 8, 1990.
K023	Soil and debris	June 8, 1991.
K023	All others	June 8, 1989.
K024	Soil and debris	Aug. 8, 1990.
K024	All others	Aug. 8, 1988.
K025 [e]	All	Aug. 8, 1990.
K026	All	Aug. 8, 1990.
K027	Soil and debris	June 8, 1991.
K027	All others	June 8, 1989.
K028	Soil and debris	June 8, 1991.
K028 (metals)	Nonwastewater	Aug. 8, 1990.
K028	All others	June 8, 1989.
K029	Wastewater	Aug. 8, 1990.
K029	Nonwastewater	June 8, 1989.
K029	Soil and debris	June 8, 1991.
K030	Soil and debris	Aug. 8, 1990.

APPENDIX VII.—EFFECTIVE DATES OF SURFACE DISPOSED WASTES REGULATED IN THE LDRs [a]—Continued

[Comprehensive List]

Waste code	Waste category	Effective date
K030	All others	Aug. 8, 1988.
K031	Wastewater	Aug. 8, 1990.
K031	Nonwastewater	May 8, 1992.
K032	All	Aug. 8, 1990.
K033	All	Aug. 8, 1990.
K034	All	Aug. 8, 1990.
K035	All	Aug. 8, 1990.
K036 [e]	All	Aug. 8, 1990.
K037	Soil and debris	Aug. 8, 1990.
K037	Wastewater	Aug. 8, 1990.
K037	All others	Aug. 8, 1988.
K038	Soil and debris	June 8, 1991.
K038	All others	June 8, 1989.
K039	Soil and debris	June 8, 1991.
K039	All others	June 8, 1989.
K040	Soil and debris	June 8, 1991.
K040	All others	June 8, 1989.
K041	All	Aug. 8, 1990.
K042	All	Aug. 8, 1990.
K043	Soil and debris	June 8, 1991.
K043	All others	June 8, 1989.
K044	All	Aug. 8, 1990.
K045	All	Aug. 8, 1990.
K046	Nonreactive nonwastewater	Aug. 8, 1988.
K046	All others	Aug. 8, 1990.
K047	All	Aug. 8, 1990.
K048	Wastewater	Aug. 8, 1990.
K048	Nonwastewater	Nov. 8, 1990.
K049	Wastewater	Aug. 8, 1990.
K049	Nonwastewater	Nov. 8, 1990.
K050	Wastewater	Aug. 8, 1990.
K050	Nonwastewater	Nov. 8, 1990.
K051	Wastewater	Aug. 8, 1990.
K051	Nonwastewater	Nov. 8, 1990.
K052	Wastewater	Aug. 8, 1990.
K052	Nonwastewater	Nov. 8, 1990.
K060 [e]	All	Aug. 8, 1990.
K061	Wastewater	Aug. 8, 1990.
K061	Nonwastewater	Aug. 8, 1988.
K062	All	Aug. 8, 1988.
K069	All	Aug. 8, 1990.
K073	All	Aug. 8, 1990.
K083	All	Aug. 8, 1990.
K084	Wastewater	Aug. 8, 1990.
K084	Nonwastewater	May 8, 1992.
K085	All	Aug. 8, 1990.
K086	All	Aug. 8, 1990.
K087	Soil and debris	Aug. 8, 1990.
K087	All others	Aug. 8, 1988.
K093	Soil and debris	June 8, 1991.
K093	All others	June 8, 1989.
K094	Soil and debris	June 8, 1991.
K094	All others	June 8, 1989.
K095	Wastewater	Aug. 8, 1990.
K095	Nonwastewater	June 8, 1989.
K095	Soil and debris	June 8, 1991.
K096	Wastewater	Aug. 8, 1990.
K096	Nonwastewater	June 8, 1989.
K096	Soil and debris	June 8, 1991.
K097	All	Aug. 8, 1990.
K098	All	Aug. 8, 1990.
K099	All	Aug. 8, 1988.
K100 [e]	All	Aug. 8, 1990.
K101	Wastewater	Aug. 8, 1988.
K101	Nonwastewater	May 8, 1992.
K102	Wastewater	Aug. 8, 1988.
K102	Nonwastewater	May 8, 1992.
K103	Soil and debris	Aug. 8, 1990.
K103	All others	Aug. 8, 1988.
K104	Soil and debris	Aug. 8, 1990.
K104	All others	Aug. 8, 1988.
K105	All	Aug. 8, 1990.

APPENDIX VII.—EFFECTIVE DATES OF SURFACE DISPOSED WASTES REGULATED IN THE LDRs [a]—Continued

[Comprehensive List]

Waste code	Waste category	Effective date
K106	High mercury nonwastewater	May 8, 1992.
K106	Low mercury nonwastewater	May. 8, 1992.
K106	All others	Aug. 8, 1990.
K113	Soil and debris	June 8, 1991.
K113	All others	June 8, 1989.
K114	Soil and debris	June 8, 1991.
K114	All others	June 8, 1989.
K115	Soil and debris	June 8, 1991.
K115	All others	June 8, 1989.
K116	Soil and debris	June 8, 1991.
K116	All others	June 8, 1989.
P001	All	Aug. 8, 1990.
P002	All	Aug. 8, 1990.
P003	All	Aug. 8, 1990.
P004	All	Aug. 8, 1990.
P005	All	Aug. 8, 1990.
P006	All	Aug. 8, 1990.
P007	All	Aug. 8, 1990.
P008	All	Aug. 8, 1990.
P009	All	Aug. 8, 1990.
P010	Wastewater	Aug. 8, 1990.
P010	Nonwastewater	May 8, 1992.
P011	Wastewater	Aug. 8, 1990.
P011	Nonwastewater	May 8, 1992.
P012	Wastewater	Aug. 8, 1990.
P012	Nonwastewater	May 8, 1992.
P013	All	Aug. 8, 1990.
P014	All	Aug. 8, 1990.
P015	All	Aug. 8, 1990.
P016	All	Aug. 8, 1990.
P017	All	Aug. 8, 1990.
P018	All	Aug. 8, 1990.
P020	All	Aug. 8, 1990.
P021	All	June 8, 1989.
P022	All	Aug. 8, 1990.
P023	All	Aug. 8, 1990.
P024	All	Aug. 8, 1990.
P026	All	Aug. 8, 1990.
P027	All	Aug. 8, 1990.
P028	All	Aug. 8, 1990.
P029	All	June 8, 1989.
P030	All	June 8, 1989.
P031	All	Aug. 8, 1990.
P033	All	Aug. 8, 1990.
P034	All	Aug. 8, 1990.
P036	Wastewater	Aug. 8, 1990.
P036	Nonwastewater	May 8, 1992.
P037	All	Aug. 8, 1990.
P038	Wastewater	Aug. 8, 1990.
P038	Nonwastewater	May 8, 1992.
P039	Soil and debris	June 8, 1991.
P039	All others	June 8, 1989.
P040	Soil and debris	June 8, 1991.
P040	All others	June 8, 1989.
P041	Soil and debris	June 8, 1991.
P041	All others	June 8, 1989.
P042	All	Aug. 8, 1990.
P043	Soil and debris	June 8, 1991.
P043	All others	June 8, 1989.
P044	Soil and debris	June 8, 1991.
P044	All others	June 8, 1989.
P045	All	Aug. 8, 1990.
P046	All	Aug. 8, 1990.
P047	All	Aug. 8, 1990.
P048	All	Aug. 8, 1990.
P049	All	Aug. 8, 1990.
P050	All	Aug. 8, 1990.
P051	All	Aug. 8, 1990.
P054	All	Aug. 8, 1990.
P056	All	Aug. 8, 1990.
P057	All	Aug. 8, 1990.

APPENDIX VII.—EFFECTIVE DATES OF SURFACE DISPOSED WASTES REGULATED IN THE LDRS [a]—Continued

[Comprehensive List]

Waste code	Waste category	Effective date
P058	All	Aug. 8, 1990.
P059	All	Aug. 8, 1990.
P060	All	Aug. 8, 1990.
P062	Soil and debris	June 8, 1991.
P062	All others	June 8, 1989.
P063	All	June 8, 1989.
P064	All	Aug. 8, 1990.
P065	High mercury non-wastewater.	May 8, 1992.
P065	Low mercury non-wastewater.	May 8, 1992.
P065	All others	Aug. 8, 1990.
P066	All	Aug. 8, 1990.
P067	All	Aug. 8, 1990.
P068	All	Aug. 8, 1990.
P069	All	Aug. 8, 1990.
P070	All	Aug. 8, 1990.
P071	Soil and debris	June 8, 1991.
P071	All others	June 8, 1989.
P072	All	Aug. 8, 1990.
P073	All	Aug. 8, 1990.
P074	All	June 8, 1989.
P075	All	Aug. 8, 1990.
P076	All	Aug. 8, 1990.
P077	All	Aug. 8, 1990.
P078	All	Aug. 8, 1990.
P081	All	Aug. 8, 1990.
P082	All	Aug. 8, 1990.
P084	All	Aug. 8, 1990.
P085	Soil and debris	June 8, 1991.
P085	All others	June 8, 1989.
P087	All	May 8, 1992.
P088	All	Aug. 8, 1990.
P089	Soil and debris	June 8, 1991.
P089	All others	June 8, 1989.
P092	High mercury non-wastewater	May 8, 1992.
P092	Low mercury non-wastewater	May 8, 1992.
P092	All others	Aug. 8, 1990.
P093	Soil and debris	May 8, 1992.
P093	All others	Aug. 8, 1990.
P094	Soil and debris	June 8, 1991.
P094	All others	June 8, 1989.
P095	Soil and debris	May 8, 1992.
P095	All others	Aug. 8, 1990.
P096	All	Aug. 8, 1990.
P097	Soil and debris	June 8, 1991.
P097	All others	June 8, 1989.
P098	All	June 8, 1989.
P099 (silver)	Wastewater	Aug. 8, 1990.
P099 (cyanides).	Wastewater	June 8, 1989.
P099 (cyanides/silver).	Nonwastewater	June 8, 1989.
P101	All	Aug. 8, 1990.
P102	All	Aug. 8, 1990.
P103	All	Aug. 8, 1990.
P104 (silver)	Wastewater	Aug. 8, 1990.
P104 (cyanides).	Wastewater	June 8, 1989.
P104 (cyanides/silver).	Nonwastewater	June 8, 1989.
P105	All	Aug. 8, 1990.
P106	All	June 8, 1989.
P108	Soil and debris	May 8, 1992.
P108	All others	Aug. 8, 1990.
P109	Soil and debris	June 8, 1991
P109	All others	June 8, 1989.

APPENDIX VII.—EFFECTIVE DATES OF SURFACE DISPOSED WASTES REGULATED IN THE LDRS [a]—Continued

[Comprehensive List]

Waste code	Waste category	Effective date
P110	All	Aug. 8, 1990.
P111	Soil and debris	June 8, 1991.
P111	All others	June 8, 1989.
P112	All	Aug. 8, 1990.
P113	All	Aug. 8, 1990.
P114	All	Aug. 8, 1990.
P115	All	Aug. 8, 1990.
P116	Soil and debris	May 8, 1992.
P116	All others	Aug. 8, 1990.
P118	Soil and debris	May 8, 1992.
P118	All others	Aug. 8, 1990.
P119	All	Aug. 8, 1990.
P120	All	Aug. 8, 1990.
P121	All	June 8, 1989.
P122	All	Aug. 8, 1990.
P123	All	Aug. 8, 1990.
U001	All	Aug. 8, 1990.
U002	All	Aug. 8, 1990.
U003	Soil and debris	May 8, 1992.
U003	All others	Aug. 8, 1990.
U004	All	Aug. 8, 1990.
U005	All	Aug. 8, 1990.
U006	Soil and debris	May 8, 1992.
U006	All others	Aug. 8, 1990.
U007	Soil and debris	May 8, 1992.
U007	All others	Aug. 8, 1990.
U008	All	Aug. 8, 1990.
U009	All	Aug. 8, 1990.
U010	Soil and debris	May 8, 1992.
U010	All others	Aug. 8, 1990.
U011	Soil and debris	May 8, 1992.
U011	All others	Aug. 8, 1990.
U012	All	Aug. 8, 1990.
U014	Soil and debris	May 8, 1992.
U014	All others	Aug. 8, 1990.
U015	Soil and debris	May 8, 1992.
U015	All others	Aug. 8, 1990.
U016	All	Aug. 8, 1990.
U017	Soil and debris	May 8, 1992.
U017	All others	Aug. 8, 1990.
U018	All	Aug. 8, 1990.
U019	All	Aug. 8, 1990.
U020	Soil and debris	May 8, 1992.
U020	All others	Aug. 8, 1990.
U021	Soil and debris	May 8, 1992.
U021	All others	Aug. 8, 1990.
U022	All	Aug. 8, 1990.
U023	All	Aug. 8, 1990.
U024	All	Aug. 8, 1990.
U025	All	Aug. 8, 1990.
U026	Soil and debris	May 8, 1992.
U026	All others	Aug. 8, 1990.
U027	All	Aug. 8, 1990.
U028	Soil and debris	June 8, 1991.
U028	All others	June 8, 1989.
U029	All	Aug. 8, 1990.
U030	All	Aug. 8, 1990.
U031	All	Aug. 8, 1990.
U032	All	Aug. 8, 1990.
U033	Soil and debris	May 8, 1992.
U033	All others	Aug. 8, 1990.
U034	Soil and debris	May 8, 1992.
U034	All others	Aug. 8, 1990.
U035	Soil and debris	May 8, 1992.
U035	All others	Aug. 8, 1990.
U036	All	Aug. 8, 1990.
U037	All	Aug. 8, 1990.
U038	Soil and debris	May 8, 1992.
U038	All others	Aug. 8, 1990.
U039	All	Aug. 8, 1990.
U041	Soil and debris	May 8, 1992.
U041	All others	Aug. 8, 1990.
U042	Soil and debris	May 8, 1992.
U042	All others	Aug. 8, 1990.
U043	All	Aug. 8, 1990.

APPENDIX VII.—EFFECTIVE DATES OF SURFACE DISPOSED WASTES REGULATED IN THE LDRS [a]—Continued

[Comprehensive List]

Waste code	Waste category	Effective date
U044	All	Aug. 8, 1990.
U045	All	Aug. 8, 1990.
U046	Soil and debris	May 8, 1992.
U046	All others	Aug. 8, 1990.
U047	All	Aug. 8, 1990.
U048	All	Aug. 8, 1990.
U049	Soil and debris	May 8, 1992.
U049	All others	Aug. 8, 1990.
U050	All	Aug. 8, 1990.
U051	All	Aug. 8, 1990.
U052	All	Aug. 8, 1990.
U053	All	Aug. 8, 1990.
U055	All	Aug. 8, 1990.
U056	All	Aug. 8, 1990.
U057	All	Aug. 8, 1990.
U058	Soil and debris	June 8, 1992.
U058	All others	June 8, 1989.
U059	Soil and debris	May 8, 1992.
U059	All others	Aug. 8, 1990.
U060	Soil and debris	May 8, 1992.
U060	All others	Aug. 8, 1990.
U061	Soil and debris	May 8, 1992.
U061	All others	Aug. 8, 1990.
U062	Soil and debris	May 8, 1992.
U062	All others	Aug. 8, 1990.
U063	All	Aug. 8, 1990.
U064	All	Aug. 8, 1990.
U066	All	Aug. 8, 1990.
U067	All	Aug. 8, 1990.
U068	All	Aug. 8, 1990.
U069	Soil and debris	June 8, 1991.
U069	All others	June 8, 1989.
U070	All	Aug. 8, 1990.
U071	All	Aug. 8, 1990.
U072	All	Aug. 8, 1990.
U073	Soil and debris	May 8, 1992.
U073	All others	Aug. 8, 1990.
U074	Soil and debris	May 8, 1992.
U074	All others	Aug. 8, 1990.
U075	All	Aug. 8, 1990.
U076	All	Aug. 8, 1990.
U077	All	Aug. 8, 1990.
U078	All	Aug. 8, 1990.
U079	All	Aug. 8, 1990.
U080	All	Aug. 8, 1990.
U081	All	Aug. 8, 1990.
U082	All	Aug. 8, 1990.
U083	All	Aug. 8, 1990.
U084	All	Aug. 8, 1990.
U085	All	Aug. 8, 1990.
U086	All	Aug. 8, 1990.
U087	Soil and debris	June 8, 1991.
U087	All others	June 8, 1989.
U088	Soil and debris	June 8, 1991
U088	All others	June 8, 1989.
U089	All	Aug. 8, 1990.
U090	All	Aug. 8, 1990.
U091	Soil and Debris	May 8, 1992.
U091	All others	Aug. 8, 1990.
U092	Soil and debris	May 8, 1992.
U092	All others	Aug. 8, 1990.
U093	Soil and debris	May 8, 1992.
U093	All others	Aug. 8, 1990.
U094	All	Aug. 8, 1990.
U095	Soil and debris	May 8, 1992.
U095	All others	Aug. 8, 1990.
U096	All	Aug. 8, 1990.
U097	Soil and debris	May 8, 1992.
U097	All others	Aug. 8, 1990.
U098	All	Aug. 8, 1990.
U099	All	Aug. 8, 1990.
U101	All	Aug. 8, 1990.
U102	Soil and debris	June 8, 1991
U102	All others	June 8, 1989.
U103	All	Aug. 8, 1990.

APPENDIX VII.—EFFECTIVE DATES OF SURFACE DISPOSED WASTES REGULATED IN THE LDRS [a]—Continued

[Comprehensive List]

Waste code	Waste category	Effective date
U105	All	Aug. 8, 1990.
U106	All	Aug. 8, 1990.
U107	Soil and debris	June 8, 1991.
U107	All others	June 8, 1989.
U108	All	Aug. 8, 1990.
U109	All	Aug. 8, 1990.
U110	Soil and debris	May 8, 1992.
U110	All others	Aug. 8, 1990.
U111	All	Aug. 8, 1990.
U112	All	Aug. 8, 1990.
U113	All	Aug. 8, 1990.
U114	Soil and debris	May 8, 1992.
U114	All others	Aug. 8, 1990.
U115	All	Aug. 8, 1990.
U116	Soil and debris	May 8, 1992.
U116	All others	Aug. 8, 1990.
U117	All	Aug. 8, 1990.
U118	All	Aug. 8, 1990.
U119	Soil and debris	May 8, 1992.
U119	All others	Aug. 8, 1990.
U120	All	Aug. 8, 1990.
U121	All	Aug. 8, 1990.
U122	All	Aug. 8, 1990.
U123	All	Aug. 8, 1990.
U124	All	Aug. 8, 1990.
U125	All	Aug. 8, 1990.
U126	All	Aug. 8, 1990.
U127	All	Aug. 8, 1990.
U128	All	Aug. 8, 1990.
U129	All	Aug. 8, 1990.
U130	Soil and debris	May 8, 1992.
U130	All others	Aug. 8, 1990.
U131	All	Aug. 8, 1990.
U132	Soil and debris	May 8, 1992.
U132	All others	Aug. 8, 1990.
U133	All	Aug. 8, 1990.
U134	All	Aug. 8, 1990.
U135	All	Aug. 8, 1990.
U136	Wastewater	Aug. 8, 1990.
U136	Nonwastewater	May 8, 1992.
U137	All	Aug. 8, 1990.
U138	All	Aug. 8, 1990.
U140	All	Aug. 8, 1990.
U141	All	Aug. 8, 1990.
U142	All	Aug. 8, 1990.
U143	Soil and debris	May 8, 1992.
U143	All others	Aug. 8, 1990.
U144	All	Aug. 8, 1990.
U145	All	Aug. 8, 1990.
U146	All	Aug. 8, 1990.
U147	All	Aug. 8, 1990.
U148	Soil and debris	May 8, 1992.
U148	All others	Aug. 8, 1990.
U149	Soil and debris	May 8, 1992.
U149	All others	Aug. 8, 1990.
U150	Soil and debris	May 8, 1992.
U150	All others	Aug. 8, 1990.
U151	High mercury non-wastewater.	May 8, 1992.
U151	Low mercury non-wastewater.	May 8, 1992.
U151	Soil and debris	May 8, 1992.
U151	All others	Aug. 8, 1990.
U152	All	Aug. 8, 1990.
U153	Soil and debris	May 8, 1992.
U153	All others	Aug. 8, 1990.
U154	All	Aug. 8, 1990.
U155	All	Aug. 8, 1990.
U156	Soil and debris	May 8, 1992.
U156	All others	Aug. 8, 1990.
U157	All	Aug. 8, 1990.
U158	All	Aug. 8, 1990.
U159	All	Aug. 8, 1990.
U160	All	Aug. 8, 1990.
U161	All	Aug. 8, 1990.
U162	All	Aug. 8, 1990.
U163	Soil and debris	May 8, 1992.
U163	All others	Aug. 8, 1990.
U164	Soil and debris	May 8, 1992.
U164	All others	Aug. 8, 1990.
U165	All	Aug. 8, 1990.
U166	All	Aug. 8, 1990.
U167	Soil and debris	May 8, 1992.
U167	All others	Aug. 8, 1990.
U168	Soil and debris	May 8, 1992.
U168	All others	Aug. 8, 1990.
U169	All	Aug. 8, 1990.
U170	All	Aug. 8, 1990.
U171	Soil and debris	May 8, 1992.
U171	All others	Aug. 8, 1990.
U172	All	Aug. 8, 1990.
U173	Soil and debris	May 8, 1992.
U173	All others	Aug. 8, 1990.
U174	All	Aug. 8, 1990.
U176	Soil and debris	May 8, 1992.
U176	All others	Aug. 8, 1990.
U177	Soil and debris	May 8, 1992.
U177	All others	Aug. 8, 1990.
U178	Soil and debris	May 8, 1992.
U178	All others	Aug. 8, 1990.
U179	All	Aug. 8, 1990.
U180	All	Aug. 8, 1990.
U181	All	Aug. 8, 1990.
U182	All	Aug. 8, 1990.
U183	All	Aug. 8, 1990.
U184	Soil and debris	May 8, 1992.
U184	All others	Aug. 8, 1990.
U185	All	Aug. 8, 1990.
U186	All	Aug. 8, 1990.
U187	All	Aug. 8, 1990.
U188	All	Aug. 8, 1990.
U189	All	Aug. 8, 1990.
U190	Soil and debris	June 8, 1991.
U190	All others	June 8, 1989.
U191	Soil and debris	May 8, 1992.
U191	All others	Aug. 8, 1990.
U192	All	Aug. 8, 1990.
U193	Soil and debris	May 8, 1992.
U193	All others	Aug. 8, 1990.
U194	Soil and debris	May 8, 1992.
U194	All others	Aug. 8, 1990.
U196	All	Aug. 8, 1990.
U197	All	Aug. 8, 1990.
U200	Soil and debris	May 8, 1992.
U200	All others	Aug. 8, 1990.
U201	All	Aug. 8, 1990.
U202	Soil and debris	May 8, 1992.
U202	All others	Aug. 8, 1990.
U203	All	Aug. 8, 1990.
U204	All	Aug. 8, 1990.
U205	All	Aug. 8, 1990.
U206	Soil and debris	May 8, 1992.
U206	All others	Aug. 8, 1990.
U207	All	Aug. 8, 1990.
U208	All	Aug. 8, 1990.
U209	All	Aug. 8, 1990.
U210	All	Aug. 8, 1990.
U211	All	Aug. 8, 1990.
U213	All	Aug. 8, 1990.
U214	All	Aug. 8, 1990.
U215	All	Aug. 8, 1990.
U216	All	Aug. 8, 1990.
U217	All	Aug. 8, 1990.
U218	Soil and debris	May 8, 1992.
U218	All others	Aug. 8, 1990.
U219	Soil and debris	May 8, 1992.
U219	All others	Aug. 8, 1990.
U220	All	Aug. 8, 1990.
U221	Soil and debris	June 8, 1991.
U221	All others	June 8, 1989.
U222	Soil and debris	May 8, 1992.
U222	All others	Aug. 8, 1990.
U223	Soil and debris	June 8, 1991.
U223	All others	June 8, 1989.
U225	All	Aug. 8, 1990.
U226	All	Aug. 8, 1990.
U227	All	Aug. 8, 1990.
U228	All	Aug. 8, 1990.
U234	Soil and debris	May 8, 1992.
U234	All others	Aug. 8, 1990.
U235	Soil and debris	June 8, 1991.
U235	All others	June 8, 1989.
U236	Soil and debris	May 8, 1992.
U236	All others	Aug. 8, 1990.
U237	Soil and debris	May 8, 1992.
U237	All others	Aug. 8, 1990.
U238	Soil and debris	May 8, 1992.
U238	All others	Aug. 8, 1990.
U239	All	Aug. 8, 1990.
U240	Soil and debris	May 8, 1992.
U240	All others	Aug. 8, 1990.
U243	All	Aug. 8, 1990.
U244	Soil and debris	May 8, 1992.
U244	All others	Aug. 8, 1990.
U246	All	Aug. 8, 1990.
U247	All	Aug. 8, 1990.
U248	All	Aug. 8, 1990.
U249	All	Aug. 8, 1990.

[a] This table does not include mixed radioactive wastes (from the First, Second, and Third Third rules) which are receiving a national capacity variance until May 8, 1992 for all applicable treatment technologies.

[b] Standards are being promulgated for 1,1,2-trichloroethane and 2-nitropropane for wastewaters and nonwastewaters.

[c] Standards are being promulgated for benzene and 2-ethoxyethanol for wastewaters and nonwastewaters.

[d] Treatment standards for nonwastewaters disposed of after June 8, 1989, were promulgated June 8, 1989.

[e] Treatment standards for nonwastewaters disposed of after August 17, 1988, were promulgated May 2, 1989.

Note: This table is provided for the convenience of the reader.

17. Appendix VIII is added to part 268, to read as follows:

APPENDIX VIII—NATIONAL CAPACITY LDR VARIANCES FOR UIC WASTES [a] Comprehensive List

Waste code	Waste category	Effective date
F001–F005	All spent F001–F005 solvent containing less than 1 percent total F001–F005 solvent constituents.	August 8, 1990.

APPENDIX VIII—NATIONAL CAPACITY LDR VARIANCES FOR UIC WASTES [a] Comprehensive List—Continued

Waste code	Waste category	Effective date
California list	Liquid hazardous wastes, including free liquids associated with any solid or sludge, containing free cyanides at concentrations greater than or equal to 1,000 mg/l, or containing certain metals or compounds of these metals greater than or equal to the prohibition levels.	August 8, 1990.
California list	Liquid hazardous waste having a pH less than or equal to 2	August 8, 1990.
California list	Hazardous wastes containing HOCs in total concentrations less than 10,000 mg/l but greater than or equal to 1,000 mg/l.	August 8, 1990.
D002 [b]	All	May 8, 1992.
D003 (cyanides)	All	May 8, 1992.
D003 (sulfides)	All	May 8, 1992.
D003 (explosives, reactives)	All	May 8, 1992.
D007	All	May 8, 1992.
D009	High Mercury Nonwastewater	May 8, 1992.
D009	Low Mercury Nonwastewater	May 8, 1992.
F011	All	June 8, 1991.
F039	Wastewater	May 8, 1992.
K009	Wastewater	June 8, 1991.
K011	Nonwastewater	June 8, 1991.
K011	Wastewater	May 8, 1992.
K013	Nonwastewater	June 8, 1991.
K013	Wastewater	May 8, 1992.
K014	All	May 8, 1992.
K016 (dilute)	All	June 8, 1991.
K048	All	August 8, 1990.
K049	All	August 8, 1990.
K050	All	August 8, 1990.
K051	All	August 8, 1990.
K052	All	August 8, 1990.
K062	All	August 8, 1990.
K071	All	August 8, 1990.
K104	All	August 8, 1990.

[a] Wastes that are deep well disposed on-site receive a six-month variance, with restrictions effective in November 1990.
[b] Deepwell injected D002 liquids with a pH less than 2 must meet the California List treatment standards on August 8, 1990.
Note: This table is provided for the convenience of the reader.

PART 270—EPA ADMINISTERED PERMIT PROGRAMS: THE HAZARDOUS WASTE PERMIT PROGRAM

1. The authority citation for part 270 continues to read as follows:

Authority: 42 U.S.C. 6905, 6912, 6924, 6925, 6927, 6939, and 6974.

Subpart D—Changes to Permit

2. Section 270.42, appendix I is amended by redesignating item B(1)(b) as B(1)(c), and adding item B(1)(b) as follows:

§ 270.42 Permit modification at the request of the permittee.

* * * * *

APPENDIX I TO SECTION 270.42—CLASSIFICATION OF PERMIT MODIFICATION

Modification	Class
* * * * *	
B. General Facility Standards	
1. * * *	
b. To incorporate changes associated with F039 (multi-source leachate) sampling or analysis methods....	1
* * * * *	

PART 271—REQUIREMENTS FOR AUTHORIZATION OF STATE HAZARDOUS WASTE PROGRAMS

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

Authority: 42 U.S.C. 6905, 6912(a), and 6926.

Subpart A-Requirements for Final Authorization

2. Section 271.1(j) is amended by adding the following entry to Table 1 in chronological order by date of publication 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
June 1, 1990	Land Disposal Restrictions for Third Third wastes	[Insert page numbers]	May 8, 1990.

3. Section 271.1(j) is amended by revising the entry for May 8, 1990 in Table 2 to read as follows:

§ 271.1 Purpose and Scope.

* * * * *

(j) * * *

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

Effective	Self-implementing provision	RCRA citation	Federal Register reference
May 8, 1990	Prohibition on land disposal of 3/3 of listed wastes.	3004(g)(6)(C)	[June 1, 1990 and page numbers of this document.]

PART 302—DESIGNATION, REPORTABLE QUANTITIES, AND NOTIFICATION

1. The authority citation for part 302 continues to read as follows:

Authority: Sec. 102 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. 9602; secs. 311 and 501(a) of the Federal Water Pollution Control Act, 33 U.S.C. 1321 and 1361.

2. Section 302.4 is amended by adding the following entry in alphabetical order under the column "Hazardous Substance" and adding as the first footnote, footnote † to read as follows. Footnotes 1* and 4 are republished.

§ 302.4 Designation of Hazardous Substances.

* * * * *

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory			Final RQ	
			RQ	Code†	RCRA Waste Number	Category	Pounds (Kg)
*	*	*	*	*	*	*	
Multi Source Leachate			1*	4	F039	X	1 (0.454)
*	*	*	*	*	*	*	

† Indicates the statutory source as defined by 1, 2, 3, and 4 below.

* * * * *

4—indicates that the statutory source for designation of this hazardous substance under CERCLA is RCRA Section 3001.
1*—indicates that the 1-pound RQ is a CERCLA statutory RQ.

[FR Doc. 90-12028 Filed 5-31-90; 8:45 am]
BILLING CODE 6560-50-M