ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 148, 264, 265, 266, 268, and 271

[SWH-FRL-3564-9]

Land Disposal Restrictions for Second Third Scheduled Wastes

AGENCY: Environmental Protection Agency.

ACTION: Final rule.

SUMMARY: The Environmental Protection Agency (EPA) is today promulgating regulations implementing the Congressionally mandated prohibitions on land disposal of hazardous wastes listed in 40 CFR 268.11 (the second one-third of the Schedule of restricted hazardous wastes, hereafter referred to as the Second 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. Today's notice promulgates specific treatment standards and prohibition effective dates for certain Second Third wastes, and imposes the "soft hammer" provisions of 40 CFR 268.8 on Second Third wastes for which the Agency is not establishing treatment standards. In addition, this notice promulgates treatment standards and effective dates for certain First Third (40 CFR 268.10) "soft hammer" wastes, as well as for certain wastes originally contained in the Third Third of the schedule (40 CFR 268.12). Wastes for which treatment standards are being promulgated can be land disposed after the applicable effective dates only if the respective treatment standards are met, or if disposal occurs in units that satisfy the "no migration" standard.

EFFECTIVE DATE: This final rule is effective June 8, 1989, except for EPA Hazardous Waste F006—cyanide (nonwastewater) which is effective July 9, 1989.

ADDRESSES: The official record for this rulemaking is identified as Docket Number F–89–LD11–FFFFF and is located in the EPA RCRA docket, Room 2427 401 M Street SW., Washington, DC 20460. The docket is open from 9:00 to 4:00, Monday through Friday, except for 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, Office of Solid Waste, U.S. Environmental Protection Agency, 401 M Street SW., Washington, DC 20460; Telephone: 800–424–9346 (toll-free) or 382–3000 locally. For general information on specific aspects of this final rule, contact Bob Scarberry or Michaelle Wilson, Office of Solid Waste (OS–333), (202) 382–4770. For specific information on BDAT treatment standards, contact James Berlow, Office of Solid Waste (OS–322), (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), (202) 382–5508. For specific information on capacity determinations or national variances, contact Jo-Ann Bassi, Office of Solid Waste (OS–322), (202) 475–6672.

SUPPLEMENTARY INFORMATION:

OUTLINE

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)). Congress established a separate schedule for restricting the disposal by underground injection of solvent- and dioxin-containing hazardous wastes, wastes referred to collectively as California list hazardous wastes (RCRA section 3004(f)(2), 42 U.S.C. 6924(f)(2)), and soil and debris resulting from CERCLA section 104 and 106 response actions and RCRA corrective actions when the soil and debris contains listed spent solvent, dioxin, and California list hazardous wastes.

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 made.

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

The land disposal restrictions are immediately effective unless the Administrator grants a national variance from the statutory or regulatory deadline and establishes a different date (not to exceed two years beyond the applicable 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 Agency has previously proposed and promulgated regulations pertaining to injected wastes separately from regulations addressing wastes disposed in surface facilities. The Agency chose this approach for two reasons. First, 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 (CFR). EPA believes that it is useful to the regulated community and to the State regulators to have requirements regarding restrictions on hazardous waste injection located in the same portion of the CFR as are other requirements pertaining to injection wells. Second, the statute established a separate schedule for the restrictions on injection of certain wastes.

3. Solvents and Dioxins

Effective November 8, 1986, HSWA prohibited land disposal (except by underground injection into deep wells) of dioxin-containing hazardous wastes numbered F020, F021, F022, and F023 and solvent-containing hazardous wastes numbered F001, F002, F003, F004, and F005 listed in 40 CFR 261.31. (RCRA sections 3004 (e)(1), (e)(2), 42 U.S.C. 6924 (e)(1), (e)(2)).

On November 7 1986, EPA promulgated a final rule (51 FR 40572) implementing RCRA section 3004(e). This rule not only established the general framework for the land disposal restrictions program, but also 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 wastes 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 for liquid corrosive wastes. The statutory prohibition is also in effect for California list wastes containing free cyanides, metals, and 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, in part, effective dates for the prohibition on injection of California list wastes (53 FR 30908).

6. Scheduled Wastes

The amendments required the Agency to prepare a schedule for restricting the land disposal of all hazardous 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, is to ensure 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 (the First Third) of all listed hazardous wastes by August 8, 1988.

(B) At least two-thirds (the Second Third) of all listed hazardous wastes by June 8, 1989.

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

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

If EPA fails to set a treatment standard by the statutory deadline for any hazardous waste in the First or Second Third, the waste may be disposed in a landfill or surface impoundment provided "such facility" is in compliance with the minimum technological requirements specified in RCRA section 3004(o) for new facilities (RCRA section 3004(g)(6)).

Note: On August 17 1988, EPA interpreted the term "such facility" in 3004(g)(6) to refer to the individual surface impoundment or landfill unit. See 53 FR 31181. This interpretation was upheld by the D.C. Circuit in *Steel Bar Mills* v. *EPA*, No. 88-1608 (Order of Feb. 22, 1989).

In addition, prior to land disposal, the generator must certify to the Administrator that he has investigated the availability of treatment capacity and has determined that he has contracted to use the practically available technology that yields the greatest environmental benefit, or that disposal in such landfill or surface impoundment is the only practical alternative to treatment currently available to the generator. This restriction on the use of landfills and surface impoundments applies until EPA sets a treatment standard for the waste or until May 8, 1990, whichever is sooner. Other forms of land disposal, including underground injection, are not similarly restricted and may continue to be used for disposal of untreated wastes until EPA promulgates a treatment standard and sets an effective date, or until May 8, 1990, whichever is sooner. If the Agency fails to set a treatment standard for any scheduled hazardous waste by May 8, 1990, the waste is automatically prohibited from all forms of land disposal after that time unless the waste is the subject of a successful "no migration" demonstration (RCRA section 3004(g)(5), 42 U.S.C. 6924(g)(5)).

For the scheduled wastes, the statute does not provide different deadlines for restriction of underground injected versus surface land disposed wastes; however, the Agency proposed and promulgated 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 may continue to be land disposed by means other than by injection. Effective dates for the prohibition of injection of certain First Third wastes are included in the final regulation published August 16, 1988 (53 FR 30908). In addition, the Agency promulgated effective dates for the prohibition on injection of another group of First Third wastes on June 14, 1989 (54 FR 25416). Today's final rule promulgates the conditions under which Second Third wastes may continue to be land disposed. It also promulgates treatment standards for some First Third and Third Third restricted hazardous wastes. This rule applies to all forms of land disposal including deep well injection, and finalizes the January 11, 1989 proposed rulemaking (54 FR 1056).

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.

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 California list final rule (52 FR 25760), as well as in the August 17 1988 First Third final rule (53 FR 31138). 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. (For a comprehensive understanding of the Land Disposal Restrictions program, refer to the aforementioned final rules.) It is included for purposes of information only, any does not reopen and of the previously-stated principles for judicial review.

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). 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 3005(j)(11). Also, the storage restrictions apply to wastes placed in storage after the effective dates.

The provisions of the land disposal restrictions program apply to wastes produced by generators (including small quantity generators) of greater than 100 kilograms of hazardous waste (or greater than 1 kilogram of acutely hazardous waste) in a calendar month. 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 both interim status and permitted facilities. The requirements of the land disposal restrictions program supersede 40 CFR 270.4(a); therefore, even though the requirements may not be specified in the permit conditions, all permitted facilities are subject to the restrictions.

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. After the applicable effective dates, restricted wastes may be land disposed if they meet the treatment standards. If EPA does not promulgate treatment standards by the statutory deadlines, such wastes are prohibited from land disposal (with the exception of First Third and Second Third wastes that are subject to the "soft hammer" provisions of 40 CFR 268.8).

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 technologies. 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. Treaters thus are not limited to use of only a particular technology. However, when treatment standards are expressed as specific technologies, such technologies must be employed.

3. National Variances from the Effective Dates

The Agency has the authority to grant national variances from the statutory or regulatory 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)). 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 a capacity variance is in place, disposal in a landfill or surface impoundment may be made only in a unit meeting the minimum technological requirements of RCRA section 3004(o). The D.C. Circuit recently upheld the Agency's interpretation of the term "such facility" in section 3004(h)(4) to refer to the disposal unit. (*Steel Bar Mills Ass'n.* v. *EPA*, No 88-1608, Order of Feb. 22, 1989; *Mobil Oil Corp.* v. *EPA*,—F.2d—(D.C. Cir., April 4, 1989)). It is the Agency's opinion, however, that if a waste subject to a national capacity variance is treated to meet the applicable treatment standards (or meets the standards as generated), 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 (MTRs) (but see RCRA sections 3004(o)(1) and 3005(j)(1), which independently require that certain surface impoundments and landfills meet MTRs). This is because such waste, once treated to meet the promulgated treatment standard (or which meets such standard as generated), is no longer prohibited from land disposal. In addition, from a policy perspective, if a person treats a national capacity variance waste to meet a treatment standard, thus electing not to take advantage of the variance, he should receive some benefit under the law and thus should be able to utilize non-MTR landfills and impoundments as he would if the Agency had not granted the national capacity variance.

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

The Agency will consider granting up to a one-year extension (renewable once) of a ban effective date on a case-by-case basis. The requirements outlined in 40 CFR 268.5 must be satisfied. During the period that such a case-by-case extension is in place, disposal in a landfill or surface impoundment may be made only in a unit meeting the minimum technological requirements of RCRA section 3004(o). In considering whether to grant a case-by-case extension, the Agency has stated that it will consider the feasibility of providing alternative capacity during the extension period, and that the determination of feasibility "may involve considerations of the technical and practical difficulties associated with providing alternative capacity. (51 FR 40603, Nov. 7 1986.) EPA wishes to clarify that in assessing questions of feasibility, it will never base a decision solely on the assertion that alternative treatment is too costly.

5. "No Migration" Exemptions From the Restrictions

The Agency has the authority to allow the land disposal of a restricted hazardous waste which does not meet the treatment standard upon the successful demonstration that there will be no migration of hazardous

constituents from the disposal unit or injection zone for as long as the waste remains hazardous (for surface disposed wastes see 40 CFR 268.6; for underground injected wastes see 40 CFR 148.20). If a "no migration" petition is granted, it can remain in effect for 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)).

The Agency's plan for implementing the "no migration" provisions of RCRA with respect to injected wastes are outlined in detail in 40 CFR 148.20 (53 FR 28118, July 26, 1988). A petitioner is required to demonstrate through modeling 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 laterally within the injection zone to a point of discharge or interface with an underground source of drinking water; 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 is in compliance with the substantive area of review, corrective action, and mechanical integrity requirements of Part 146.

6. Variances From the Treatment Standards

The variance from the treatment standard procedures were established to account for cases where the treatment standard is expressed as a performance level and the waste, after properly-conducted treatment, cannot meet the level, or where the treatment technology is not appropriate for the waste. The petitioner must demonstrate that because the physical or chemical properties of the waste differs significantly from the wastes analyzed in developing the treatment standard, the waste cannot be treated to specified levels or by the specified methods (51 FR 40605 and 40 CFR 268.44). The 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 the waste if it is generated at other sites (53 FR 31199, August 17, 1988).

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 (RCRA section 3005(j)(11) and 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 are not placed into any other surface impoundment. The owner or operator must certify to the Regional Administrator that the impoundment meets the liner, leachate collection system and ground water monitoring requirements imposed by RCRA section 3004(o)(1) (unless the impoundment qualifies for an exemption from those requirements under RCRA sections 3005 (j)(2) and (j)(4)). The owner or operator must also submit a copy of the waste analysis plan that has been modified to provide for testing treatment residuals in accordance with § 268.4 requirements.

8. Storage of Restricted Wastes

Storage of restricted wastes is prohibited except where storage is solely for the purpose of accumulating sufficient quantities of wastes to facilitate proper treatment, recovery, or disposal (RCRA section 3004(j) and 40 CFR 268.50). A facility that stores a prohibited waste for more than one year bears the burden of proving that such storage is solely for this purpose. The Agency bears the burden of proof if it 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. Since any placement of wastes in landfills, piles, impoundments, etc. is defined as land disposal (RCRA section 3004(k)), only storage in tanks and containers is affected by the storage prohibition in § 268.50 (see 52 FR 21013, June 4, 1987).

9. The "Soft Hammer" Provisions

The First and Second Third wastes for which EPA has not promulgated treatment standards may be disposed in landfill and surface impoundment units, provided certain demonstrations are made, and provided these units meet the minimum technology requirements of section 3004(o) as specified in 40 CFR 268.8.

The Agency's reading that "soft hammer" wastes destined for landfill or impoundment disposal can only be disposed in minimum technology landfills and surface impoundment units was upheld by the D.C. Circuit in *Steel Bar Mills Ass'n.* v. *EPA*, No. 88-1608 (order of Feb. 22, 1989), and endorsed in *dicta* in *Mobil Oil Corp.* v. *EPA*, __F.2d__ (D.C. Cir., April 4, 1989, slip op. at 7-8). The "soft hammer" provisions apply only until May 8, 1990, or until EPA promulgates treatment standards, whichever is sooner. Other types of land disposal are not restricted until EPA promulgates treatment standards and effective dates, or until May 8, 1990.

C. Summary of the Proposed Rule

The Agency proposed treatment standards and effective dates for 32 Second Third wastes. In addition, the Agency proposed treatment standards and effective dates for 19 First Third wastes which previously had been subject to the "soft hammer" provisions, as well as for 14 Third Third wastes and 4 newly listed wastes. Effective dates for wastes being underground injected were also proposed. No changes to the land disposal restrictions framework were proposed. The proposed approach, as well as any changes being made in today's final rule, is discussed in preamble section III of today's rule.

D. Comments Received on the Proposed Rule

The Agency received 92 comments addressing various elements of the proposed rule. Some of the most frequently discussed issues were: the proposed treatment standards for cyanide wastes, the use of "no land disposal" as a treatment standard, and rescheduling of wastes from the Third Third to the Second Third. A summary of these issues, along with the Agency's response, is provided in the appropriate preamble sections related to the individual waste codes of today's rule.

The Agency also received comments on the applicability of the land disposal restrictions to wastes included in lab packs and on the advance notice of the Agency's proposed approach for regulating the remaining listed and characteristic wastes by May 8, 1990. A summary of these comments and the Agency's responses follows in this section.

Detailed summaries of all comments and the Agency's responses can be found in the documents "Comment Response Document for the Second Third Land Disposal Restrictions Proposed Rule" Volumes 1-3, in the RCRA docket.

1. Regulation of Lab Packs

The Agency received several comments related to the regulation of lab packs under the land disposal restrictions framework. Some commenters requested an exemption from the land disposal restrictions for lab packs. Other commenters requested that the Agency establish as the treatment standard a specified treatment method for the entire lab pack, disregarding the treatment standards applicable to the wastes it contains. Several commenters requested relief from the paperwork burden associated with providing notice of each restricted waste in the lab pack and its corresponding treatment standard (as required under the land disposal restrictions recordkeeping requirements). Commenters also stated that there may be hundreds of wastes included in a lab pack and the land disposal restrictions require that applicable treatment standards or "soft hammer" requirements be met for each waste prior to land disposal. They assert that such regulation is inappropriate for lab packs.

The Agency addressed the issue of applicability of the land disposal restrictions to lab packs in the final rule promulgated on November 7 1986 (see 51 FR 40584–85), and is not changing its position in today's final rule. The Agency maintains that these wastes cannot be exempt from the statutory requirements since the plain language of the statute includes them, and there is no indication in the legislative history to exclude lab packs from the land disposal restrictions if they contain restricted wastes.

With respect to means of easing the administrative burden on lab packs, the Agency is sympathetic to the concerns voiced, but lacks the time and resources (given the pressing statutory deadlines) to take action in this rulemaking, particularly when no clearly acceptable approach is now apparent. The Agency is thus today soliciting further comment and data on issues associated with lab packs. The Agency requests data and specific suggestions supporting treatment options for lab packs. The Agency also solicits specific suggestions on modifications that could be made to the notification and certification requirements, in order that the administrative burden for lab packs might be somewhat relieved, while at the same time satisfying the "cradle to grave" paper trail for hazardous wastes regulated under the land disposal restrictions.

2. Advance Notice of Third Third Approach

Several comments addressed the Agency's advance notice of an approach for regulating the remaining listed and characteristic hazardous wastes by May 8, 1990. The Agency appreciates these comments and suggestions, and will consider them when proposing land disposal restrictions for the Third Third later this year. The Agency will respond to comments received on the advance notice in the Response to Comments Document for Third Third wastes.

3. Comments on Stabilization of Organics

Comments were received in response to the Agency's request for data on the effectiveness of stabilization of organic constituents. The Agency will evaluate these comments prior to promulgation of the Third Third final rule.

II. Summary of Today's Final Rule

Today's notice describes the Agency's final approach to implementing RCRA section 3004(g) requirements with respect to certain listed hazardous wastes included in 40 CFR 268.11 (as well as §§ 268.10 and 268.12). The Agency is required to promulgate regulations establishing conditions under which Second Third wastes may be land disposed by the statutory deadline of June 8, 1989.

A. Applicability of Treatment Standards

Today the Agency is promulgating treatment standards and effective dates for only certain Second Third wastes. Wastes listed in 40 CFR 268.11 for which EPA does not establish treatment standards or effective dates are subject to the "soft hammer" provisions that allow continued land disposal until May 8, 1990, or until treatment standards are promulgated, whichever is sooner (40 CFR 268.8).

The Agency is also promulgating treatment standards for certain First Third "soft hammer" wastes, as well as certain Third Third wastes, to become effective immediately upon promulgation. The Third Third wastes included in today's final rule were originally scheduled to be prohibited from land disposal by May 8, 1990. These wastes are included in today's rule because of the similarity of the Third Third wastes to First or Second Third waste treatability groups for which treatment standards are being promulgated. The Agency maintains that the original schedule promulgated May 26, 1986 (51 FR 19300) is not irrevocable: the Agency retains a continuing authority to shift particular wastes from one third of the schedule to another (see *Chemical Waste Management* v. *EPA*, 839 F 2d 1526, 1529 n.2 (D.C. Cir. 1989). The statutory language likewise indicates that scheduling decisions are committed solely to the Agency's discretion (RCRA section 3004(g)(3)), and that prohibitions need not be delayed until the end of a scheduling period to take effect (see, e.g., RCRA section 3004(g)(1): "Not later than *"). Given the Congressional concern about an expeditious end to land disposal of untreated hazardous wastes (see e.g., RCRA sections 1002(b)(7), 1003(5), 1003(6)), it also makes sense from a policy perspective to accelerate prohibitions where it is possible to do so. Thus, the Agency is not precluded from proposing or promulgating treatment standards for any wastes ahead of schedule.

In addition, the Agency is amending the schedule so that certain Second Third wastes are moved to the Third Third. The Agency is moving wastewater residues resulting from certain treatment methods (i.e., metals recovery, metals precipitation, cyanide destruction, carbon adsorption, chemical oxidation, steam stripping, biodegradation, and incineration or other direct thermal destruction provided such treatment methods are well-designed and well-operated) for which EPA has not promulgated wastewater treatment standards. This action is being taken in order that residues from substantial treatment of these "soft hammer" wastes may be further treated in land disposal units that do not meet minimum technology requirements. As was explained in the First Third final rule (53 FR 31184), the Agency finds justification for such action in that wastes that have undergone substantial treatment to levels that may ultimately satisfy treatment standards should not be precluded from further treatment in polishing or advanced biological treatment units (RCRA sections 3005 (j)(3) and (j)(13)) that are substantially protective of human health and the environment.

It should be noted that the Agency moved all multi-source leachate derived from most listed hazardous wastes to the Third Third in a final rule promulgated on February 27 1989 (54 FR 8264). The February 27 1989 rule thus applies to multi-source leachate derived from disposal of Second Third listed hazardous wastes. This action has the effect of rescheduling the residues from treating the leachate and to contaminated ground water or soil that contain such leachate. *Id.* Other

restricted wastes not initially part of the leachate that are mixed with it, however, are not rescheduled and thus remain subject to all applicable statutory and regulatory prohibitions. *Id.*

EPA is today deleting § 268.12(c), as adopted in the August 17 1988 First Third regulation. That provision rescheduled leachate derived from management of soft hammer wastes to the Third Third. By rescheduling all multi-source leachate to the Third Third, this provision is no longer necessary. The only leachate to which it would still apply would be single-source leachate, and EPA has already determined that all prohibitions and standards for single-source leachate should take effect immediately (see 54 FR 8265, Feb. 27 1989). Consequently, there is no reason for this provision to remain in effect.

The Agency is moving Second Third wastes that are mixed hazardous/radioactive wastes to the Third Third. As was explained in the First Third final rule (53 FR 31147), there are relatively small volumes of such waste mixtures being generated, so such waste is more appropriately addressed in the Third Third.

B. Best Demonstrated Available Technologies (BDAT)

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

Following are tables listing BDAT for the wastes for which treatment standards are promulgated in today's rule:

Best Demonstrated Available Technologies for Wastes Included in Today's Final Rule

1. Alkaline chlorination, followed by precipitation, settling, and sludge dewatering:

F007 wastewaters
F008 wastewaters
F009 wastewaters
F010 wastewaters
F011 wastewaters
F012 wastewaters
P013 wastewaters
P021 wastewaters
P029 wastewaters
P030 wastewaters
P063 wastewaters
P074 wastewaters
P098 wastewaters
P099 wastewaters
P104 wastewaters
P106 wastewaters
P121 wastewaters

2. Alkaline chlorination, followed by precipitation, settling, filtration, and stabilization of metals:

F006 nonwastewaters

(note: metal standards for this wastecode were establisehd as part of the First Third final rule and are not being repromulgated)

F007 nonwastewaters
F008 nonwastewaters
F009 nonwastewaters

3. Electrolytic oxidation followed by alkaline chlorination, followed by precipitation, settling, filtration, and stabilization of metals:

F011 nonwastewaters
F012 nonwastewaters
P074 nonwastewaters
P099 nonwastewaters
P104 nonwastewaters

4. Electrolytic oxidation followed by alkaline chlorination, followed by precipitation, settling, filtration:

P013 nonwastewaters
P021 nonwastewaters
P029 nonwastewaters
P030 nonwastewaters
P063 nonwastewaters
P098 nonwastewaters
P106 nonwastewaters
P121 nonwastewaters

4. Incineration:

F010 nonwastewaters
F024
K009 nonwastewaters
K010 nonwastewaters
K011 nonwastewaters
K013 nonwastewaters
K014 nonwastewaters
K023
K028
K029 nonwastewaters
K038 nonwastewaters
K039 nonwastewaters*
K040 nonwastewaters
K043
K093
K094
K095 nonwastewaters
K096 nonwastewaters
P039 nonwastewaters
P040 nonwastewaters*
P041 nonwastewaters*
P043 nonwastewaters*
P044 nonwastewaters*
P062 nonwastewaters*
P071 nonwastewaters
P085 nonwastewaters*
P089 nonwastewaters
P094 nonwastewaters
P097 nonwastewaters
P109 nonwastewaters*
P111 nonwastewaters*
U028
U058 nonwastewaters*
U069
U087 nonwastewaters*
U088
U102
U107
U109
U235 nonwastewaters

*Required method of treatment

5. Incineration or fuel substitution:

K027 nonwastewaters*
K113 nonwastewaters*
K114 nonwastewaters*
K115 nonwastewaters*
K116 nonwastewaters*
U221 nonwastewaters*
U223 nonwastewaters*

*Required method of treatment

6. Carbon adsorption or incineration; or pretreatment (such as biological treatment or chemical oxidation) followed by carbon adsorption and incineration:

K027 wastewaters*
K039 wastewaters*
K113 wastewaters*
K114 wastewaters*
K115 wastewaters*
K116 wastewaters*
P040 wastewaters*
P041 wastewaters*
P043 wastewaters*
P044 wastewaters*
P062 wastewaters*
P085 wastewaters*
P109 wastewaters*
P111 wastewaters*
U058 wastewaters*
U087 wastewaters*
U221 wastewaters*
U223 wastewaters*

*Required method of treatment

7 Biological treatment:

K036 wastewaters
K038 wastewaters
K040 wastewaters
P039 wastewaters
P073 wastewaters
P089 wastewaters
P094 wastewaters
P097 wastewaters
U235 wastewaters

8. Steam stripping followed by biological treatment:

K009 wastewaters
K010 wastewaters

9. No land disposal based on no generation (generated from the process in the listing description and disposed after June 8, 1989):

K005 nonwastewaters
K007 nonwastewaters

10. Stabilization:

K115—nickel

11. No standards for the Second Third waste codes ("soft hammer"):

K025 wastewaters
K029 wastewaters
K041
K042
K095 wastewaters
K096 wastewaters
K097
K098
K105
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, U244

C. Applicability of Today's Rule to Class I-H Hazardous Waste Injection Wells Regulated Under 40 CFR Part 148

The Agency has previously 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. The Agency is today addressing all methods of land disposal, including injection wells regulated jointly under the Safe Drinking Water Act (SDWA) and RCRA.

D. Waste Analysis Requirements

The Agency is today finalizing for Second Third wastes the waste analysis requirements already promulgated in the First Third final rule (53 FR 31146). 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. 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 types of technology are identified as BDAT, both types of waste analyses are required.

In order for the initial generator to determine whether his waste meets the applicable treatment standard as generated, he should analyze the total waste if a treatment standard is in § 268.41, or he should analyze a waste extract if the treatment standard is found in § 268.43. The generator may also make this determination based on his knowledge of the waste provided there is a reasonable basis for doing so as, for example, the generator using so little of a key constituent that it could not be found in the waste at levels exceeding a treatment standard (51 FR 40597 Nov. 7 1986; and § 268.7(a)).

E. Nationwide Extensions of the Effective Date

Due to lack of sufficient alternative protective treatment or recovery capacity, EPA is granting a national capacity extension for soil and debris contaminated with certain waste codes covered by today's final rule. A two-year extension, until June 8, 1991, is granted for soil and debris contaminated with First, Second, and Third Third wastes for which treatment standards promulgated in today's rule are based upon the performance of incineration. (See preamble section III.C.2.)

A capacity variance is also granted for certain wastes disposed by underground injection. A two-year extension of the effective date, until June 8, 1991, is granted for hazardous waste codes F007 K009 (wastewaters), K011 (nonwastewaters), and K013 (nonwastewaters) (see preamble section III.C.3.).

EPA has determined to establish an effective date of July 8, 1989 for the F006—cyanide (nonwastewater) treatment standard. Although existing information indicates that the treatment standard is readily achievable with existing treatment systems, the delayed effective date will provide any time needed for generators to adjust or fine tune existing treatment systems, or to enter into contracts with commercial treaters. At the same time, given the information showing that well over 90 percent of generators are already achieving treatment standards and the existence of excess commercial treatment capacity (see preamble section III.C.), EPA does not believe that the regulated community needs any longer period to come into compliance with the new standard (see RCRA section 3010(b)(1)).

EPA does not believe that section 3004(h)(1) mandates an immediate effective date for the cyanide standard for F006 nonwastewaters. Section 3004(h)(1) applies to prohibitions issued under sections 3004(d)–(g). The cyanide standard is not a prohibition of the waste (since F006 is already prohibited under the First Third rule), but rather an additional treatment standard issued pursuant to section 3004(m). The general policy of section 3004(h), however, provides good cause within the meaning of section 3010(b)(3) for not delaying the new standard's effective date for any more than 30 days.

The Agency is also delaying the effective date for 30 days, until July 8, 1989, for F007 F008, and F009 wastewaters and nonwastewaters. EPA has determined that no long term national capacity variance for these wastes is warranted. The extension is being granted, however, in order to be cautious and allow time (if any is truly needed) for facilities to adjust existing cyanide treatment processes to operate more efficiently, or to enter into contracts with commercial treatment facilities.

EPA is also granting a 30-day capacity extension to F011 and F012 wastewaters and nonwastewaters, until July 8, 1989. Additionally, for the period between July 8, 1989 and December 8, 1989, F011 and F012 nonwastewaters will be subject to the same cyanide standards as the electroplating wastes (i.e., 590 mg/kg for total cyanide and 30 mg/kg for amenable cyanide). Effective December 8, 1989, however, these wastes must meet the 110 mg/kg total cyanide standard and the 9.1 mg/kg amenable cyanide standard (see preamble section III.C.1. for further discussion of the effective dates).

F Treatment Standards for Prohibited Wastes that are Mixed with Non-Prohibited Wastes

Prohibited wastes are not exempted from the land disposal prohibitions when they are mixed with other wastes (or any other materials, for that matter.) Were this not the case, land disposal prohibitions would be without meaning since they could be evaded by the expedient of mixing with a non-prohibited waste. (See 54 FR 8265, Feb. 27 1989.)

Prohibited wastes are sometimes mixed with other materials in the course of treatment. If the prohibited waste is no longer capable of being treated to meet the treatment standard after mixing, it is possible that an improper form of mixing is occurring. The Agency realizes and acknowledges, however, that mixing wastes can be a normal part of treatment. Therefore, to the extent that such mixing occurs and can be

determined to be a legitimate part of the treatment process, the mixture could be eligible for a treatability variance pursuant to § 268.44. Part of the demonstration, however, would be whether mixing has made the prohibited waste more difficult to treat, and if so, whether the treatment method utilized is still legitimate.

It should be evident that intentional mixing to evade a treatment standard is impermissible, and if such intentional mixing occurs, it never could serve as grounds for granting a treatability variance under § 268.44. The Agency further expects that generators and treatment facilities would take reasonable steps to avoid mixing waste streams that are generated separately if such mixing is not a legitimate part of the treatment process. For example, it would ordinarily be inappropriate to mix a metal-bearing waste like F006 with a halogenated organic waste like F024.

The status of mixtures that consist of multi-source leachate and other non-leachate First Third prohibited wastes is presently controlled by a recent order filed by the D.C. Court of Appeals for the District of Columbia Circuit. In that order, the Court left in effect (by mutual consent of the parties) a judicial stay of the applicability of the so-called waste code carry-through principle to multi-source leachate. The order continues, "[a]s 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 standards and requirements in the August 8, 1988 rule. Order of April 24, 1989 in *Chemical Waste Management* v. *EPA*, No. 88-1581.

EPA interprets this order in the following way: First, by requiring that all non-leachate First Third prohibited wastes be treated "to the extent technically feasible" the Court made clear that only technical considerations are involved in the determination, and that the cost of treatment is not a relevant consideration. (In fact, the Court amended its earlier order of September 23, 1988, which required treatment "to the extent feasible" in response to the government's pleading that cost could not legally be considered in determining treatment standards.) In determining whether treatment has occurred to the extent technically feasible, it ordinarily would be necessary to address the possible means of treating all of the hazardous constituents in the prohibited waste, including both organics and inorganics.

Second, all of the parties in their pleadings to the Court represented that any mixing of prohibited wastes and multi-source leachate that occurred *after* September 23, 1988, the date of the first amended order entered by the Court related to this situation, would be deemed to be mixing with the purpose of avoiding a treatment standard and that therefore all applicable treatment standards would continue to apply to the non-leachate prohibited waste(s) in such mixtures. (See Petitioners' Response of April 13, 1989 at pp. 5–6, 8 expressing this understanding, and Petitioners' Supplemental Response of April 24, 1989 characterizing language suggested by petitioners that documents this understanding as stating that "restricted wastes in such mixtures occurring on or after the date of amendment of the stay order will have to be treated to the applicable treatment standards, notwithstanding the presence in the mixture of multi-source leachates.") Consequently, any prohibited waste that was mixed with multi-source leachate after September 23, 1988 remains subject to treatment standards.

EPA believes that any person seeking to dispose of a leachate-non-leachate First Third prohibited waste mixture would have the burden of demonstrating that the mixture has been treated to the extent technically feasible. This is because that person would be claiming an exception to a remedial statutory scheme, see, e.g., *SEC* v. *Ralston Purina Co.*, 346 U.S. 119, 126 (1953), and in addition would be in possession of facts within its special knowledge. The Agency notes in addition that States could evaluate the validity of an "extent technically feasible" claim only if the State is authorized to administer the land disposal prohibition regulations. Since no State is so authorized at the present time, any regulatory concurrence would have to come from EPA.

EPA believes it important that the Court's order not be used as a means to evade technically achievable treatment standards. Therefore, the Agency recommends careful evaluation of any claim that one of these mixtures has been treated to the extent technically feasible. In addition, the Agency recommends that EPA headquarters personnel be notified of such claims in order to assist in the technical determination and in order to have technology-based determinations of waste treatability be as consistent as possible.

G. Rationale for Immediate Effective Date

The regulations promulgated today will be effective immediately except where the Agency has specified a national extension of the effective date or otherwise specified an alternative effective date. HSWA requires that today's regulations become effective on or before the June 8, 1989 effective date of the restrictions on the second one-third of the wastes scheduled pursuant to RCRA section 3004(g)(4)(A). If the Agency fails to promulgate regulations for any of these wastes by the statutory effective date, the restrictions on disposal of the waste in a landfill or surface impoundment, stipulated in section 3004(g)(6)(B) take effect automatically on June 8, 1989. If the Agency has not promulgated treatment standards for any scheduled waste by May 8, 1990, that waste is prohibited from all forms of land disposal unless a generator has been granted an extension of the effective date (either a national capacity extension or a case-by-case extension) or a "no migration" finding has been made. Hence, June 8, 1989 is the latest date for EPA to promulgate regulations that will prevent the "soft hammer" in section 3004(g) from becoming effective for all Second Third wastes.

Section 3004(h) requires that regulations established under sections 3004 (d), (3), (f), or (g) be effective immediately upon promulgation. Furthermore, section 3004(m) specifies that regulations setting treatment standards must have the same effective date as applicable regulations established under sections 3004 (d), (e), (f), or (g). For today's regulations which set treatment standards and are promulgated under section 3004(g), this date will be June 8, 1989. Since the statute clearly states that the regulations implementing section 3004(g) must go into effect on or before June 8, 1989 in order to prevent the "soft hammer" from falling, EPA finds that good cause exists under section 3010(b)(3) to have an immediate effective date. For the same reason, EPA finds that good cause also exists under section 554(d)(3) of the Administrative Procedure Act, 5 U.S.C. section 553(d)(3), to waive the requirements that regulations be published at least 30 days before the effective date.

III. Detailed Discussion of Today's Rule

A. Development and Identification of Treatment Standards

Today's rule promulgates BDAT treatment standards for many Second Third wastes, some First Third wastes for which land disposal has been previously restricted according to the "soft hammer" provisions, and several Third Third wastes. Sections III.A.1. through III.A.11. of the January 11, 1989 Proposed Rule (54 FR 1062–1104) presented discussions on the determination of treatability groups and the development of treatment standards for RCRA hazardous wastes. Sections III.A.1. through III.A.7 (54 FR 1062–1065) presented an overview of the general procedures that the Agency follows for these determinations. A detailed discussion of the methodology for identification of BDAT is provided in the November 7 1986 Final Rule for Solvents and Dioxins (51 FR 40572). The Agency specifically stated that it did not reopen the issues presented in these sections for public comment, but merely restated the Agency's position on these issues in order to save readers the trouble of referring to earlier documents. The same is true for most of the reiterated discussions in today's preamble. However, the Agency is also adding a clarifying discussion of certain issues, particularly the comparison of treatment standards to Practical Quantitation Limits (PQLs), and the use of grab and composite samples for purposes of establishing and enforcing treatment standards.

1. Clarification of the General Applicability of BDAT

a. *Wastewater versus nonwastewater standards.* The treatment standards in today's rule are generally expressed as constituent concentrations for "wastewaters" and for "nonwastewaters" The treatment standards apply to the prohibited waste as well as to all residuals generated by treating the original prohibited waste. Therefore, solids generated from treatment of a particular waste must meet the nonwastewater treatment standards and wastewaters generated from treatment of this waste must meet the wastewater treatment standards. Section III.A.3.(f.) and (h.) of today's rule provides a discussion of the applicability of treatment standards to treatment residuals where BDAT is established as a method of treatment rather than as numerical concentration-based standards.

For purposes of this rule, the Agency defines wastewaters 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, except for those wastes identified as F001, F002, F003, F004, and F005 solvent-water mixtures. See 53 FR 31145 (August 17 1988) adopting this definition for 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 would contain greater than or equal to 1% TOC, or greater than or equal to 1% total suspended solids. It is not permissible 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 nonwastewaters are not prohibited.

b. *Analytical requirements and relationship of PQLs to BDAT.* For all wastes in today's rule, BDAT has been identified as a destruction technology for all of the organic constituents and for cyanides. The corresponding treatment standards for these constituents are based on the analysis of total concentration. Since these technologies are specifically designed to destroy the organics and cyanides, the Agency maintains that the best measure of treatment performance is the one that reflects the extent to which these organics and cyanides have been destroyed.

Note: The land disposal restrictions for solvent waste codes F001–F005 (51 FR 40572) require the analysis of TCLP extracts 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 of performance.

In cases where treatment standards for metals in nonwastewaters are based on stabilization, the use of the TCLP is required as a measure of the performance of the treatment technology. The Agency maintains that where data are available, the TCLP data best reflect the extent to which the mobility of these metals can be minimized. Where treatment standards for nonwastewaters are based on multiple treatment processes due to the presence of organics and metals, the waste has to meet both total constituent concentrations for organics and TCLP concentrations for metals prior to land disposal.

The Agency evaluates all BDAT list constituents when establishing treatment standards. This list of chemicals was derived from the constituents listed in 40 CFR Part 261 Appendix VII and Appendix VIII. 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 restricted to regulating only those constituents for which a waste is listed (40 CFR Part 261 Appendix VII). This is appropriate given that Appendix VII, setting forth the constituents that were the basis for listing, is not an exhaustive list of hazardous constituents in each waste, and was never intended to be. (See RCRA section 3001(f), a provision designed to force EPA to consider 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.)

EPA has been asked a number of questions about the relationship of BDAT treatment standards to the practical quantitation limits (PQLs) for a number of constituents. In response, it is important to clarify the definition of PQLs, their intended use, and their relationship to BDAT treatment standards.

In the September, 1986, edition of SW–846 (Volume 1B, Chapter 1, p. 1–9), the Agency defines PQLs as follows: "The practical quantitation limit (PQL) is the lowest level that can be reliably achieved within the specified limits of precision and accuracy during routine laboratory operating conditions. Further, in Method 8250 of SW–846 (the analytical method for determination of semivolatile organics in wastes by gas chromatography/mass spectrometry) the Agency states "Sample PQLs are highly matrix-dependent. The PQLs listed herein are provided for guidance and may not always be achievable" (*Ibid*, Table 2, p. 8250–5), and further defines PQLs as the method detection limit (from Table 1, p. 8250–2, 3, and 4) multiplied by a matrix dependent factor that was estimated for four matrices (Table 2, p. 8250–5).

As evident from the above citations, the Agency recognizes the importance of the dependency of the waste matrix to

the level of PQLs obtainable. The Agency also recognizes that PQLs listed in SW-846 are not always achievable for constituents as measured in untreated wastes. However, the Agency points out that the levels of PQLs are directly related to the amount of interferences that are present in the different waste matrices. Most treatment processes, particularly destructive technologies such as incineration, do not destroy only the hazardous constituents of the waste. They destroy other organics present that typically interfere with the analysis for constituents in untreated wastes. Thus, PQLs are typically significantly lower for treatment residuals such as incinerator ash than for untreated wastes. These differences in PQLs for untreated and treated wastes are demonstrated in almost every BDAT background document where incineration has been established as BDAT.

With respect to the use of PQLs, the Agency points out that PQLs were established as a means of guidance for analysis of waste samples and were intended to act as minimum performance criteria for analytical laboratories. They do not necessarily represent the lowest limits of achievable analytical performance for any given waste. They were also intended to be broadly applied to groups of wastes. The matrix dependent correction factors were not developed for any particular waste code, and as listed in Table 2 (cited above) do not specifically apply to any particular treatment residuals (i.e., Table 2 only lists correction factors for matrices identified as ground water, low-level soil, high-level soil, and non-water miscible waste). Further, the Agency is currently in the process of modifying and expanding these matrix correction factors, as well as modifying the detection limits from which the PQLs are derived.

The major point of confusion regarding PQLs is that the PQLs noted in SW-846 for some constituents are higher than some of the promulgated treatment standards. This apparent anomaly results primarily from the fact that the PQLs in SW-846 were not based on testing the matrices that were tested in developing the treatment standards. The treatment standards for a given waste code, in contrast, are based on analytical testing of the residuals from the treatment of that waste (or in some cases, a similar waste from which the treatment standards are transferred). Thus, the resulting treatment standards appropriately reflect the level of analytical performance achievable for that waste.

Other commenters questioned whether constraints posed by the limits of applicable analytic methods allow the treatment standards to be met on a reliable, routine basis. The Agency points out that the laboratories used in the development of the BDAT standards are themselves reliable and must maintain compliance with all QA/QC requirements on a routine basis. Further, the background documents for all wastes for which incineration has been established as BDAT, indicate a consistency of the laboratories in obtaining low detection limits for the regulated constituents in these wastes, thus providing additional support that these treatment standards are achievable on a routine and reliable basis.

In cases where a facility believes that particular, waste-specific treatment standards cannot be obtained due to the inability of their laboratory to achieve PQLs below the treatment standards on certain treatment residuals, the facility may submit a petition for a variance from those particular treatment standards for that particular waste or wastes. In such a case, the facility must demonstrate that the analyses are in compliance with all other BDAT QA/QC provisions and that the treatment process is a well-designed and well-operated BDAT process. (As outlined in the BDAT Generic Quality Assurance Project Plan (EPA/530-SW-87-011, March 1987), the Agency may also use analytical methods for setting treatment standards that are not specifically identified in SW-846, provided that the methods comply with all appropriate detection limits, spike/surrogate recoveries, and other quality assurance criteria.)

c. *Restrictions on the use of technologies identified as BDAT.* All of the treatment standards expressed as concentrations of specific constituents in the waste reflect performance achieved by the Best Demonstrated Available Technology (BDAT). As such, compliance with these standards only requires that these concentrations (treatment levels) be achieved prior to land disposal. The standard generally does not require or restrict the use of any particular treatment technology to achieve these levels. The Agency emphasizes that the technologies identified as BDAT (for those wastes with only concentration-based standards) are simply those technologies that EPA utilized to develop the waste specific concentration-based performance standards. The waste need not be treated by that specific technology. Any treatment, including recycling or any combination of treatment technologies, unless prohibited (such as impermissible dilution), can be used to achieve these concentration-based standards unless that technology is defined as land disposal (i.e., land treatment).

Treatment standards promulgated today are expressed as numerical concentration levels, with a few exceptions. Because of difficulties associated with analysis of specific constituents in wastes from the production of toluene diisocyanate (K027 K113, K114, K115, K116, U221 and U223) and certain organophosphorus pesticides (K039, P040, P041, P043, P044, P062, P085, P109, P111, U058 and U087), some treatment standards in today's rule are expressed as a technology rather than as a concentration-based standard (see sections III.A.3.(f.) and III.A.3.(h.)). In addition, treatment standards for K005 and K007 wastes that are generated from the process described in the listing for these waste codes (rather than derived from residuals from prior disposal of these wastes) are expressed as "No Land Disposal Based on No Generation" (see section III.A.3.(c.)).

In situations where wastes subject to concentration-based standards are mixed with wastes subject to treatment standards that are specified technologies, the mixture would have to be treated by the specified BDAT method, and would have to meet the concentration-based treatment standards for any other prohibited wastes that are contained in the matrix. See generally 53 FR 31146-147 (August 17 1988).

It may not be appropriate to apply the specified technology to every mixture that contains the waste subject to that technology. However, EPA has structured the final rule in a way that the technology specified as BDAT is likely to be appropriate for the types of mixtures that are most likely to be encountered in the near term application of this rule.

For example, EPA has specified incineration or fuel substitution as the treatment technology for certain wastes prohibited by today's regulation. The most likely mixture for which these technologies might be inappropriate is contaminated soil and debris. In today's rule, however, EPA is granting a two-year national capacity variance for soil and debris for those wastes where BDAT has been specified as incineration. Multi-source leachate might also be contaminated with these wastes, but EPA has deferred standards for such leachates until the Third Third.

See 54 FR 8264 (February 27 1989). EPA also notes that in other situations it may be inappropriate for multi-waste mixtures to be treated by the specified treatment methods which are demonstrated treated methods for most wastes that contain organic contaminants. Given the lack of immediate applicability to soil and debris and multi-source leachate, the Agency does not believe that there are may other situations where the promulgated treatment standards would prove inappropriate. However for those situations, the treatability variance in 40 CFR 268.44 is available.

d. *Applicability of treatment standards to treatment residues identified as "derived-from" wastes.* BDAT typically consists of a treatment operation, or series of operations, that generate additional waste residues. For example, the BDAT for K001 nonwastewaters is incineration followed by stabilization. (See 53 FR 31153 (August 17 1988).) Incineration generates two residues that may require further treatment, namely ash and scrubber waters. Treatment of scrubber waters to remove metals may generate additional inorganic residues also requiring stabilization. Ultimately these additional wastes (i.e., treatment residues) may be land disposed, so they must meet the same standards as the stabilized ash. With respect to these additional wastes, the Agency emphasizes that all residues from treating the original listed waste are likewise considered to be the listed waste by virtue of the "derived-from" rule contained 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 through a no-migration petition or by a capacity variance.

The Agency is, however, developing "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. At this time, EPA has not proposed these "de minimis" levels. In addition, the Agency has not completed its evaluation of the regulations that would be impacted by these "de minimis" levels—in particular, their relationship to BDAT treatment standards.

e. *Transfer of treatment standards.* Some treatment standards are not based on testing the performance of BDAT on the specific waste subject to the treatment standard. Rather, in certain instances, the Agency examines similarities in waste characteristics and constitutents and determines whether the treatment standards can be transferred. EPA believes that transferring treatment performance data to establish standards for untested wastes or constitutents is technically valid when the untested wastes are generated from similar industries and/or similar processing steps or when the constituents have similar chemical and physical properties. Transfer of treatment standards to wastes from similar processing steps involves relatively minimal amount of analysis because of the likelihood that the production processes will produce a waste matrix with similar characteristics.

In cases where only the industry is similar, EPA closely examines the waste characteristics prior to concluding that the untested waste constitutents can be treated to levels associated with tested wastes. EPA reviews the available waste characteristic data to identify those parameters which are expected to affect treatment selection. Some of the most important constitutents, as well as other parameters, are identified to facilitate the selection of the appropriate treatment technology for a given waste. When the analysis suggests that the untested waste can be treated with the same technology as a waste for which treatment performance data are already available, a more detailed list of constituents is analyzed to identify the most important waste characteristics which the Agency believes will affect the performance of the technology. By examining and comparing these characteristics, the Agency determines whether the untested wastes will achieve the same level of treatment as the tested waste. Where the Agency determines that the untested waste can be treated to the same concentration-based levels as well as the tested waste, the treatment standards can be transferred. A detailed discussion of this transfer process can be found in the BDAT background documents for each waste or waste treatability group.

f. *Treatment standards based on single facility data and grab samples versus composite samples.* As discussed previously in the August 17 1989 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 is available, or when data exist but there is no verification that the treatment process from which the data was 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 BDAT treatment standards, the Agency has established a procedure and methodology for selecting particular facilities and treatment systems that it considers to be well-designed and well-oeprated (53 FR 31138). The Agency also selects wastes that are representative of those most difficult to treat.

The Agency recognizes that there are certain variabilities inherent to every treatment system as well as a certain amount of variability in the characteristics of the wastes. In the calculation of the treatment standards, the Agency accounts for these by multiplying the mean of the concentration of the constituents to be regulated by a correction factor known as the variability factor. This factor is derived utilizing a quantitative procedure that determines the statistical 99th percentile for the treatment standard. This results in the establishment of a treatment standard that is believed to be achievable 99 percent of the time by a well-designed, well-operated system.

The Agency further accounts for variability due to analytical reproducibility by adjusting the treatment standard for the analytical recovery data for constituents. In addition, the Agency performs all analyses of hazardous constituents used in the development of the treatment performance data, in accordance with an established quality assurance/quality control plan (as outlined in the BDAT Generic Quality Assurance Project Plan).

Where performance data exist based on both the analysis of composite samples and on the analysis of grab samples, the Agency establishes the treatment standards based on the analysis of grab samples. There are two principal reasons for this. It is normally easier and more expeditious for EPA to enforce on the basis of grab samples. In addition, grab samples normally reflect maximum process variability, and thus would reasonably characterize the ranges 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 this data is 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.

An individual facility's waste analysis plan will provide the basis for that facility's compliance monitoring. This plan must be adequate to assure compliance with Part 268. However, a facility remains strictly liable for meeting the treatment standards, so that if it disposes of a waste that does not meet a treatment standard, it is in violation of the land disposal restrictions regulations. If the facility complied with its waste analysis plan, it would not be in violation of the waste analysis plan provisions. Put another way, a waste analysis plan cannot immunize land disposal of prohibited wastes, although such plans may be written to authorize types of sampling and monitoring different from those used to develop the treatment standard(s).

If a waste analysis plan were to authorize a different mode of sampling or monitoring, there would need to be a demonstration that the plan (and the specific deviating feature) is adequate to assure compliance with Part 268 (see 40 CFR 264.13(a)). 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. (EPA repeats that enforcement of the rule is based on the treatment standard, not the facility's waste analysis plan, so that enforcement officials would normally take grab samples and analyze for all constituents regulated by the applicable treatment standards.)

2. Second Third Wastes From Specific Sources for Which BDAT Standards are not Promulgated in Today's Rule

K019 and K025 wastes were originally scheduled to be examined as part of the Second Third rulemaking. However, EPA promulgated treatment standards for these wastes in the First Third final rule on August 8, 1988 (53 FR 31155, 31156 and 31174 (August 17 1988)). Concentration-based treatment standards, based on the performance of rotary kiln incineration, were promulgated for the wastewater and nonwastewater forms of K019 and a treatment standard of "No Land Disposal Based on No Generation" was promulgated for nonwastewater forms of K025. EPA recently amended the standard for K025 nonwastewaters so that it applies only to wastes generated from the process description in the listing of K025 wastes and that are disposed after August 17 1988. See 54 FR 18836 (May 2, 1989).

EPA did not promulgate treatment standards for the K025 wastewaters on August 8, 1988. The "soft hammer" provisions, however, did not apply because K025 wastes were originally scheduled in the Second Third. The Agency is not promulgating treatment standards for these wastewaters in today's rule (i.e., prior to their statutory deadline); therefore, land disposal of K025 wastewaters is now restricted according to the "soft hammer" provisions in 40 CFR 268.8. EPA is presenting this information in today's preamble as a matter of convenience, in order to show treatment standards for all of the Second Third wastes. EPA did not reopen the comment period on the promulgated concentration-based treatment standards for K019 wastes or on the promulgated "No Land Disposal Based on No Generation" standards for K025 nonwastewaters.

The Agency has not completed its evaluation of BDAT for Second Third wastes identified as K029 wastewaters, K095 wastewaters, K096 wastewaters, nonwastewater and wastewater forms of K041, K042, K097 K098, K105 as well as certain other Second Third wastes identified with a "U" or "P" waste code. Therefore, the Agency is not promulgating treatment standards for these wastes in today's rule. Since the Agency is not promulgating standards for these Second Third wastes by their statutory deadline, land disposal of these wastes is regulated by the "soft hammer" provisions of 40 CFR 268.8. The Agency believes that the majority of these "soft hammer" wastes, as generated, are nonwastewaters containing relatively high concentrations of chlorinated organics. In addition, EPA believes that the majority of these wastes contain high enough concentrations of halogenated organics (greater than 0.1%), that they are already restricted from land disposal as Halogenated Organic Compounds (HOCs) under the California List Rule.

Treatment standards for some wastewater or nonwastewater forms of other Second Third wastes have not been promulgated in today's rule. An explanation of each can be found in the discussion of treatment standards for the appropriate treatability group in the ensuing section (III.A.3.) of today's preamble.

3. Treatment Standards and Responses to Major Comments for All Wastes Proposed With the Second Third Wastes

This section of today's rule discusses treatment standards for all wastes and waste treatability groups proposed in the Second Third proposal. This includes many of the Second Third wastes, some of the First Third wastes that were, until today, regulated under the "soft hammer" provisions, and some Third Third wastes for which the Agency decided to promulgate restrictions ahead of schedule. A more detailed explanation of the Agency's action is found in relevant background documents and response to comment documents which are part of the administrative record to this rule.

a. *Cyanide wastes.* Today's rule promulgates treatment standards for many wastewater and nonwastewater forms of RCRA hazardous wastes that contain cyanides. Wastes containing cyanides are generated primarily by facilities performing operations such as electroplating (generating F006, F007 F008 and F009 wastes), heat treating (F010, F011 and F012), chemical conversion coating of aluminum (F019), other metal finishing, and acrylonitrile production (K011, K013 and K014). Facilities in these industries as well as others can also generate cyanide wastes listed as P013, P021, P029, P030, P063, P074, P098, P099, P104, P106 and/or P121. Wastes designated with these "P" codes are typically discarded, out-of-date, or off-specification chemicals used by these industries. Detailed technical descriptions of the specific production processes generating these "F" and "K" wastes and background on the specific chemical represented by the "P" waste codes can be found in the background documents for the listing of these wastes.

The same industries often generate other reactive cyanide wastes identified simply as D003 wastes (as defined in 40 CFR 261.23(a)(5)). Today's rule, however, does not promulgate treatment standards for these D003 wastes.

In the January 11, 1989 proposed rule, the Agency defined three subcategories of cyanide wastes from the metal finishing industry: Metal Finishing Aqueous Liquids, Metal Finishing Organic Liquids, and Metal Finishing Sludges. The Agency has re-examined the need for these subcategories and believes they are unnecessary for the establishment of separate treatment standards. Rather, the Agency has decided that presentation of the treatment standards on a waste code basis (according to the wastewater and

nonwastewater forms of the waste) provides a significant distinction of the treatability groups.

The treatment standards for all of these cyanide wastes are based on testing performed by the Agency or on testing performed by the commercial hazardous waste treatment industry. Additional performance data were submitted during the comment period. Analysis of these dates support the positions of many of the commenters (as well as the Agency). EPA has determined that the use of these data to promulgate revised treatment standards for many of the cyanide wastes is technically justified. The Agency provided notice of these additional data (that provide the basis for many of the final treatment standards for cyanides) by sending a letter to all persons submitting initial comments on the issue of cyanide treatability. This letter included: (1) A copy of the additional data on the treatment of cyanide that was received by the Agency; (2) a notice of the anticipated changes in the appropriate treatment standards; and (3) a request for additional comments. All of this information, including the Agency's response to the additional comments, have been placed in the administrative record for today's rule.

The treatment standards for total cyanides, amenable cyanides, and organics (i.e., those in K011, K013, and K014) were developed based on the performance of destructive technologies such as alkaline chlorination, electrolytic oxidation, wet air oxidation and/or incineration. The treatment standards for metals are based on the performance of technologies such as hexavalent chromium reduction, lime or sulfide precipitation, filtration, and stabilization. Other treatment technologies that can achieve these concentration-based treatment standards are not precluded from use by this rule (see the detailed discussion on the use of alternative technologies in section III.A.1.(c) of today's rule). The specific regulated constituents and treatment standards for each waste code are listed in the tables at the end of such section according to the wastewater and nonwastewater forms of the waste.

1. Comments with general applicability to cyanide wastes. This section discusses the Agency's response to those comments that pertain to all or many of the cyanide wastes. This includes comments on the following: precision of the analytical methods for amenable and total cyanides; establishment of alkaline chlorination versus electrolytic oxidation as BDAT, the forcing of pretreatment by BDAT, effects of iron-cyanide complexes on cyanide treatability; potential stabilization of cyanides; and use of the TCLP for development of alternative leachable cyanide standards.

i. Precision of analytical methods. Several commenters had serious reservations regarding the precision and accuracy of the analysis for total and amenable cyanides in nonwastewaters. They pointed out that the reproducibility (i.e., precision) of the analytical method for analyzing total cyanide in nonwastewaters (using the official test methods of the Office of Solid Waste i.e., EPA Publication SW-846) exceeded the proposed standard for amenable cyanides in nonwastewaters. Analysis of amenable cyanide involves two measurements of total cyanides, i.e., one analysis of total cyanide before and one after a laboratory alkaline chlorination step. The Agency has re-examined the data used to develop the treatment standards for amenable cyanides. Although the Agency maintains the overall validity of these analytical methods, it agrees, in part, with the commenters that at certain levels of total cyanides the reproducibility of the analytical method may indeed exceed the standards for amenable cyanide as originally proposed. Thus, the Agency has recalculated the standards for amenable cyanides, and in doing so has taken into account the reproducibility of the analytical method for total cyanides. The standards presented in today's rule have been developed based on these calculations. Details on the recalculation of the amenable cyanide standards for each waste treatability group are provided in the background document for cyanide wastes.

ii. Alkaline chlorination versus electrolytic oxidation. Several commenters questioned whether an electrolytic oxidation treatment system, typically a batch process, could be implemented in a continuous wastewater treatment process The commenters explained that most electroplating job shops that generate F006, F007 F008, and F009 wastes employ a continuous alkaline chlorination process as part of their wastewater treatment process. The commenters further stated that they could not possibly retrofit existing facilities by June 8, 1989, the promulgation date of this rule.

The commenters' point was addressed chiefly to F006 wastes. However, the comment no longer has applicability for F006 wastes (nor for F007 F008 or F009) because electrolytic oxidation is no longer the technology basis for the final cyanide standards for these waste codes. Rather, for these wastes, the promulgated BDAT treatment standards are based on the performance of alkaline chlorination, without electrolytic oxidation.

The Agency has determined that electrolytic oxidation is applicable primarily as a pretreatment step, particularly when cyanide concentrations in the raw waste are quite high (several percent, at least). It is part of the basis for final treatment standards only for waste codes F011 and F012 nonwastewaters and certain discarded commercial chemical products (i.e., those cyanide wastes identified with a "P").

In addition, the Agency reemphasizes that where BDAT treatment standards are expressed as concentration limits, it is not required to use technologies identified as BDAT. Other treatment technologies that can achieve these concentration-based standards are not precluded from use by this rule. Further discussion on the restrictions on the use of technologies identified as BDAT can be found in section III.A.1.(c.) of this rule.

iii. Pretreatment standards. According to 40 CFR 261.31, F006, F012 and F019, wastes are specifically listed as wastewater treatment sludges (Note: at this time the Agency is not promulgating treatment standards for F019 wastes as discussed in section III.A.1.(c.)(4.)). Many commenters stated that by establishing treatment standards for cyanides in these wastes, the Agency is requiring pretreatment (of the cyanides) before the listed waste is generated. They assert that the Agency lacks the authority to take such action under RCRA.

EPA rejects the view that the statutory language of HSWA precludes the approach adopted today. The statute requires EPA to establish treatment standards "which substantially diminish the toxicity of the waste or substantially reduce the likelihood of migration of hazardous constituents from the waste *" (section 3004(m)(1)). Alkaline chlorination of aqueous cyanide streams is a standard method of treatment that destroys cyanides, and thus substantially diminishes the toxicity of the wastewater treatment sludge, thereby satisfying this statutory requirement. In addition, Congress focused specifically on the treatment of cyanides in promulgating the 1984 amendments and indicated that "[d]estruction of total cyanides should be required as a precondition to land disposal. 130 Cong. Rec. S 9179 (daily ed. July 25, 1984) (Statement of Senator

Chaffee explaining the amendment which became section 3004(m)). Cyanides in these wastes are customarily destroyed by treating aqueous wastestreams. Given the evident Congressional purpose of the land disposal restriction provisions, and the specific Congressional intention (quoted above) that cyanides be destroyed, EPA believes that Congress was not concerned whether cyanides were destroyed before or after the listed waste technically is generated, but rather was concerned with the cyanide content in the waste when disposed. Consequently, it is reasonable for the Agency to develop a standard which is achievable by treating cyanides before the listed waste is generated. (EPA emphasizes, however, that cyanide treatment does not require any change to the manufacturing process. It may in certain cases involve changes in treatment of wastewaters from the manufacturing processes.)

Commenters also stated that the BDAT technology studied by the Agency was not based on the treatment of wastewater treatment sludges and that the technology could not be applied to F006, F012 or F019 after generation particularly when the wastewater treatment processes included a dewatering step. They asserted that after dewatering, the wastewater treatment sludges have high solid content (approximately 40–60%) and as a result, could not be processed through the systems EPA determined to be BDAT. The Agency maintains that the BDAT technologies can be applied prior to the dewatering step or can be applied after dewatering by slurrying the waste with water. In this case, the dewatering step would probably only be performed in order to reduce the volume of these wastes prior to transportation to a treatment and disposal facility. Indeed, one of the commercial facilities that treat cyanide wastes informed EPA that some solid cyanide wastes were being dissolved and slurried prior to treatment through the BDAT process (after which treatment they are able to meet the cyanide treatment standards). While the Agency does not believe that slurrying these wastes is necessarily the most cost-effective way to perform alkaline chlorination (or other cyanide treatment), this treatment option remains available. In addition, generators of these sludges need not dewater them but rather may send the high water content sludges to alkaline chlorination. In either of these situations, cyanide treatment would be performed on the listed waste itself.

The Agency also points out that this "pretreatment" argument appears academic, in that many of the wastes and wastewaters entering the wastewater treatment process that generate F006, F012 and F019 are already RCRA hazardous wastes or are mixed with hazardous wastes (such as F007 F008, F009, F010, and/or F011). In these situations, EPA would be applying treatment standards to a cyanide-containing hazardous waste already generated, and in most cases, the cyanide standard would be the same as for F006.

In conclusion, the commenter's arguments regarding "pretreatment" appear artificial, and may have no practical consequences. The Agency maintains that these BDAT technologies are applicable to these wastes and thus is promulgating the appropriate treatment standards for cyanides.

iv. Treatment of iron-cyanide complexes. As stated in the proposed rule and the proposed cyanide background document, the Agency believed that the F011 and F012 wastes that were treated by the Agency had similar chemical characteristics as F006, F007 F008, F009, and F019 wastes, and therefore believed that the performance of the treatment system of electrolytic oxidation followed by alkaline chlorination could be transferred to these wastes. Many commenters stated that EPA's performance data for electrolytic oxidation followed by alkaline chlorination for total and amenable cyanide constituents in F011 and F012 nonwastewaters could not be transferred to F006, F007 F008, F009 and F019 nonwastewaters because of the differences in the concentration of iron-cyanide complexes. They stated that these complexes are more difficult to treat by conventional cyanide oxidation processes.

Based on a re-examination of the chemical composition and waste characteristics of these wastes, the Agency agrees with the commenters that the F006, F007 F008, F009 and F019 wastes have different waste treatability characteristics than the F011 and F012 wastes because of the iron-cyanide complexes. The Agency believes that the source of the high iron concentration in these wastes may be due to the fact that these wastes are generated from the electroplating industry and that the material being plated is steel. The iron contained in steel is replaced with the metal contained within the electroplating baths (for example zinc in zinc cyanide plating baths). The iron that is thus released is believed to then react with the cyanide to form compounds that are referred to as iron-complex cyanides.

Some iron in these wastes results, not from the plating process itself, but rather from other sources that are generated sporadically. These sources include: other metal finishing operations such as acid cleaning, descaling and pickling; the degradation of process tank linings or racks; or the intermingling of electroplating rinse water streams with other wastes with high iron content.) It is possible that these sources of iron can be avoided by implementing waste audits and by application of simple source reduction techniques such as proper equipment maintenance, segregation of high iron waste streams, and substitution of pickling/descaling acids. Because the principal source of iron appears to be the steel plating process itself, however, EPA views this as an intrinsic characteristic of the electroplating wastewaters that needs to be taken into account in assessing the treatability of F006, F007 F008 and F009 wastes.

The Agency agrees that the high concentrations of iron in the cyanide wastes (when present as iron-cyanide complexes) appear to effect the level of cyanide destruction that is achievable (i.e., they appear to be more difficult to treat). Data also indicate that some F006, F007 F008 and F009 wastes containing low concentrations of iron (or no iron) appear to be treatable to lower cyanide concentrations than those with high iron. At this time, however, the Agency has not determined a specific concentration of iron in these wastes that would indicate a difference in treatability for the cyanides (i.e., a separate treatability group for F006, F007 F008 and F009 wastes containing low iron), and thus promulgated a higher total cyanide treatment standard of 590 mg/kg for all F006, F007 F008 and F009 wastes based on the new data provided by industry (that included wastes treatment performance data on wastes with high iron content).

Where the Agency could determine that specific cyanide waste codes (i.e., F011, F012, P013, P021, P029, P030, P063, P074, P098, P099, P104, P106, and P121) normally contain relatively low concentrations of iron, the Agency promulgated the proposed total cyanide treatment standard of 110 mg/kg.

Other commenters further stated that not only are the F006, F007 F008, and F009 wastes and F011 and F012 wastes different in waste characteristics (such as iron content) but also in the type of metal finishing processes that generate these wastes. The F006, F007 F008, and F009 wastes are generated from the

electroplating process and the F011 and F012 wastes are generated from a heat treating process. The commenters stated that electroplaters have pretreatment requirements for NPDES permits for total and amenable cyanides and that heat treaters are not subject to the same requirements. Since alkaline chlorination is also the technology basis for most of the cyanide treatment standards in today's rule, there is no inconsistency in the approach between the Clean Water Act limitations and standards and the treatment standards adopted in today's rule. (As noted elsewhere, existing data show that the great majority of generators are meeting the F006 treatment standards for cyanides with their existing wastewater treatment technology.)

Clean Water Act effluent limitations and standards could technically be achieved by adding reagents such as ferrous sulfate to the wastewaters. EPA, however, did not base the NPDES and pretreatment standards on precipitation with ferrous sulfate but rather on alkaline chlorination to destroy cyanides and hydroxide precipitation to remove metals. If a company chooses to precipitate with ferrous sulfate, there is an increase in concentration of the iron-cyanide complexes that results in an increase of the measured total cyanide concentration in the sludge (i.e., nonwastewaters) generated from the wastewater treatment. The Agency maintains that, in most cases, this type of addition of ferrous ions can be eliminated through proper design and operation of the existing onsite cyanide destruction technologies without significantly impacting the achievement of the NPDES effluent limitations on cyanides.

By reducing the concentration of iron-cyanide complexes that end up in the wastewater treatment sludges, the potential for release of toxic cyanides from land disposal units is reduced. This is entirely consistent with the Congressional intent with respect to the destruction of cyanide. (See further discussion in section III.A.3.(a.)(1.)(vi.) of today's rule.)

v. *Stabilization of cyanides.* Several commenters stated that the Agency should consider stabilization as an effective technology for the treatment of cyanides. Commenters also stated that the Agency did not provide any stabilization data in the background document or the administrative record. At the time of proposal, the Agency had not reviewed any performance data for stabilization that meet the QA/QC requirements for determining BDAT. During the comment period, the Agency had an opportunity to review some stabilization data that was generated by both the Agency and industry. (This data appears in the final background document for cyanide wastes and has been placed in the administrative record.)

The Agency does not agree with commenters that stabilization is an applicable technology for the treatment of the majority of cyanide wastes. While some data may indicate that stabilization processes appear to reduce the leachability of some forms of cyanide, the Agency contends that destruction of cyanide is clearly a preferred treatment method (as further discussed in section III.A.3.a.1.vi. of today's rule). The Agency believes that the majority of commercially available conventional stabilization technologies are primarily designed to stabilize cationic species (such as many of the BDAT list metals) and are not specifically designed for anionic species (such as cyanide). The Agency believes that the presence of certain metal complex cyanides may appear to give the effect of "stabilization" due to the low solubility of these cyanide complexes. The Agency believes that the extrapolation of stabilization data on wastes containing complexed cyanides could lead to erroneous assumptions on the ability of cyanides that are somewhat more soluble to be "stabilized" In addition, solitary use of treatment processes that convert the soluble cyanides present in the wastes to a less soluble state (i.e., complexed cyanides) for purposes of stabilization does not provide an overall reduction in toxicity. (See following discussion of leachable cyanides.)

vi. Use of the TCLP for leachable cyanide. Many commenters stated that the Agency should develop treatment standards for cyanides based on a leachable level of cyanide as opposed to a total cyanide level. The Agency has reviewed the data submitted by commenters on the level of leachable cyanides and the analysis of the data appears in the background document for cyanide wastes and in the administrative record for today's rule. The Agency strongly disagrees with the commenters that the cyanide treatment standards should be based on leachable levels. The Agency believes that the legislative history to RCRA section 3004(m) indicates that Congress intended that the "destruction of total cyanides would be required as a precondition to land disposal" (130 Congressional Record S9179, July 25, 1984, statement of Senator Chafee).

The treatment standards for cyanides are based on a total waste analysis for two reasons. First, the Agency believes that by only regulating the leachable cyanide concentration, the complex-metal cyanides that are present in the wastes would not be regulated. Second, based on the review of the available treatment data, the Agency believes that the conventional cyanide treatment technologies provide substantial treatment of both the amenable and total cyanide concentration as measured by the Cyanide Amenable to Chlorination test in Method 9010 (EPA Publication SW-846).

Finally, the Agency believes that there is a real potential for the complexed cyanides that are present in these wastes to at least partially degrade into the more toxic form of cyanides known as "free" cyanides. This process is anticipated to result from exposure to ultraviolet light (from sunlight) when the wastes are placed into certain land disposal units such as a surface impoundment. This is consistent with the Agency's approach to establishing effluent guideline limitations for total cyanides in wastewater discharges from these same metal finishing industries.

In today's rule, the Agency is promulgating a total cyanide standard for F006, F007 F008, and F009 nonwastewaters as 590 mg/kg. This standard is higher than the proposed standard of 110 mg/kg and thereby allows for an overall higher concentration of iron cyanide complexes to be present in the nonwastewaters. At the same time, based on the same performance data, the total cyanide standard for wastewaters has been reduced from 12 mg/l to 1.9 mg/l and the amenable cyanide standard for wastewaters has been reduced from 1.3 mg/l to 0.10 mg/l. Since the complexed cyanides present in wastewaters are more likely to be subject to photodegradation to "free" cyanide than those in the nonwastewaters, the Agency believes that these revised total and amenable cyanide standards promulgated in today's rule provide a significant overall reduction in potential toxicity from the photodegradation of iron-cyanide complexes.

2. Wastes from electroplating operations

F006—Wastewater treatment sludges from electroplating operations except from the following processes: (1) Sulfuric acid anodizing of aluminum; (2) tin plating on carbon steel; (3) zinc plating (segregated basis) on carbon steel; (4) aluminum or zinc-aluminum plating on carbon steel; (5) cleaning/stripping associated with tin, zinc and

aluminum plating on carbon steel; and (6) chemical etching and milling of aluminum.

F007—Spent cyanide plating bath solutions from electroplating operations.

F008—Plating bath sludges from the bottom of plating baths from the electroplating operations where cyanides are used in the process.

F009—Spent stripping and cleaning bath solutions from electroplating operations where cyanides are used in the process.

Today's rule promulgates treatment standards for amenable and total cyanides in F006 nonwastewaters, and for amenable cyanides, total cyanides, and metal constituents in F007 F008, and F009 nonwastewaters and wastewaters. BDAT treatment standards for the nonwastewaters are based on the performance of alkaline chlorination for the amenable and total cyanides and stabilization for the metal constituents. BDAT treatment standards for the wastewaters are based on the performance of alkaline chlorination for the amenable and total cyanides and chemical precipitation followed by settling and filtration for the metals.

i. Nonwastewaters. In the January 11, 1989 proposed rule (54 FR 1066–1071), the Agency proposed nonwastewater treatment standards based on the performance of electrolytic oxidation followed by alkaline chlorination for amenable and total cyanides. The Agency received comments that questioned whether the performance of electrolytic oxidation is considered demonstrated because of the limited number of data points. The Agency maintains that the use of a small number of data points from a single facility can be representative of the treatment achieved by any particular treatment system (such as those data from electrolytic oxidation). However, the Agency has received a significant amount of new data on alkaline chlorination that form the basis for the cyanide treatment standards for F006, F007 F008 and F009 wastes promulgated in today's rule.

The Agency also received extensive comments that questioned the devisability of the proposed standards. In particular, many commenters stated that performance data for F011 and F012 wastes (based on electrolytic oxidation followed by alkaline chlorination) should not be transferred to F006, F007 F008, F009 wastes because of the differences in concentration of iron-cyanide complexes in these wastes. (See section III.A.3.(a.)(1.)(iv.) for a more complete discussion of the Agency's position on the treatment of iron-cyanide complexes). The Agency agrees with the commenters that a sufficient number of F006, F007 F008 and F009 electroplating wastes have different treatablity characteristics (i.e., high iron concentration) than F011 and F012 wastes, and that the proposed transfer of the treatment standards is no longer warranted. Therefore, the Agency is promulgating revised cyanide treatment standards based on the new alkaline chlorination performance data received by the Agency during the comment period. (This data appeared as part of the record for the proposed rule and is also part of the administrative record for this final rule. See further discussion of how the Agency noticed this data and solicited additional comment in the introduction to section III.A.3.(a.) of today's preamble.)

In supplemental comments on this new data, certain commenters questioned the devisability of the revised treatment standard of 590 mg/kg for total cyanide in nonwastewaters. (The proposed standard was 110 mg/kg.) They reiterated their previous argument that this standard was only representative of the treatment of wastewaters and not representative of the treatment of F006 as generated. In addition, they stated that the revised standard was based on insufficient operating data. Some commenters also indicated that some of their F006 wastes (as generated) would not be able to meet even the revised standard for total cyanides.

EPA is responding in detail to both the initial comments to the proposed rule and these additional comments in the background document for cyanide wastes and in the response to comments background document, and will address a few of the major points in today's preamble. First, the treatment standard is based on one month of operating data (14 data points) which the Agency has examined carefully and believes (based on detailed descriptions of the treatment process plus descriptions of sampling and analysis data) represent a well-designed and well-operated treatment process and that represent BDAT treatment for F006, F007 F008 and F009 wastes.

Second, although not all of the data came from treating F006 wastes (in fact, treatment was performed during a one month period on RCRA wastes identified as F006, F007 F008, F009, F011, F012, D002, D003, P029, P030 and P106), the waste mixtures that were treated should be more difficult to treat than segregated F006 wastes. This is because the mixtures of these RCRA wastes contained roughly an order of magnitude more iron and cyanide and greater concentrations of the minor complexing metals, nickel, zinc, and copper than typical F006 precursor wastewaters from electroplating (based on a review of the data used to develop the effluent guidelines limitations for cyanides from the metal finishing industries).

Third, with respect to the devisability of the revised standards, the Agency points out that most of the treatment and waste characterization data submitted to the Agency corroborates that the 590 mg/kg standard for total cyanide is achievable. Over 90 percent of the waste characterization data for F006 sludges reported to the Agency in comments to the proposed rule (submitted by both the affected industry and treatment facilities alike) meet the promulgated standard for total cyanides in F006 nonwastewaters. Not only do these comments confirm the ultimate standard's devisability, but also imply generators do not need to make significant modifications in their current treatment processes in order to meet the standard.

In addition, EPA reviewed treatment and waste characterization data contained in over 1500 individual facility's responses submitted to the Agency as part of the 1986 Treatment Storage, Disposal and Recycling Survey and the 1986 Generator Survey (which responses were selected by EPA from generators generating the largest volumes of F006 wastes). Again, these responses corroborated the standard's devisability (plus the lack of need to modify existing treatment processes). The responses EPA reviewed showed that over 90 percent of the F006 wastewater treatment sludges generated contained less than the 590 mg/kg total cyanide treatment standard required as a result of today's rule. That is, treatment performed with existing treatment technology before imposition of treatment standards for cyanides in wastewater treatment sludge indicate that over 90 percent of facilities are already achieving the standard. The Agency believes that these data show that most of the industry is capable of meeting the total cyanide standard through proper operation of the treatment technology that is already in place at the generators' facilities.

Further, for those few instances where commenters claimed to be unable to meet the 590 mg/kg standard, they provided no information on the circumstances of treatment or generation, leaving the Agency no means of ascertaining why the cyanide standards promulgated in today's rule

were not achievable. In short, EPA believes there is ample support for stating that the total cyanide standard for F006, F007 F008 and F009 nonwastewaters promulgated in today's rule is achievable.

The standards for amenable cyanides in the nonwastewater forms of F006, F007 F008 and F009 reflect the limits of precision of the analytical method for cyanides amenable to chlorination (so that the amenable cyanide is approximately 5 percent of the standard for total cyanides). EPA believes that properly conducted alkaline chlorination actually destroys free cyanides to a greater extent, but that it is difficult to measure amenable cyanides in nonwastewaters. No commenter suggested that a free cyanide standard of 30 mg/kg was not achievable for these nonwastewaters.

The Agency is promulgating treatment standards for the metal constituents in F007 F008, and F009 nonwastewaters, based on the transfer of performance data from the stabilization of F006 wastes. (The metal standards for F006 nonwastewaters were promulgated in the First Third final rule (see 53 FR 31152–31153) and are not being revised in today's rule.) The Agency received no comments or data refuting this transfer.

ii. Wastewaters. Today's rule promulgates revised treatment standards for amenable and total cyanides and metal constituents in F007 F008, and F009 wastewaters. In the January 11, 1989 proposed rule (54 FR 1066–1071), EPA proposed treatment standards based on performance of wet air oxidation for cyanides, and chemical precipitation followed by settling and filtration for metals.

Many commenters expressed concerns that the data base used by the Agency to establish treatment standards for cyanide were limited. They therefore questioned whether wet air oxidation is a demonstrated technology. However, the issue is essentially moot for these waste codes because during the comment period the Agency received cyanide treatment data for F007 F008, and F009 wastewaters based on the performance of alkaline chlorination. EPA performed a statistical comparison of wet air oxidation and alkaline chlorination and found that there is a statistical difference between the two technologies for cyanides. The Agency determined that alkaline chlorination technology performs better than wet air oxidation for these particular wastes based on a comparison of the available data. Therefore, the Agency is promulgating revised wastewater treatment standards for cyanides to reflect BDAT as alkaline chlorination.

These data (which substantially expand the treatment data base for these wastewaters) also indicate that the standard for these wastewaters should be decreased from the proposed level to 1.9 mg/l total cyanide and 0.10 mg/l amenable cyanide (from 12 mg/l and 1.3 mg/l respectively). These standards are more similar to the promulgated effluent guidelines limitations and standards for the metal finishing industries. Commenters, in fact, raised no significant challenges to EPA's solicitation to lower the wastewater standard for these wastes.

The Agency is promulgating the wastewater treatment standards for metals in F007 F008, and F009 based on the transfer of the treatment performance data for chemical precipitation, settling, filtration and sludge dewatering for K062 wastes. The Agency believes that the K062 wastewaters are more difficult to treat than F007 F008, and F009 wastewaters based on the higher concentrations of dissolved metals in K062 (up to 100,000 mg/l).

The Agency is not promulgating the treatment standards for total and amenable cyanide in F006 wastewaters at this time. Concentration-based treatment standards for cyanides and metal constituents in the F006 wastewaters will be promulgated by May 8, 1990. It is likely that the total and amenable cyanide treatment standard for the F006 wastewaters will be based on a data transfer from the performance of alkaline chlorination for the F007 F008, and F009 wastewaters. It is likely that the metal treatment standards will be based upon information available from EPA's effluent limitations guidelines and standards program. Since no treatment standards are promulgated in today's rule for F006 wastewaters, these wastes continue to be subject to the "soft hammer" provisions of 40 CFR 268.8.

BDAT TREATMENT STANDARDS FOR F006

[Nonwastewaters]

Constituent	Maximum for any single grab sample	
	Total composition (mg/kg)	TCLP (mg/l)
Cyanides (total)	590	(1)
Cyanides (amenable)	30	(1)

(1) Not applicable.

BDAT TREATMENT STANDARDS FOR F007 F008 AND F009

[Nonwastewaters]

Constituent	Maximum for any single grab sample	
	Total composition (mg/kg)	TCLP (mg/l)
Cyanides (total)	590	(1)
Cyanides (amenable)	30	(1)
Cadmium	(1)	0.066
Chromium	(1)	5.2
Lead	(1)	0.51
Nickel	(1)	0.32
Silver	(1)	0.072

(1) Not applicable.

BDAT TREATMENT STANDARDS FOR F007 F008 AND F009

[Wastewaters]

Constituent	Maximum for any single grab sample	
	Total composition (mg/l)	TCLP (mg/l)
Cyanides (total)	1.9	(1)
Cyanides (amenable)	0.10	(1)
Chromium	0.32	(1)
Lead	0.04	(1)
Nickel	0.44	(1)

(1) Not applicable.

3. Wastes from Metal Heat Treating Operations.

F010—Quenching bath sludge from oil baths from metal heat treating operations where cyanides are used in the process.

F011—Spent cyanide solutions from salt bath pot cleaning from metal heat treating operations.

F012—Quenching wastewater treatment sludges from metal heat treating operations where cyanides are used in the process.

Today's rule promulgates treatment standards for F010, F011, and F012 wastewaters and nonwastewaters. Treatment standards for total cyanide in F010 nonwastewaters are based on the performance of incineration. Treatment standards for F011 and F012 nonwastewaters are based on the performance of electrolytic oxidation followed by alkaline chlorination for amenable and total cyanides, and based on the performance of stabilization for the metal constituents. Treatment standards for amenable and total cyanide in F010, F011 and F012 wastewaters are based on the performance of alkaline chlorination. Treatment standards for metals in F011 and F012 wastewaters are based on the performance of chemical precipitation,

settling, and filtration. Other technologies that can achieve these concentration-based treatment standards are not precluded from use by this rule.

EPA notes that the technology basis for treating cyanides in the wastewaters from F010, F011 and F012 differ from the technology basis for treatment of the corresponding nonwastewaters. EPA, however, expects that the technology used to treat the cyanides in the nonwastewaters will achieve the standards promulgated for the wastewaters.

Thus, EPA expects that if an F010 waste is incinerated, then the F010 scrubber water that may be generated as a residue from incineration will not need further treatment for cyanides because they will already meet the promulgated treatment standards. If any F010 wastewaters are generated by a process other than incineration and they do not meet the treatment standards, then it would be reasonable to treat these wastewaters with alkaline chlorination rather than incineration.

In a similar manner, wastewaters generated from the treatment of F011 or F012 nonwastewaters using electrolytic oxidation followed by alkaline chlorination are not expected to need further treatment for cyanides because the Agency believes that these wastewaters will also already meet the promulgated standards. However, if any F011 or F012 wastewaters are generated by another treatment technology and do not meet the treatment standards as generated, it would also be reasonable to treat these wastewaters with alkaline chlorination alone rather than electrolytic oxidation followed by alkaline chlorination. (Electrolytic oxidation is applicable primarily as a pretreatment step, particularly when cyanide concentrations in the raw waste are quite high.)

i. Standards for F010 wastes. In the January 11, 1989 proposed rule, the Agency proposed a treatment standard for total cyanide in F010 nonwastewaters based on BDAT as incineration. Also, EPA indicated that these wastes could contain up to 5 percent oil and grease content and can exist as a bi-layered waste, i.e. organic and aqueous layer. Based on conversations with the treaters of this waste, the Agency believes that the F010 wastes can be separated into an organic layer and an aqueous layer. This F010 organic layer is what is typically incinerated, while the F010 aqueous layer can be treated by conventional cyanide treatment rather than incineration. At the time of the proposal, the Agency had not examined the efficiency of this separation process, and so proposed standards for all F010 nonwastewaters based on the incineration of the wastes.

Also, in the proposal, the Agency did not clarify what the treatment standards would be for F010 nonwastewaters that could be generated from the alkaline chlorination treatment of the separated aqueous layer (an F010 wastewater). During the comment period, the Agency received no comments (or data) indicating the efficiency of the separation of the layers or whether the proposed treatment standard (based on incineration) could be met.

In this rule, the Agency is clarifying its position on the treatment standards for the F010 nonwastewaters that might be generated from treating a separated F010 aqueous layer or other F010 wastewaters. As a point of clarification, the Agency first notes that treatment residues from treating F010 wastewaters are listed under the F012 waste code (wastewater treatment sludge from metal heat treating operation) and would therefore be subject to the cyanide standards for F012 nonwastewaters. Such sludges would therefore not be subject to the standards based on performance of incineration. With respect to F010 wastewaters, the Agency believes that aqueous F010 wastewaters have similar waste characteristics to F011 and F012 wastewaters. The Agency is therefore transferring the performance of the treatment system of alkaline chlorination for the cyanide constituents (based on the new data obtained on alkaline chlorination during the comment period). See the following discussion of treatment standards for F011 and F012 wastewaters. Therefore, the treatment standards for amenable cyanides and total cyanides in F010 wastewaters are 0.10 mg/l and 1.9 mg/l respectively. The promulgated treatment standard for residues from the incineration of the F010 organic layer (i.e., F010 nonwastewaters high in organics) is 1.5 mg/kg, the same standard that EPA proposed. The Agency notes that if a generator or treater of a F010 wastes does not separate the waste into the two layers, that facility would have to meet the 1.5 mg/kg treatment standard for total cyanides in the nonwastewater residuals (based on incineration).

The Agency did not propose treatment standards for any metals contained n F010 wastewaters or nonwastewaters. At the time, the Agency had no waste characterization data that indicated the presence of hazardous metals in the untreated wastes. In addition, the Agency received no comments or data indicating that metals were present in these wastes. As a result, the Agency is promulgating only the treatment standards for cyanides contained in F010 wastewaters and nonwastewaters. This does not preclude the Agency from proposing the regulation of metals in these wastes if any F010 waste characterization data or treatment performance data become available.

ii. Standards for F011 and F012 wastes. The treatment standards proposed on January 11, 1989, for F011 and F012 nonwastewaters were based on the performance of electrolytic oxidation followed by alkaline chlorination for the cyanides (both total and amenable) and stabilization for the metal constituents. The Agency is not basing treatment standards for these wastes on the new alkaline chlorination data used to establish standards for F006, F007 F008 and F009 wastes. The treatment standards for F011 and F012 wastes are thus substantially lower than those for the other waste codes. The Agency believes that this is appropiate not only because of the existing performance data supporting the lower standard, but because these wastes do not have the treatability characteristics (i.e., high iron concentrations) that justify the higher standards for F006, F007 F008, and F009 nonwastewaters.

The Agency is promulgating a total cyanide standard of 100 mg/kg and an amenable cyanide standard of 9.1 mg/kg for F011 and F012 nonwastewaters. The amenable cyanide standard is based on measured concentrations of amenable cyanides in F011 and F012 treatment residuals rather than based only on the reproducibility of the analytic method for total cyanides.

(Note.—The Agency used the reproducibility of the analysis for total cyanides to establish the amenable cyanide standards for F006, F007 F008 and F009 nonwastewaters because the data indicated that the amenable cyanides could be reduced to below the reproducibility of the analysis for total cyanides. The treatment data indicated that this was not the case for F011 and F012 wastes.)

Two commenters believed that the calculation of the variability factor for the total cyanide treatment standard (100 mg/kg) for these wastes was incorrect. The Agency disagrees with the commenters. The calculation of a variability factor for two data points is based on the standard deviation and the mean. EPA uses the two data points as the limits on lognormal distribution. Based on this information, the calculated variability factor is 1.58. Thus, the variability factor multiplied by the mean of the two data points

represents the treatment standard. The calculation of these standards is further clarified and presented in the final background document for cyanide wastes and the administrative record for this rule.

The Agency received extensive comments on its use of only two data points to establish the treatment standards for cyanides based on the performance of electrolytic oxidation followed by alkaline chlorination. As discussed previously in section III.A.1.(f.) of today's rule and in the August 17 1989 final rule for First Third wastes, the Agency believes that the use of a small number of data sets from a single facility can be representative of the treatment achieved by the particular treatment system. EPA has a mandatory duty to issue standards on a very tight timetable, and automatic consequences occur should the Agency fail to act. Under these circumstances, EPA must base standards on the best data available to it, even if the data is limited. If better sources of data were made available, EPA would make every effort to use them (as has occurred with a number of wastes in this rulemaking, such as in the development of standards for the organophosphorus waste treatability group as discussed in section III.A.3.(h.) of today's preamble). Therefore, the Agency is promulgating the final standard based on the information available.

For F012 nonwastewaters (as with F006), many commenters stated that the Agency is requiring a pretreatment for the cyanides before the hazardous waste (as listed) is actually generated. The Agency has responded to this issue on pretreatment in detail in section III.A.3.(a.)(1.)(a)(iii.) of today's preamble.

The proposed treatment standards for F011 and F012 wastewaters were based on the performances of wet air oxidation for the cyanides and chemical precipitation, settling, and filtration for the metal constituents. During the comment period the Agency received performance data for the treatment of cyanides in wastewaters by alkaline chlorination. EPA performed a statistical comparison of the data from wet air oxidation and the new data from alkaline chlorination and found that alkaline chlorination performed better. Therefore, EPA is promulgating revised treatment standards for total and amenable cyanides for F011 and F012 wastewaters based on these new data and is transferring these standards to F010 wastewaters as previously discussed.

The Agency is promulgating the metal standards for F011 and F012 nonwastewaters based on the transfer of the treatment performance data for chemical precipitation, settling, filtration and sludge dewatering for K062 wastes. The Agency believes that the K062 wastes are more difficult to treat than the residues from treatment of F011 and F012 based on the higher concentrations of dissolved metals in K062 (up to 100,000 mg/l).

BDAT TREATMENT STANDARDS FOR F010

[Nonwastewaters]

Constitutent	Maximum for any single grab sample	
	Total composition (mg/kg)	TCLP (mg/l)
Cyanides (total)	1.5	(1)

(1) Not applicable.

BDAT TREATMENT STANDARDS FOR F010

[Wastewaters]

Constitutent	Maximum for any single grab sample	
	Total composition (mg/l)	TCLP (mg/l)
Cyanides (total)	1.9	(1)
Cyanides (amenable)	0.10	(1)

(1) Not applicable.

BDAT TREATMENT STANDARDS FOR F011 AND F012

[Nonwastewaters]

Constitutent	Maximum for any single grab sample	
	Total composition (mg/kg)	TCLP (mg/l)
Cyanides (total)	110	(1)
Cyanides (amenable)	9.1	(1)
Cadmium	(1)	0.066
Chromium	(1)	5.2
Lead	(1)	0.51
Nickel	(1)	0.32
Silver	(1)	0.072

(1) Not applicable.

BDAT TREATMENT STANDARDS FOR F011 AND F012

[Nonwastewaters]

Constitutent	Maximum for any single grab sample	
	Total composition (mg/l)	TCLP (mg/l)
Cyanides (total)	1.9	(1)
Cyanides (amenable)	0.10	(1)
Chromium	0.32	(1)
Lead	0.04	(1)
Nickel	0.44	(1)

(1) Not applicable.

4. F019 wastes.

F019—Wastewater treatment sludges from the chemical conversion coating of aluminum.

Today's rule does not promulgate treatment standards for the wastewater or nonwastewater forms of F019. This waste was originally scheduled for regulation in the First Third, with the statutory deadline of August 8, 1988. Since the Agency did not promulgate standards for the wastewater or nonwastewater forms of F019, land disposal of these wastes shall continue to be regulated by the "soft hammer" provisions in 40 CFR 268.8. EPA intends to promulgate concentration-based treatment standards for cyanides and metals constituents in F019 wastes by May 8, 1990.

The Agency believes that F019 wastes are in a different treatability group than F006, F007 F008, and F009 electroplating wastes or F010, F011, and F012 heat treating wastes due to the very high concentration of iron-cyanide complexes in both the wastewaters and nonwastewaters. These iron levels are significantly higher than those found in F006 wastewater precursors, and higher than any of the wastes used to establish BDAT for the electroplating wastes. The Agency believes that the source of the iron-cyanide complexes is the soluble ferrocyanide compounds (such as potassium ferrocyanide) that are used as constituents in aluminum conversion coating compounds or baths. Therefore, the cyanides present in these conversion coating baths would be the iron-cyanide complexes which are used as a component of the coating. The Agency believes that F019 nonwastewaters or the wastewater treated to generate this waste have substantial concentrations of iron-cyanide complexes. The Agency believes that the source of iron for the F019 waste is a legitimate source of iron and that F019 wastes represent a separate treatability group of cyanide wastes.

The Agency is investigating ultraviolet/ozonation, wet air oxidation, hydrolysis and incineration as potential candidates for BDAT. Recovery or reuse of the wastes containing iron-cyanide complexes is also being considered. In the interim, the "soft hammer" provisions continue to apply to the land disposal of F019 wastes.

5. Wastes from Acrylonitrile Production.

K011—Bottom stream from the wastewater stripper in the production of acrylonitrile.

K013—Bottom stream from the acetonitrile column in the production of acrylonitrile.

K014—Bottoms from the acetonitrile purification column in the production of acrylonitrile.

Wastes identified as K011, K013, and K014 are generated primarily in the organic chemicals manufacturing industry, specifically those engaged in the production of acrylonitrile. Detailed technical descriptions of the specific production processes generating these wastes can be found in the final background document for these wastes.

Today's rule promulgates treatment standards for K011, K013, and K014 nonwastewaters based on the performance of incineration. Other treatment technologies that can achieve these concentration-based standards, such as wet air oxidation, are not precluded from use by this rule. EPA is promulgating treatment standards for four organic constituents and for total cyanide. At this time the Agency is not promulgating any standards for K011, K013, or K014 wastewaters. The specific regulated constituents and treatment standards for these wastes are listed in tables at the end of this section.

i. *Nonwastewaters.* In the January 11, 1989 proposed rule (54 FR 1066–1071), the Agency proposed treatment standards for nonwastewaters based on the performance of incineration for total cyanide and organics and stabilization for the metal constituents, specifically nickel.

Several commenters argued against developing a treatment standard for nickel because, based on waste characterization data, nickel was not present in significant concentrations in the raw waste. Commenters also stated that the presence of certain constituents (e.g., sulfates and ammonia) would make the removal of nickel from wastewaters, and the stabilization of nickel in the sludge and ash, much more difficult than the Agency has estimated, thereby making the BDAT treatment standards unachievable.

The Agency has concluded, based on extensive review of existing data, that nickel is not present in concentrations that would merit regulation as part of the K011, K013, and K014 treatment standards, and therefore is removing nickel from the list of regulated constituents for K011, K013, and K014 nonwastewaters. If additional treatment performance data for nickel becomes available, the Agency is not precluded from regulating nickel as a nonwastewater treatment standard for K011, K013, and K014 wastes. As a result of this determination, the Agency is revising its BDAT treatment standards for K011, K013, and K014 nonwastewaters to be based solely on the performance of incineration.

ii. *Wastewaters.* In the January 11, 1989 proposed rule (54 FR 1066–1071), the Agency proposed wastewater treatment standards based on the performance of wet air oxidation followed by biological treatment for amenable cyanides, total cyanides, and organic constituents, and chemical precipitation, settling, and filtration for metal constituents. The Agency received many comments concerned with EPA's rationale for transferring performance data for the cyanide constituents from wet air oxidation of F007 wastes, and for organic constituents from the effluent limitations for facilities in the Organic Chemical Plastics and Synthetic Fibers (OCPSF) industry for biological treatment. Because of these comments and the additional treatment data that are being compiled by the Ad Hoc Acrylonitrile Producers UIC Group, the Agency believes that additional data collection and analysis is necessary prior to promulgation of these treatment standards.

Therefore, today's rule does not promulgate treatment standards for the wastewater forms of K011, K013 and K014. These wastes were originally scheduled for regulation in the First Third, with a statutory deadline of August 8, 1988. Since the Agency still has not promulgated standards for the wastewater forms of K011, K013 and K014, land disposal of these wastewaters shall continue to be regulated by the "soft hammer" provisions in 40 CFR 268.8. EPA intends to promulgate concentration-based treatment standards for cyanides, organics, and metals constituents for these wastes prior to May 8, 1990.

BDAT TREATMENT STANDARDS FOR K011, K013, AND K014

[Nonwastewaters]

Constituent	Maximum for any single grab sample	
	Total composition (mg/kg)	TCLP (mg/l)
Acetonitrile	1.8	(¹)
Acrylonitrile	1.4	(¹)
Acrylamide	23.	(¹)
Benzene	0.03	(¹)
Cyanides (Total)	57.	(¹)

¹ Not applicable.

6. Cyanide wastes designated with a "P" waste code.

P013—Barium cyanide
P021—Calcium cyanide
P029—Copper cyanide
P030—Soluble cyanides salts (NOS)
P063—Hydrogen cyanide
P074—Nickel cyanide
P098—Potassium cyanide
P099—Potassium silver cyanide
P104—Silver cyanide
P106—Sodium cyanide
P121—Zinc cyanide

Wastes identified as P013, P021, P029, P030, P063, P074, P098, P099, P104, P106, and P121 are usually discarded, out-of-date, or off-specification chemicals. Facilities in industries such as electroplating, heat treating, chemical conversion coating of aluminum, and acrylonitrile production typically generate these wastes.

P013, P021, P099, and P121 and Third Third wastes that were originally scheduled to be regulated no later than May 8, 1990. Several commenters opposed accelerating the schedule for these wastes. However, the statute does not preclude EPA from prohibiting the land disposal of a given waste ahead of schedule (and the schedule in §§ 268.10 through 268.12 itself says that wastes will be evaluated by a given date, indicating that the specified date is the latest time by which EPA must act). The Agency believes that this is a particularly prudent approach for P013, P021, P099, and P121 because these wastes are not only generated, but are similar to F011 and F012 wastes from the heat treating industry.

Today's rule promulgates concentration-based treatment standards for wastewater and nonwastewater forms of these wastes. BDAT for the nonwastewater forms of these wastes is based on the performance of electrolytic oxidation followed by alkaline chlorination for the cyanide constituents, and stabilization for the metal constituents. BDAT for the wastewater forms of these wastes is based on the performance of alkaline chlorination for the cyanide constituents and chemical precipitation, settling, and filtration for the metal constituents (where regulated). Treatment standards for these wastes were transferred from the performance of the BDAT for the F011 and F012 waste codes generated from heat treating operations. These discarded commercial chemical products do not contain high concentrations of iron and therefore the Agency believes that the treatment standards need not reflect the difficulties of treating complex cyanides.

The Agency is thus promulgating these concentration-based treatment standards in this section due to the similarity of these "P" wastes to the listed metal heat treating wastes.

Treatment standards for nickel in P074 and silver in P099 and P104 nonwastewaters are based on the performance of stabilization of F006 nonwastewaters. Treatment standards for nickel in P074 wastewaters are based on the performance of chemical precipitation and filtration of K062 wastewaters. The Agency believes that these wastes are more difficult to treat than the corresponding P wastes based on the higher concentrations of metals and dissolved solids anticipated to be present in F006 and K062 as compared to the P wastes (i.e., up to 100,000 ppm). The Agency is not promulgating treatment standards for barium in any P013 wastes or for silver in P099 and P104 wastewaters due to the current lack of treatment data for these metals in their respective waste types. The Agency is not precluded from developing standards for barium or silver in these particular wastes if treatment data becomes available.

One commenter argued that the Agency should not regulate copper or zinc, as EPA proposed to do, because they are not hazardous constituents specifically listed in Appendix VIII of 40 CFR Part 261. The Agency does not totally agree, in that both zinc and copper are components of zinc cyanide and copper cyanide. EPA has determined that both zinc and copper exhibit aquatic toxicity, and has considered adding these constituents to Appendix VIII for that reason. However, EPA has decided to reserve that determination for a later rulemaking, and is only regulating cyanides in these wastes (P029 and P121).

BDAT TREATMENT STANDARDS FOR P013, P021, P029, P030, P063, P074, P098, P099, P104, P106, AND P121

[Nonwastewaters]

Constituent	Maximum for any single grab sample	
	Total composition (mg/kg)	TCLP (mg/l)
Cyanides (total)	110	(1)
Cyanides (amenable)	9.1	(1)
Nickel (P074 only)	(1)	0.32
Silver (P099 and P104 only).	(1)	0.072

Not applicable.

BDAT TREATMENT STANDARDS FOR P013, P021, P029, P030, P063, P074, P098, P099, P104, P106, AND P121

[Wastewaters]

Constituent	Maximum for any single grab sample	
	Total composition (mg/l)	TCLP (mg/l)
Cyanides (total)	1.9	(1)
Cyanides (amenable)	0.10	(1)
Nickel (P074 only)	0.44	(1)

Not applicable.

7 Cyanide Wastes Designated as D003 Reactive.

Today's rule does not promulgate treatment standards for wastes identified as D003 wastes. In the January 11, 1989 proposed rule, the Agency presented a strategy for the development of treatment standards for cyanide wastes designated as D003 (see 54 FR 1071) and proposed a subcategory for D003 identified as the Reactive Cyanides Subcategory. According to 40 CFR 261.23(a)(5), a waste can be identified as D003 when it is a cyanide or sulfide bearing waste which, when exposed to pH conditions between 2 and 12.5, can generate toxic gases, vapors or fumes in quantities sufficient to present a danger to human health or the environment. No specific comments were received that challenged the development of this D003 Subcategory.

In general, the Agency received many comments that supported the development of concentration-based treatment standards. However, some commenters expressed concerns about what the treatment standard levels should be. The Agency believes that some of the general concerns about the measurement of cyanides and the selection of technologies for electroplating and heat treating cyanide wastes may also be applicable to D003 cyanide wastes. The Agency will respond to these comments and propose treatment standards for D003 wastes in the Reactive Cyanide Subcategory in a future notice of proposed rulemaking for the Third Third wastes.

b. *Wastes from chlorinated aliphatics production.*

F024—Wastes including but not limited to, distillation residues, heavy ends, tars, and reactor clean-out wastes from the production of chlorinated aliphatic hydrocarbons, having carbon content from one to five, utilizing free radical catalyzed processes. (This listing does not include light ends, spent filters and filter aids, spent dessicants, wastewater, wastewater treatment sludges, spent catalysts, and wastes listed in 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 specific production processes generating these wastes can be found in the background document for the listing of this waste code.

Today's rule promulgates treatment standards for F024 wastewaters and nonwastewaters as proposed for all constituents except 2-chloro-1,3-butadiene, 3-chloropropene, di-n-octyl phthalate, chromium and nickel. BDAT treatment standards for F024 are based on rotary kiln incineration for nonwastewaters, and rotary kiln incineration followed by chemical precipitation and vacuum filtration for wastewaters. 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 two metals in F024 wastewaters and fourteen organic constituents in F024 nonwastewaters and wastewaters. The specific regulated constituents and treatment standards for these wastes are listed in the tables at the end of this section.

Several commenters suggested that the Agency specify a method of treatment as the BDAT treatment standard for the polychlorinated dioxins (PCDDs) and polychlorinated furans (PCDFs) instead of establishing concentration-based treatment standards. Where treatment performance data are available, the Agency prefers to set concentration-based treatment standards rather than specifying a method of treatment as the BDAT treatment standard. Defining concentration-based treatment standards in terms of concentrations of hazardous constituents in the treated waste ensures that treatment standards are achievable, in practice, using available technologies, but does not specifically mandate the use of any particular treatment technology in order to comply with the treatment standard. Because treatment performance data were available for the constituents regulated in F024, concentration-based treatment standards were established.

Several other commenters stated that the PCDDs and PCDFs should be regulated for the following reasons: (1) F024 is not listed for these constituents; (2) their levels in F024 were below the practical quantitation limits (PQLs); (3)

QA/QC data did not affirm their presence in F024; and (4) a quantitation level below 10 ppb is difficult to achieve and standards should not be set any lower than the PQLs demonstrated in F024 incinerator ash.

In response to the first issue, the Agency points out the hazardous constituents for which a waste is listed are considered by the Agency in selection of constituents for regulation. However, these constituents only provide a minimum basis for listing a waste as hazardous. The Agency believes that it is not restricted to regulation of these constituents. Indeed, to do so would (at least in some cases) fail to substantially reduce toxicity or mobility of hazardous constituents in the waste, as required by section 3004(m). Moreover, the language of 3004(m) applies to all "hazardous constituents" not just those for which the waste is listed. The Agency uses waste characterization data and treatment performance data collected under the BDAT program to determine the constituents that should be regulated. A more detailed explanation of the selection of regulated constituents in F024 is provided in the BDAT background document for this waste code.

With respect to the second issue, the commenters were incorrect in stating that PCDD and PCDF levels measured in the F024 wastes were below the PQLs. In fact, these constituents were detected in untreated F024 at levels of 0.3 to 50 ppb (parts per billion), which were well above the PQLs (0.2 to 30 ppt (parts per trillion)) for these constituents. Section III.A.1.(b.) of today's preamble provides a further discussion of the applicability of Appendix VII and the relationship of PQLs to BDAT treatment standards.

The commenters were also incorrect with respect to the third issue on the QA/QC. As evidenced in the background document for this waste, the available QA/QC data does confirm the presence of dioxins and furans in F024.

The Agency also disagrees with the commenters' fourth issue. A quantitation level below 10 ppb is not difficult to achieve. The Agency does not anticipate any difficulties in achieving detection at the treatment standard of 1 ppb for either the nonwastewater or wastewater. The treatment standards for all of the PCDDs and PCDFs regulated in F024 are greater than the PQLs demonstrated on F024 incinerator ash (30 to 80 ppt). Finally, the Agency believes that these treatment standards are analytically achievable on a routine basis and points out that quantitation levels for these PCDDs and PCDFs have been achieved by commercial laboratory facilities at low ppt levels in nonwastewaters and low ppq (parts per quadrillion) levels in wastewaters.

The treatment standards set for bis(2-ethylhexyl) phthalate and di-n-octyl phthalate were opposed by one commenter who argued that setting treatment standards for these constituents was unnecessary because they were not detected in the F024 feed streams at levels above their PQLs. This commenter further stated that since the treatment standards for these two constituents are below their PQLs, the treatment standards are invalid and unreasonable. The commenter suggested that the low levels of these phthalates could be a result of cross-contamination and thus, recommended that the Agency either set a method of treatment as the treatment standard instead of establishing a concentration-based treatment standard or reserve the standards for these two phthalate constituents until more complete information is available.

The premise to the commenter's argument is incorrect in that both of these phthalate constituents were quantified above their respective PQLs in the F024 feed streams. The treatment performance data for bis(2-ethylhexyl) phthalate in F024 demonstrate that substantial treatment was achieved by rotary kiln incineration. Because bis(2-ethylhexyl) phthalate was not found in either the laboratory blanks or the treatment residuals, the commenter's claim that this constituent could be present as a result of cross-contamination does not appear to be supportable. Thus, the Agency has no reason to believe that the presence of bis(2-ethylhexyl) phthalate in F024 sampled by the Agency was due to cross-contamination. (See also the Agency's response to comments on cross-contamination of phthalates in section III.A.3.(e.) of today's preamble.)

The Agency's data indicated, however, that di-n-octyl phthalate was identified in only a few characterization samples at treatable concentrations. Further, bis(2-ethylhexyl) phthalate was also found at treatable concentrations in each of these samples. These two phthalate constituents have similarities in chemical properties and structure such that the Agency believes that they can be treated to similar concentrations by incineration. Due to the similarity in treatability of these constituents, any di-n-octyl phthalate present in F024 will be effectively controlled by regulating the bis(2-ethylhexyl) phthalate (using incineration as BDAT). Accordingly, the Agency is promulgating the treatment standards for bis(2-ethylhexyl) phthalate, but is not promulgating the treatment standards for di-n-octyl phthalate.

Several commenters stated that the concentration-based treatment standards for F024 nonwastewaters should be identical with treatment standards previously promulgated for the same constituents in other waste codes. The Agency disagrees with these commenters. BDAT treatment standards for a particular waste are developed based on treatment performance data for that waste or for a waste judged to be similar. Constituents may be treated to different levels depending on the waste matrices in which they are present. Accordingly, treatment standards for a constituent may vary among the waste codes in which the constituent is regulated.

Another commenter suggested that the nonwastewater treatment standards be raised by two orders of magnitude because they believed the proposed treatment standards could not be analytically achieved on a routine basis. However, based on routine analysis performed by contract laboratories supporting the Agency's various programs, the Agency does not anticipate any analytical difficulties in achieving the F024 treatment standards on a routine basis.

One commenter suggested that the Agency consider the composition of F024 wastewater when it is comingled with wastewater from other treated listed wastes. However, the Agency cannot take into account all of the possible mixes of waste residuals. (See also the previous discussion of mixing in section III.A.1.(c.) in today's preamble.) For these cases, the regulated community must consider the treatment standards for each regulated waste stream and comply with the strictest standards for each of the regulated constituents (or if mixing is part of a legitimate treatment process, seek a treatability variance).

One commenter felt that stabilization of incinerator ash should not be required unless leachable metal levels were higher than characteristic hazardous waste levels. The Agency reminds the commenter that F024 treated waste residuals are also considered to be listed hazardous wastes under the "derived-from" rule, regardless of whether or not the waste exhibits a characteristic. The metal constituents originally proposed for regulation (chromium and nickel) were found in F024 at treatable levels. Because incineration does not provide treatment for metals, the Agency chose to stabilize the incinerator ash to immobilize these and other metal constituents.

One commenter felt that treatment of chromium and nickel was not demonstrated by the stabilization testing performed on K048 and K051 wastes, thereby invalidating the transfer of the treatment standards for chromium and nickel from these waste codes to F024. This commenter suggested transferring treatment performance data from F006 instead.

The Agency has recently completed an analysis of TCLP extracts obtained from the stabilization of F024 incinerator ash residues. The results of this analysis show substantial reduction of metals in TCLP extracts after stabilization. However, since this data was not available for public notice and comment, and since the resultant treatment standards are significantly different from the proposed standards, the Agency has decided not to promulgate treatment standards for metals in F024 nonwastewaters in today's rule. The Agency is reserving treatment standards for metals in F024 nonwastewaters in order to provide notice that revised standards will be proposed for restrictions in a future rulemaking. No specific comments or data were received disputing the validity of the proposed standards for the metals in F024 wastewaters and thus the Agency is promulgating these standards as proposed.

The Agency discovered an error in its calculation of the proposed treatment standards for 2-chloro-1,3-butadiene and 3-chloropropene for F024 nonwastewater (i.e., 0.014 mg/kg for each constituents). Because the data used to calculate these standards were correct and in the public record, the Agency is promulgating the recalculated standards in today's rule (i.e., 0.28 mg/kg for each constituent).

BDAT TREATMENT STANDARD FOR F024

[Nonwastewaters]

Constituent	Maximum for any single grab sample	
	Total composition (mg/kg)	TCLP (mg/l)
2-Chloro-1,3-butadiene.	0.28	Not applicable
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	
Hexachlorodibenzofurans.	0.001	
Hexachlorodibenzo-p-dioxins.	0.001	
Pentachlorodibenzofurans.	0.001	
Pentachlorodibenzo-p-dioxins.	0.001	
Tetrachlorodibenzofurans.	0.001	
Chromium (Total)	Not applicable.	Reserved
Nickel		Reserved

BDAT TREATMENT STANDARD FOR F024—Continued

[Nonwastewaters]

Constituent	Maximum for any single grab sample	
	Total composition (mg/kg)	TCLP (mg/l)
Hexachlorodibenzo-p-dioxins.	0.001	
Pentachlorodibenzofurans.	0.001	
Pentachlorodibenzo-p-dioxins.	0.001	
Tetrachlorodibenzofurans.	0.001	
Chromium (Total)	Not applicable.	Reserved
Nickel		Reserved

BDAT TREATMENT STANDARD FOR F024

[Wastewaters]

Constituent	Maximum for any single grab sample	
	Total composition (mg/l)	(mg/l)
2-Chloro-1,3-butadiene.	0.28	Not applicable
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	
Hexachlorodibenzofurans.	0.001	
Hexachlorodibenzo-p-dioxins.	0.001	
Pentachlorodibenzofurans.	0.001	
Pentachlorodibenzo-p-dioxins.	0.001	
Tetrachlorodibenzofurans.	0.001	
Chromium (Total)	0.35	
Nickel	0.47	

c. *Wastes from pigment production.*

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 residues from the production of chrome oxide green pigments.

Wastes identified as K002, K003, K004, K005, K006, K007 and K008 are generated primarily by facilities in the inorganic chemicals manufacturing industry, specifically those engaged in the production of pigments. Detailed technical descriptions of the specific production processes generating these wastes can be found in the background document for the listing of these wastes.

1. Nonwastewaters. Today's rule promulgates a "No Land Disposal Based on No Generation" treatment standard for K005 and K007 nonwastewaters as proposed—applicable only to wastes generated from the process described in the listing description and disposed after June 8, 1989. Many commenters opposed any standard that specifies "No Land Disposal" for a particular waste. The Agency maintains that for *certain* wastes, this standard is appropriate. The Agency believes that the following clarification of the applicability of this standard to K005 and K007 wastes may remove the majority of the commenters' concerns.

Based on conversations with representatives of manufacturers of inorganic pigments and responses to EPA s RCRA section 3007 questionnaires, the Agency believes that the last company producing chrome-green and iron blue pigments (from which K005 and K007 wastes are generated), shut down production in 1987 Thus, the proposed "No Land Disposal" standard is appropriate for these wastes, with one important caveat. This standard applies only to wastes generated from the process described in the listing description for these wastes (in 40 CFR 261.32) that are disposed after June 8, 1989 (the effective date of this standard). The Agency recently modified existing regulatory standards for most of the "No Land Disposal" treatment standards promulgated with the First Third wastes to adopt this distinction. See 53 FR 31174 (August 17 1988) promulgating these standards, and the subsequent revision in 54 FR 18836 (May 2, 1989). The Agency adopts the explanation in the May 2, 1989 notice for its action here with respect to the waste from pigment production that are no longer being generated (i.e., K005 and K007).

K005 and K007 are Third Third Wastes that were originally scheduled to be promulgated by May 8, 1990. Several commenters opposed the

proposed accelerated schedule for these wastes as well as other wastes. However, the statute does not preclude EPA from prohibiting the land disposal of a given waste ahead of schedule (and the schedule in 40 CFR 268.10–268.12 itself says that wastes will be evaluated by a given date, indicating that the specified date is the latest time by which EPA must act), and in fact compels the Agency to prohibit the land disposal of hazardous wastes as soon as possible. The Agency believes that this is a particularly prudent approach for K005 and K007 nonwastewaters, since the basis of the treatment standard for these wastes is that they are not being generated and since no comments were received disputing this premise specifically for K005 and K007

In the January 11, 1989, proposed rule for Second Third Wastes (54 FR 1072–74), EPA proposed a treatment standard of "No Land Disposal Based on Recycling" for K002, K003 and K006 nonwastewaters and proposed to revise the promulgated treatment standard (53 FR 31174) for K004 and K008 nonwastewaters from "No Land Disposal Based on No Generation to "No Land Disposal Based on Recycling" EPA received comments, however, suggesting that there may be wastes generated as part of the recycling process that could remain subject to the land disposal prohibitions, and which otherwise called into question the circumstances of recycling. Although EPA does not necessarily endorse these comments, the Agency believes that these issues warrant further study and, therefore, has decided that K002, K003 and K006 wastes will remain in the Third Third of the schedule. Thus, the Agency is not promulgating the treatment standard of "No Land Disposal Based on Recycling" for K002, K003, and K006 nonwastewaters.

The methods of recycling, which EPA has determined require further evaluation, also apply to K004 and K008 wastes; therefore, since EPA s initial premise of no generation has not proven correct, EPA has decided to revoke the promulgated treatment standard of "No Land Disposal Based on No Generation" for K004 and K008 nonwastewaters, and to reschedule the development of treatment standards for the nonwastewater forms of K004 and K008 wastes to the Third Third of the schedule. The Agency will study these wastes along with K002, K003 and K006 nonwastewaters.

2. Wastewaters. In today's rule, the Agency is not promulgating treatment standards for the wastewater forms of K002, K003, K004, K005, K006, K007 or K008. Since K004 and K008 were First Third wastes, land disposal of these wastewaters continues to be subject to the "soft hammer" provisions in 40 CFR 268.8. Because K002, K003, K005, K006 or K007 wastes were originally scheduled for development of BDAT treatment standards with the Third Third Wastes, land disposal of these wastewaters is not subject to the "soft-hammer restrictions.

The Agency may develop concentration-based treatment standards for all of these wastewaters prior to May 8, 1990, if there is an identified need for such standards (i.e. if wastewater forms of the listed waste are proven to be generated). Wastewater forms of these wastes are expected to be generated from only a few sources. The Agency is currently evaluating the possibility of transferring treatment performance data from wastes having similar physical and chemical characteristics. The Agency has identified several sources of chromium reduction, cyanide destruction, and metals precipitation/stabilization performance data which may be applicable.

As a point of clarification, nonwastewater residuals generated from treatment of K005 or K007 wastewaters are also considered to be the listed wastes (based on the derived-from rule) and would be required to meet the treatment standards for nonwastewaters when EPA develops them. However, as noted above, the "No Land Disposal Based on No Generation" standard does not apply to these wastes. It only applies to the waste as originally generated, according to the description of the waste in the listing (as listed in 40 CFR 261.32).

BDAT TREATMENT STANDARD FOR K005 AND K007

[Nonwastewater forms of these wastes generated by the process described in the waste listing description and disposed after June 8, 1989, and not generated in the course of treating wastewater forms of these wastes]

No Land Disposal Based on No Generation

d. *Wastes from acetaldehyde production.*

K009—Distillation bottoms from the production of acetaldehyde from ethylene.

K010—Distillation side cuts from the production of acetaldehyde from ethylene.

Wastes identified as K009 and K010 are generated primarily by facilities in the organic chemicals manufacturing industry, specifically those engaged in the production of acetaldehyde. Detailed technical descriptions of the specific production processes generating these wastes can be found in the background document for the listing of these wastes.

Today s rule promulgates treatment standards for organic constituents in nonwastewater and wastewater forms of wastes identified as K009 and K010. Standards applicable to nonwastewaters are based on the performance achieved by rotary kiln incineration and the concentration of organics measured in ash residuals. Standards applicable to wastewaters are based on the performance achieved by steam stripping followed by biological treatment and the concentration of organics measured in the resultant effluent wastewaters. 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 listed in the tables at the end of this section.

In comments to the proposed rule, one of the two generators of K009 and K010 wastes indicated to the Agency that some of the organic constituents proposed for regulation were extraneous to the manufacturing process of acetaldehyde and that another of the proposed constituents could be effectively controlled by the proposed regulation of chloroform. After reviewing the commenter's rationale and the available data on the manufacturing of acetaldehyde, the Agency has determined that the proposed standards for 1,1-dichloroethane, acrolein, methylene chloride, and/or ethyl methacrylate in wastewaters are unnecessary and is therefore not promulgating the proposed standards for these constituents. However, the Agency is promulgating treatment standards for chloroform in both nonwastewater and wastewater forms of K009 and K010.

The same commenter questioned EPA's legal authority to regulate constituents that were not explicitly identified by the Agency as toxic constituents of concern when K009 and K010 were listed as hazardous wastes under Subtitle C of RCRA.

The Agency strongly disagrees with the commenter's interpretation of section 3004(m) and its interpretation of toxicity. RCRA section 3004(m) mandates EPA to promulgate treatment standards that sustantially reduce the

toxicity of the waste or that substantially reduce the likelihood of migration of hazardous constituents from the wastes. Section 3004(m) applies to all hazardous constituents and does not limit the concern to those constituents for which the waste is listed. The Agency has thus interpreted the intent of the statutory language to measure reduction of toxicity in terms of the amount and types of constituents that define the chemical composition of the waste. Thus, the Agency believes that in the development of treatment standards, the Agency can regulate any of the Appendix VII and VIII (40 CFR Part 261) constituents.

Further, the Agency has interpreted this statutory mandate as authorizing the Agency to develop treatment standards for constituents that serve as indicators of performance, thereby accounting for the reduction in either the amount or mobility of Appendix VII and VIII constituents contained in the wastes. The Agency believes that the use of surrogate or indicator constituents fully responds to the intent of section 3004(m) because there could be instances that available analytical methods cannot satisfactorily analyze for Appendix VII and VIII constituents in complex waste matrices and thus, the Agency would be unable to develop concentration-based treatment standards for the waste.

In addition, Appendix VII constituents supporting the listing of K009 and K010 were intended to support the Administrative Record of EPA in assessing the need to regulate K009 and K010 as hazardous wastes under RCRA. These constituents were by no means an exhaustive list of hazardous constituents contained in the waste, but merely provided a minimum basis for listing a waste as hazardous. Therefore, the Agency believes that it is not restricted to regulation of only these constituents. See further clarification of the use of Appendix VII constituents in section III.A.1.(b.) of today's preamble.

As noted in the proposal, performance data supporting the development of treatment standards were not generated from the direct treatment of K009 and K010 wastes. Instead, these performance data are from the treatment of wastes either judged to be as difficult to treat as the wastes of concern or containing treatable concentrations of the constituents that are candidates for regulation in the wastes of concern.

For wastewaters, these performance data were originally developed specifically to support the effluent guidelines limitations for facilities in the Organic Chemical Plastics and Synthetic Fibers (OCPSF) industry and represent the performance of Best Practical Technologies and Best Available Technologies for treatment of wastewaters. The Agency has determined that it is technically feasible to transfer the OCPSF performance data to K009 and K010, and thus is promulgating treatment standards developed from these data. Further details of the Agency's evaluation of performance data and determinations of BDAT are found in the BDAT background document for K009 and K010 wastes.

Also, this commenter pointed out that the data used by the Agency in supporting the wastewater standards may not have been adjusted for analytical spiked recoveries. The adjustment that the commenter is referring to is known as a "correction factor" which may be obtained by injecting a known quantity of a pollutant into water and determining the percent of known amount measured. During preliminary stages of the OCPSF rulemaking, EPA in fact used this adjustment technique for a variety of data, including the chloroform data discussed by the commenter in the present rulemaking. However, the Chemical Manufacturers Association submitted comments in the OCPSF rulemaking arguing that the use of correction factors for these data are technically unsound. EPA agreed that these data are "better represented as unadjusted for recovery" and decided to present the data in unadjusted form (48 FR 11856, March 21, 1983).

For purposes of the current rulemaking under RCRA section 3004(m), however, EPA believes that it is appropriate to apply a correction factor to the chloroform data to ensure consistency with the BDAT Generic Quality Assurance Project Plan (EPA/530-SW-87-011, March 1987). This Plan presents data and uses it to establish standards in a conservative manner that assures that variability in calculating correction factors is accounted for.

Thus, EPA has recalculated the wastewater standard for chloroform. At proposal, the chloroform standard for wastewaters was 0.09 mg/l. Today's rule promulgates a revised chloroform standard of 0.10 mg/l. Although this revision is minimal, the Agency believes this recalculation of the chloroform standard was necessary and fully complies with Agency methodology for developing treatment standards. Detailed information of the Agency's revisions to this standard are provided in the BDAT background document for K009 and K010 wastes.

The proposed treatment standards for wastewaters were originally presented as based on analysis of grab samples. The Agency received comments that pointed out that the data used to determine the treatment standards represented analysis of composite rather than grab samples. At the time of proposal, the Agency believed that since the standards were for volatile organic constituents, analysis of grab samples had been performed due to potential losses of volatiles during a composite sampling. However, the Agency has since determined that while grab samples are indeed used during sampling, the analysis of the samples is performed by careful compositing of the grab samples in the analytical laboratory immediately prior to analysis. Therefore, the treatment standard for methylene chloride in K009 and K010 wastewaters promulgated in today's rule are corrected and expressed as based on a composite sample. See further discussion of issues concerning grab versus composite sampling in section III.A.1.(f.) of today's preamble.

The Agency also solicited comments on the need for regulating other chlorinated organic constituents that are not on the BDAT list but were found at treatable concentrations. The only commenter supported the Agency's approach that no regulation is necessary, indicating that available data appear to indicate that these constituents are unlikely to interfere with the treatment of the regulated constituents. As a result, EPA is not promulgating, at this time, additional requirements for these other organic constituents present in K009 and K010 wastewaters.

BDAT Treatment Standards for K009 and K010

[Nonwastewaters]

Constituent	Maximum for any single grab sample	
	Total composition (mg/kg)	TCLP (mg/l)
Chloroform	6.0	(1)

(1) Not applicable.

BDAT Treatment Standards for K009 and K010

[Wastewaters]

Constituent	Maximum for any composite sample	
	Total composition (mg/l)	TCLP (mg/l)
Chloroform	0.10	(1)

(1) Not applicable.

e. *Phthalates and phthalic anhydride production wastes.*

K023—Distillation light ends from the production of phthalic anhydride from naphthalene.
K093—Distillation light ends from the production of phthalic anhydride from ortho-xylene.
K094—Distillation bottoms from the production of phthalic anhydride from ortho-xylene.
U028—Bis-(2-ethylhexyl) phthalate
U069—Di-n-butyl phthalate
U088—Diethyl phthalate
U102—Dimethyl phthalate
U107—Di-n-octyl phthalate
U190—Phthalic anhydride

Wastes identified as K023, K093, and K094 are wastes generated primarily by facilities in the organic chemicals manufacturing industry, specifically those engaged in the production of phthalic anhydride. Detailed technical descriptions of the specific production processes generating these three wastes can be found in the background document for the listing of these wastes. Phthalic anhydride, when discarded, out-of-date, off-specification, or spilled often becomes the waste identified as U190. In contact with water, phthalic anhydride reacts readily to become phthalic acid. Phthalic anhydride and phthalic acid can be reacted with other simple compounds to form a class of chemicals known as phthalic acid esters. Generally, these esters are simply referred to as phthalates. The chemicals for which wastes identified as U028, U069, U088, U102, and U107 are listed are all phthalates.

All of these compounds are very similar in chemical composition and structure (i.e., they contain one aromatic ring and are comprised of only carbon, hydrogen and oxygen). For the purposes of determining BDAT, all of these wastes have been grouped together into one treatability group identified as "phthalates and phthalic anhydride production wastes" or "phthalates" (for short).

Treatment standards for the majority of these wastes were originally scheduled to be promulgated as part of the Third Third wastes (i.e., promulgation by May 8, 1990). Only U028 and U107 wastes were originally scheduled for promulgation with the Second Third wastes. However, in the January 11, 1989, proposed rule for Second Third wastes, the Agency proposed standards for all nine of these phthalate and phthalic anhydride production wastes based on a transfer of treatment standards from similar wastes identified as K024 (distillation bottoms from the production of phthalic anhdride from naphthalene). Standards for K024 wastewaters and nonwastewaters were promulgated with the First Third wastes on August 8, 1988, based on the performance of incineration of K024 nonwastewaters in a rotary kiln as measured by the concentrations of hazardous constituents found in the ash and scrubber water residuals.

Several commenters opposed the accelerated schedule for these wastes. However, the statute (i.e., HSWA) does not preclude EPA from prohibiting the land disposal of a given waste ahead of schedule (and the schedule in §§ 268.10 through 268.12 itself says that wastes will be evaluated by a given date, indicating that the specified date is the latest time by which EPA must act). The Agency believes that setting the treatment standards and restrictions as early as possible is consistent with Congressional intent to move away from land disposal and towards treatment. Moreover, Congress created the capacity variance in section 3004(h) to address the concerns of providing additional time (where necessary) to develop protective treatment or disposal capacity. Thus, in today's rule, the Agency is promulgating treatment standards as proposed for K023, K093, K094, U028, U069, U088, U102, U107 and U190 based on the direct transfer of standards for K024.

While the treatment standards are based on the performance of incineration of K024 in a rotary kiln, other treatment technologies such as fluidized bed incineration, fuel substitution, biodegradation, and solvent extraction, that can achieve these standards are not precluded from use by this rule. The treatment standards in today's rule for all of these wastes are listed in the tables at the end of this section.

1. K023, K093 and K094 wastes. The Agency has data that indicate that there are relatively few generators of K023, K093 and K094. Information also suggests that many of these wastes, as generated, are not typically land disposed. The Agency considered promulgating a treatment standard of "No Land Disposal Based on No Generation" for the nonwastewater forms of K023, K093 and K094. However, several commenters provided information that these wastes are indeed being generated. Since the premise of no generation is not valid, the Agency decided to promulgate the proposed concentration-based standards.

The Agency determined that the treatment standards for K024 may be transferred to K023, K093 and K094 wastes because: (1) All of these wastes are generated from the production of phthalic anhydride; (2) distillation residues generated from production processes using naphthalene (corresponding to K023 and K024 wastes) are expected to contain higher concentrations of less volatile constituents than distillation residues generated from production processes using ortho-xylene (corresponding to K093 and K094 wastes). Since these constituents in K023 and K024 have lower volatility, they are more difficult to vaporize and subsequently be destroyed in a rotary kiln. K023 and K024 are thus more difficult to treat than K093 and K094; and (3) distillation *bottoms* (K024) are expected to contain lower concentrations of volatile constituents than the distillation *light ends* (K023) and thus would be more difficult to treat than K023. Based on this analysis, the Agency has determined that K024 represents the most difficult to treat of the four wastes generated from the production of phthalic anhydride. In addition, since K023, K024, K093 and K094 are all wastes from the production of phthalic anhydride, they are expected to contain a greater concentration of interfering constituents than off-spec or discarded phthalic anhydride (U190) and thus would be more difficult to treat than U190. Therefore, the Agency is directly transferring the concentration-based standards for phthalic anhydride (as measured by the analysis for phthalic acid) in K024 wastewaters and nonwastewaters to K023, K093, K094 and U190 wastewaters and nonwastewaters respectively.

One commenter questioned why the Agency did not simply establish treatment standards for K023, K024, K093, K094 and U190 measuring for phthalic anhydride rather than phthalic acid. The commenter reasoned that: (1) Analytical methods for the direct measurement of phthalic anhydride exist and are available; (2) measurement should be for phthalic anhydride because it has a significantly higher toxicity than phthalic acid; and (3) treatment standards for phthalic anhydride would allow treatment by hydrolysis and hydrolysis significantly reduces the toxicity of the waste.

The Agency's response to these issues is twofold: (1) Although methods for the measurement of phthalic anhydride exist, the measurement of phthalic acid as a surrogate provides a more effective means of measuring treatment, due to the instability of phthalic anhydride in water (i.e., hydrolysis of the anhydride in the wastes prior to analysis of treatment residuals could result in false

positive measurements of treatment efficiency if analysis were performed only for the anhydride); and (2) destruction of phthalic anhydride by incineration provides a more complete reduction in total toxicity than simple hydrolysis (i.e., incineration completely destroys both the phthalic anhydride and the phthalic acid to carbon dioxide and water, while hydrolysis does not provide any significant destruction of the organics, but rather enlarges the phthalic anhydride molecule to the acid form).

Several commenters pointed out that, as initially generated, K023, K024, K093, K094 and U190 nonwastewaters are comprised primarily of phthalic anhydride and would contain practically no phthalic acid. Thus, the wastes would probably meet the treatment standard based on analysis for phthalic acid without any treatment. Commenters suggested that the treatment standard should include a hydrolysis step prior to analysis for phthalic acid.

The Agency never intended, by establishing the standard only for phthalic acid, that these wastes should avoid treatment. In the proposed rule (54 FR 1088 (January 11, 1989)), the standards for U190 were correctly expressed as "phthalic anhydride (U190) reported as phthalic acid" The Agency thus clearly intended that the phthalic anhydride be converted to phthalic acid prior to analysis. The Agency recognizes that the standards for K023, K093 and K094 were expressed in the proposed rule (54 FR 1078 (January 11, 1989)) only as "phthalic acid" However, today's rule corrects this inconsistency by expressing all of the wastewater and nonwastewater standards for K023, K093, and K094 and U190 as "phthalic anhydride (measured as phthalic acid)" Thus, the Agency is specifically requiring analysis for phthalic acid after hydrolysis of K023, K093, K094 and U190 nonwastewaters.

For the same reason, EPA is also making this same clarifying change as a technical correction to the standards for K024 wastewaters and nonwastewaters that were adopted in the First Third rule. Thus, these standards are now expressed as "phthalic anhydride (measured as phthalic acid)" (EPA is not altering the numerical standards for these K024 wastes.)

For the wastewater forms of these wastes, the Agency is not requiring an additional hydrolysis step provided that complete hydrolysis of the anhydride can be reasonably assumed to have occurred (such as in cases where the phthalic anhydride in the waste has been in prolonged contact with water in the waste, been sufficiently mixed with the water, or suspected to have been present in low concentrations in the water).

2. Standards for U028, U069, U088, U102, and U107. EPA proposed concentration-based treatment standards for U028, U069, U088, U102, and U107 based on the transfer of data on the performance of rotary kiln incineration for K024 nonwastewaters. Standards for these wastes are derived from a direct transfer of the numerical values for phthalic acid to each of the individual phthalate esters (i.e., 28 mg/kg for all nonwastewaters and 0.54 mg/l for all wastewaters as measured by each phthalate).

One commenter argued that the Agency has not adequately demonstrated the transferability of the treatment standards for K024 wastes to these phthalate esters. The commenter stated that it had found no support for EPA's statement that all of these compounds are anticipated to be easier to burn than phthalic acid. At the same time, the commenter claimed the following information as support to their position: (1) The K024 phthalic anhydride residue is a solid and the phthalates are typically liquids; and (2) the autoignition temperature (a measure of the ease of ignition) for phthalic anhydride is 1083°F; 1032°F for dimethyl phthalate; 950°F for phthalic acid; and 735°F for bis-(2-ethylhexyl)phthalate.

The Agency recognizes that there are many factors that affect how easily a compound can be burned, such as boiling point, activation energy, bond dissociation energy, heat of combustion, heat of formation, and general structural class. However, the information provided by the commenter appears to support the Agency's position rather than the commenter's. In general, solids should be more difficult to burn than liquids. In addition, phthalic anhydride with the highest autoignition temperature appears to be more difficult to burn than the phthalic acid or the other identified phthalates.

Moreover, these data support that these phthalates pose relatively the same difficulty in burning because their autoignition temperatures are within the same order of magnitude. More important, the Agency maintains that the performance data available to the Agency support that the treatment standards for the incineration of K024 are not only transferable to these wastes but also achievable on a routine basis.

Incineration data for K024 indiate that untreated K024 wastes contained from 1.3 to 22% phthalic anhydride, approximately 10% ash, and up to 83% polymeric materials. Analysis of the incinerator residues for phthalic acid, the surrogate for phthalic anhydride (see previous discussion for K023, K093 and K094 wastes above), indicated destruction to detection limits of 8.2 mg/kg in the ash and 0.16 mg/1 in the scrubber water. Thus, if phthalic anhydride is, as the commenters' data indicates, one of the more difficult phthalates to burn, then the other phthalates and phthalic acid should be able to be destroyed to these levels. The Agency points out that the ash and the polymeric materials present in the untreated K024 waters also contribute to the difficulty in incineration of this waste. Thus, the Agency concluded that the K024 wastes are the most difficult to treat of these wastes.

The commenters expressed concern about several other issues that led them to believe that the standards could not be achieved. These include the potential for false positives due to cross-contamination from: (1) The co-incineration of nonhazardous materials containing phthalates; (2) plastic materials used during sampling and analysis; (3) nonhazardous materials co-disposed with treatment residuals; (4) liners and covers used in a roll-off containers used to transport ash (containing 35 mg/kg of phthalates); and (5) plastic materials used in the scrubber water systems. They also argued that household garbage (containing 22 mg/kg of phthalates) and landfill liners would exceed the treatment standards. Thus, they concluded that the treatment standards were not meaningful nor could they possibly be met. Several commenters further concluded that since the treatment standards could not be met, the Agency should simply establish incineration as a technology, rather than set concentration-based standards. Finally, one commenter also stated that the Agency has an insufficient number of data points on which to base the standards.

In response to the majority of these comments, the Agency points to the data on phthalate concentrations in the residuals from the test burns of four different waste types that support the Agency's key positions. The wastes include: (1) K019 (heavy ends from the distillation of ethylene dichloride in ethylene dichloride production); (2) K037 (wastewater treatment sludges from the production of Disulfoton); (3) F024 (various wastes from the production of chlorinated aliphatics such distillation residues, heavy ends, tars, and reactor clean-out wastes); and (4) K101/K102 (distillation tar residues from the distillation of aniline-based compounds

and residue from activated carbon in the production of veterinary pharmaceuticals). These wastes represent a myriad of different hazardous waste types and these data are from more than one different incineration facility.

EPA analyzed for various phthalates in the incineration residues from these test burns as follows: (1) Six data sets for di-n-butyl and bis-(2-ethylhexyl) phthalate in K019 ash residues and six data sets for di-n-octyl, di-n-butyl, and bis-(2-ethylhexyl) phthalate in K019 scrubber waters; (2) six data sets for bis-(2-ethylhexyl) phthalate in K037 ash and scrubber waters; (3) six data sets for diethyl and bis-(2-ethylhexyl) phthalate in F024 ash and scrubber waters; and (4) six data sets for bis-(2-ethylhexyl) phthalate in K101 and K102 ash and scrubber waters.

In general, the majority of the measured values for phthalates were approximately at the detection limit for the majority of phthalates that were analyzed. In kiln ash the measured values or detection limits ranged from <0.42 to <2.0 mg/kg. This is consistent with the estimated PQLs for these phthalates in ash residues (as calculated by multiplying the detection limits for the individual phthalates as measured by SW–846 Method 8250 by the correction factor of 670 for low-level contaminated soil) ranging from 1.6 mg/kg for dimethyl phthalate to a maximum of 2.5 mg/kg for di-n-butyl, di-n-octyl, and bis-(2-ethylhexyl) phthalate. The data from these four test burns also indicated that in the scrubber waters the measured values for these phthalates (or their detection limits) ranged from <0.002 to <0.050 mg/l. The concentrations of phthalates in the untreated wastes ranged from 0.05 to 500 mg/kg.

The concentrations of phthalates in the untreated wastes (for the aforementioned data) were relatively low. Accordingly, EPA did not attempt to transfer standards for phthalates from these wastes. However, these data illustrate several important points with regard to cross-contamination and the achievability of the standards. For four different test burns on four completely different waste types, analysis of treatment residuals indicated concentrations or achievable detection limits well below the promulgated treatment standards (typically an order of magnitude less). Thus the commenters' cross-contamination concerns during incineration, scrubber water processing, sample collection, transport of analytical samples, and laboratory preparation and analysis of the samples are not supported by these data. In addition, the proper use of analytical techniques in accordance with standard QA/QC in their laboratories can also reduce the potential for incidental cross-contamination.

With respect to cross-contamination concerns from incineration of nonhazardous wastes, the Agency notes that in general, a facility operator may need to segregate wastes to meet treatment standards and that need is fully consistent with the intent of the land disposal restrictions. However, based on the demonstration of incinerability of the high concentrations of phthalic anhydride in K024 wastes, the demonstration of achievability of low detection limits for ash and scrubber waters, and the basic high efficiency of destruction inherent to hazardous waste incinerators, the Agency believes that segregation of other wastes from these phthalate wastes is unnecessary and that compliance with the treatment standards for phthalate wastes would not be mitigated by co-incineration with other wastes containing phthalates.

With respect to cross-contamination concerns from co-disposal with nonhazardous wastes, from liners and covers of roll-off containers, or from the landfill liners, the Agency notes that contamination from these materials (as evidenced in the commenters' data referenced above) would be expected to be small compared to the standards. It appears unlikely that an ash residue that typically contains <2.0 mg/kg of phthalates would be significantly contaminated to a level above the treatment standard of 28 mg/kg by wastes containing only 22 mg/kg or 35 mg/kg. The fact that these materials contain phthalate levels at or near the treatment standards has no relevance to the achievability of the treatment standards. The fact that incineration can destroy hazardous wastes to a level that may be deemed nonhazardous is exactly the goal of incineration treatment.

One commenter suggested that the Agency set technology-based treatment standards for these wastes instead of concentration-based standards. This commenter felt that setting technology-based standards would eliminate the concerns of achievability of the treatment standards due to cross-contamination. Though section 3004(m) specifies that BDAT treatment standards may be expressed as either concentration-based levels or as a method of treatment (technology-based), the Agency maintains that where treatment performance data are available concentration-based treatment standards should be established rather than specifying a method of treatment. Concentration-based standards allow industry the flexibility to use any treatment technology or combination of technologies to treat the wastes as long as land disposed residuals produced, have concentrations of the regulated constituents less than or equal to the treatment standards.

Moreover, none of the commenters supported their claims (that the treatment standards could not be achieved) with data on the measurement of phthalates in treatment residuals. Because acceptable treatment performance data were available for treatment of K024 and since the data support that cross-contamination is not anticipated to affect the achievability of the standards, the Agency is promulgating the concentration-based treatment standards for U028, U069, U088, U102, and U107

BDAT TREATMENT STANDARDS FOR K023, K024, K093, K094, AND U190

[Nonwastewaters]

Constituent	Maximum for any single grab sample	
	Total composition (mg/kg)	TCLP (mg/l)
Phthalic anhydride (measured as Phthalic acid).	28	Not applicable

BDAT TREATMENT STANDARDS FOR K023, K024, K093, K094, AND U190

[Wastewaters]

Constituent	Maximum for any single grab sample	
	Total composition (mg/kg)	TCLP (mg/l)
Phthalic anhydride (measured as Phthalic acid).	0.54	Not applicable

BDAT TREATMENT STANDARDS FOR PHTHALATES U028, U069, U088, U102, AND U107

[Nonwastewaters]

Waste code	Regulated constituent	Maximum for any single grab sample	
		Total composition (mg/kg)	TCLP (mg/l)
U028	Bis-(2-ethylhexyl) phthalate	28	Not Applicable
U069	Di-n-butyl phthalate	28	
U088	Diethyl phthalate	28	
U102	Dimethyl phthalate	28	
U107	Di-n-octyl phthalate	28	

BDAT TREATMENT STANDARDS FOR PHTHALATES U028, U069, U088, U102, AND U107 [WASTEWATERS]

Waste code	Regulated constituent	Maximum for any single grab sample	
		Total composition (mg/kg)	TCLP (mg/l)
U00.28	Bis-(2-ethylhexyl) phthalate	0.54	Not Applicable
U069	Di-n-butyl phthalate	0.54	
U088	Diethyl phthalate	0.54	
U102	Dimethyl phthalate	0.54	
U107	Di-n-octyl phthalate	0.54	

f. *Wastes from the production of dinitrotoluene, toluene diamine and toluene diisocyanate.*

K027—Centrifuge and distillation residues from toluene diisocyanate production.

K111—Product washwasters from the production of dinitrotoluene via nitration of toluene.

K112—Reaction by-product water from the drying column in the production of toluenediamine via hydrogenation of dinitrotoluene.

K113—Condensed liquid light ends from the production of toluenediamine via hydrogenation of dinitrotoluene.

K114—Vicinals from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene.

K115—Heavy ends from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene.

K116—Organic condensate from the solvent recovery column in the production of toluene diisocyanate via phosgenation of toluenediamine.

U221—Toluenediamine (TDA).

U223—Toluene diisocyanate (TDI).

Today's rule promulgates treatment standards for nonwastewater and wasterwater forms of K027 K113, K114, K115, K116, U221, and U223 wastes. 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 treatment standards for the organic hazardous constituents are expressed as specific methods of treatment. For the nonwastewater forms of these wastes, the treatment methods are either incineration or fuel substitution. For the wastewater forms of these wastes, the methods are either carbon adsorption followed by incineration or fuel substitution of the spent carbon, or direct incineration of the wastewaters. In addition, for K115 wastes, the Agency is promulgating concentration-based treatment standards for nickel. The Agency did not propose treatment standards for K111 and K112 wastes, and therefore is not promulgating treatment standards in today's rule. At this tme, K111 and K112 wastes are not prohibited from land disposal.

The Agency determined that the analytical methods available during the development of today's rule could not satisfactorily measure the principal hazardous organic constituents contained in K027 K113–K116, U221, and U223 wastes and treatment residuals. One commenter identified a preliminary method of analysis for at least one constituent and urged the Agency to establish concentration-based standards based on the use of this method. However, since the Agency has not finalized this or any other analytical method for the major constituents in these wastes, performance data could not be obtained using this method that would allow the Agency to develop concentration-based treatment standards for today's rule. The Agency has also been unable to identify any surrogate constituents or gross parameters that could be used to assure reduction of the hazardous organic constituents of concern. Thus, the Agency is unable to promulgate concentration-based treatment standards for organics in these wastes.

EPA prefers concentration-based treatment standards due to the greater flexibility in choice of technology used to achieve the standard, and to the greater control afforded in ensuring efficient design and operation of the chosen technology. However, in the absence of analytical methods the Agency believes that the only logical alternative to a concentration-based standard is to establish a method of treatment as the BDAT treatment standard.

It should be noted that promulgating standards expressed as specified methods of treatment does not preclude the Agency from establishing concentration-based standards in the future, should an analytical method be developed with sufficient QA/QC that will measure the hazardous constituents, or should an adequate surrogate or indicator constituent be identified.

The majority of commenters addressing this issue supported this approach. Further, EPA believes that this approach is consistent with the BDAT methodology and with RCRA section 3004(m) which authorizes the Agency to establish either levels or methods of treatment. Therefore, today's rule promulgates treatment standards expressed as required methods for these wastes.

The Agency also points out that when treatment standards are expressed as a specific technology rather than as concentration-based standards, it is possible for a generator or treater to

demonstrate that an alternative technology can achieve an equivalent level of performance as that specified treatment method (40 CFR 268.42(b)). This demonstration could be based on: (1) A newly developed analytical method for the primary hazardous constituent; (2) a concentration-based standard utilizing a surrogate or indicator compound; or (3) other demonstrations of equivalence for an alternative method of treatment. The resultant treatment standard, as well as any analytical methodology used in the demonstration, could then be proposed by the Agency to be applicable to all wastes in this group.

EPA's full rationale for finalizing the treatment standards promulgated today is contained in the BDAT background document for these wastes. The treatment standards promulgated today for nonwastewaters and wastewater forms of K027 K113–K116, U221, and U223 are summarized in the set of tables at the end of this section.

1. Nonwastewaters. The Agency believes that incineration and fuel substitution represents BDAT for the organics in nonwastewater forms of these wastes. The Agency is promulgating a treatment standard of "Incineration or Fuel Substitution as a Method of Treatment" for the nonwastewater forms of K027 K113–K116, U221, and U223. Incinerators must comply with the requirements of 40 CFR Part 264 Subaprt O, or Part 265 Subpart O. Similarly, fuel substitution units must comply with the requirements of 40 CFR Part 266, Subpart D.

The majority of commenters addressing the nonwastewater treatment standards agreed with the Agency's rationale for requiring that these hazardous wastes be burned in incinerators regulated under 40 CFR Part 264 Subpart O or Part 265 Subpart O, or in fuel substitution units burning for energy recovery under requirements set out in 40 CFR Part 266 Subpart D (see 54 FR 1078–1080).

There were a number of comments concerning the regulatory status of residues resulting after burning these wastes. In the January 11, 1989 proposal, the Agency limited its discussion of residues from incineration/fuel substitution to those that are routinely generated during the burning of the restricted wastes (e.g., ashes, incineration/fuel substitution scrubber waters, spent filters and/or sludges from the treatment of scrubber waters). 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 other requirements, as it is doing in this proceeding for nickel in K115 wastes and for organics concentrated in the spent carbon from the treatment of K027 K113–K116, U221, or U223 wastewaters).

However, some commenters asked the Agency to clarify the regulatory status of wastes that are generated sporadically (e.g., aging equipment which have been exposed to the treated wastes). In response to the commenters who pointed out that wastes resulting from maintenance operations (e.g., replacing of aging materials in the combustion chambers, descaling of boiler soot, or debris equipment) as well as post treatment residues (e.g., filter cakes from water discharges of incineration scrubber waters and washes from the rinsing of incineration equipment) were not addressed by the Agency in the proposed rule, EPA notes that none of these sporadically generated residues are prohibited from land disposal so long as they originate from the treatment method specified in this rule. See further discussion clarifying the applicability of the treatment standards to incinerator equipment and other treatment residues where the treatment standards are promulgated as a specific method or method(s) of treatment in section III.A.3.(h.)(2.) of today's preamble.

For K115, the concentration-based standard for nickel is based on the performance achieved by stabilization of F006 sludges as measured by analysis of the TCLP extract. The Agency has determined that it is technically feasible to transfer the F006 performance data to the K115 incinerator residues because these residues are believed to show similar treatability characteristics to F006 wastes (high concentrations of nickel), and none of the constituents in K115 residuals are likely to interfere with the treatability of nickel. K115 wastes and its incineration/fuel substitution treatment residuals must comply with the concentration-based treatment standards promulgated for nickel.

2. Wastewaters. For organics in the wastewater forms of K027 K113–K116, U221 and U223 wastes, the Agency proposed as the BDAT treatment method carbon adsorption followed by incineration of spent carbon. Based on analysis of the comments received, today's rule promulgates treatment standards for these requiring the use of either: (1) Carbon adsorption of wastewaters followed by incineration of the spent carbon, or (2) direct incineration of wastewaters as a method of treatment. For K115 wastewaters, the Agency is also promulgating concentration-based treatment standards for nickel. The total concentration level for nickel is based on the transfer of performance data that EPA has for metal bearing wastewaters containing nickel. K115 must comply with both the organic and metal standards.

Most of the commenters supported EPA's proposal specifying carbon adsorption followed by incineration of the spent carbon as the method of treatment for K027 K113–K116, U221, and U223 wastewaters. The commenters agreed that this treatment train substantially reduces the amount of soluble organics in wastewaters by concentrating the soluble organics in the activated carbon. The spent carbon is generated by a nondestructive treatment process and thus, the spent carbon must undergo further treatment in order to destroy the amount of organics concentrated in the spent carbon. As a result, spent carbon treatment residues must comply with the nonwastewater treatment standards being promulgated in today's rule for the organics in the nonwastewater form of these wastes (i.e., incineration or fuel substitution).

Carbon adsorption is often used at the end of a treatment train, after the constituent concentrations are reduced by technologies such as chemical oxidation, hydrolysis or biodegradation. It should be noted that the use of such other treatment technologies prior to carbon adsorption is not prohibited by this rule provided that the activated carbon is utilized at a point prior to placing the treated wastewaters in a surface impoundment and that the other forms of treatment do not involve land disposal. (Treatment in an impoundment that meets the requirements of RCRA section 3005(j)(11) (implemented by 40 CFR 261.4) is also not prohibited). For example, biological treatment in a tank followed by activated carbon treatment, followed by discharge of treated wastewaters to a surface impoundment is not precluded.

Any nonwastewater residues from treatment technologies prior to carbon adsorption must meet the same treatment standards applicable to the spent carbon (i.e., they would have to be incinerated in order to meet BDAT). The wastewater effluent from carbon adsorption is considered to meet the treatment standard. See further discussion on the applicability of the land disposal restrictions on the residues from carbon adsorption in section III.A.3.(h.)(2.) of today's preamble.

EPA is further specifying that, to avoid ineffective treatment, effluent wastewaters must be treated by well-

designed and well-operated activated carbon unit. This is a unit that is designed and operated in a manner where operating parameters are consistent with the range of operational parameters for which the units were designed.

For instance, wastewaters contaminated with K027 generate insoluble organics (polymers) that may upset the operation of the carbon-adsorption unit and thus, these insoluble organics (typically measured as total suspended solids, TSS) must be removed from the wastewaters prior to carbon adsorption. Pretreatment of wastewaters will minimize operating problems such as plugging of the carbon bed by keeping the TSS of influent wastewaters to the carbon adsorption unit at levels that allow the unit to operate properly. Carbon adsorption units thus must be operated such that breakthrough of TDI and TDA does not occur. Selection of an indicator gross parameter or indicator constituent that can account for the performance of this technology should be made on a case-by-case basis (for example, as part of a facility's waste analysis plan). (See also the discussion of waste analysis plans in section III.A.1.(f.) of today's preamble.) The BDAT background document for K027 K111-K116, U221, and U223 wastes provides additional information of these and other parameters that are typically monitored and considered for the design and operation of carbon adsorption units.

EPA emphasizes that the specified method of treatment includes incineration or fuel substitution of the spent carbon and any other nonwastewater forms of the wastes that are generated up-stream from the effluent discharge of the carbon adsorption column (e.g., spent filters or biotreatment sludges). The spent carbon and other nonwastewaters generated prior to carbon adsorption could presumably be burned for energy recovery in a boiler or industrial furnace. Such additional treatment is necessary to thermally destroy the organic constituents left behind in the spent carbon or nonwastewaters. Without these treatment steps, the hazardous constituents would be merely transferred from one environmental media (water), to another (the carbon or other solid waste).

Commenters also urged the Agency to consider direct incineration of these wastewaters either as the BDAT or as an alternative BDAT method of treatment. The Agency believes that incineration of these restricted wastewaters is a treatment equivalent to carbon adsorption followed by incineration of spent carbon because the amount of organics concentrated in the spent carbon undergo further treatment by incineration prior to land disposal (i.e., incineration or fuel substitution of spent carbon and spent filters). Further, incineration/fuel substitution alone is capable of substantially reducing the organics in these restricted wastewaters. Therefore, EPA is promulgating incineration or fuel substitution as an equivalent BDAT method for these wastewaters. Treatment residues from incineration or fuel substitution of these wastewaters are not prohibited from land disposal.

One commenter indicated that it thermally regenerates the spent carbon used to treat wastewaters contaminated with TDI wastes. Thermal regeneration of the spent carbon is not prohibited providing that the nonwastewater residues resulting from thermal regeneration of the spent carbon undergo incineration or fuel substitution (i.e., meet the K027 K113-K116, U221, and U223 nonwastewater standards promulgated today). The regenerated carbon is no longer a solid waste provided that it is further reused or marketed (See 40 CFR 261.3(c)(2)(i)).

Several commenters urged the Agency to consider currently available treatment methods that deactivate the reactivity of wastewaters containing TDI constituents (K027 and/or U223). The methods of treatment consist of adding large amounts of water with or without chemical reagents, in order to polymerize most of the free TDI to ureas and/or polyurethanes. Commenters argued that these deactivated TDI wastewaters could be land disposed without causing any harm to the human health and the environment.

The Agency disagrees with the commenters because deactivation methods alone cannot be deemed BDAT. For instance, the addition of large amounts of water may successfully remove the reactivity of TDI. This technology, however, leaves behind residues of aromatic organic rings containing nitrogen constituents such as TDA. Since this method of treatment, alone, neither removes the long term toxicity of the organic constituents in the waste nor reduces the potential for migration of organics, the Agency has ruled out this method of treatment as a potential candidate for BDAT.

BDAT TREATMENT STANDARDS FOR K027 K113-K116, U221 AND U223

[Nonwastewaters]

Incineration or fuel substitution as a method of treatment
Incinerators must comply with 40 CFR 264 Subpart O or 265 Subpart O. Fuel substitution units must be in compliance with 40 CFR Part 266 Subpart D.

BDAT TREATMENT STANDARDS FOR K027 K113-K116, U221 AND U223

[Wastewaters]

Carbon adsorption or incineration as a method of treatment
Incinerators must comply with 40 CFR 264 Subpart O or 265 Subpart O. Fuel substitution units must be in compliance with 40 CFR Part 266 Subpart D. Spent carbon and any other nonwastewater residuals generated upstream from a carbon adsorption unit must meet the nonwastewater standards applicable to these wastes prior to land disposal. Carbon adsorption units must be operated such that breakthrough of TDI and TDA does not occur. Selection of a surrogate or indicator compound as a measure of breakthrough should be considered on a case-by-case situation.

BDAT TREATMENT STANDARDS FOR K115

[Nonwastewaters]

Constituent	Maximum for any single grab sample	
	Total composition (mg/kg)	TCLP (mg/l)
Nickel	(1)	0.32

(1) Not applicable.

BDAT TREATMENT STANDARDS FOR K115

[Wastewaters]

Constituent	Maximum for any single grab sample	
	Total composition (mg/l)	TCLP (mg/l)
Nickel	0.47	(1)

(1) Not applicable.

g. *Wastes from 1,1,1-trichloroethane production.*

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 end column from the production of 1,1,1-trichloroethane.

Wastes identified as K028, K029, K095 and K096 are generated primarily by facilities in the organic chemicals manufacturing industry, specifically those engaged in the production of 1,1,1-

trichloroethane. Detailed technical descriptions of the specific production processes generating these wastes can be found in the background document for the listing of these wastes. Today's rule promulgates treatment standards for nonwastewater forms of K028, K029, K095 andK096 and wastewater forms of K028. The regulated constituents and treatment standards for these wastes are listed in the tables at the end of this section.

1. Revision of the "No Land Disposal" standards. At the time of the proposed rule, information available to the Agency indicated that K029 wastes were no longer being generated and that K095 and K096 wastes were being completely recycled. According to available waste characterization data, all three of these wastes would be classified as nonwastewaters for the purposes of BDAT. Therefore, the Agency proposed a treatment standard of "No Land Disposal Based on No Generation" for K029 nonwastewaters and "No Land Disposal Based on Recycling" for K095 and K096 nonwastewaters. The Agency simultaneously proposed that concentration-based standards for the nonwastewaters could be transferred from treatment performance data for incineration of either K019 or F024 nonwastewaters. This data transfer would be possible because these two wastes were more difficult to treat than K029, K095 and K096.

Many commenters opposed any standard that specified "No Land Disposal" for a particular waste because of complications arising from EPA's application of the "derived-from" and "mixture" rules. The commenters were concerned that during the process of recycling their K095 and K096 wastes, an accidental spill may occur thus creating a nonrecyclable K095 or K096 nonwastewater based on either the "derived-from" or the "mixture" rule. The commenters also pointed out that potential fluctuations in the generation processes, or modifications to the generation process may result in the generation of a waste that could no longer be recycled. They indicated that these wastes, if generated, would probably require incineration and may produce an ash that would most likely require land disposal. Thus, a genuine need for a concentration-based treatment standard would arise.

The Agency maintains that for *certain* wastes, the "No Land Disposal" standard is appropriate. The Agency believes that the clarification of the applicability of this standard may remove the majority of the commenters' concerns. Such a standard is appropriate, provided that it applies to wastes generated from the process described in the listing description for this waste that appears in 40 CFR Part 261, and is disposed after the date of the applicable land disposal prohibition for that waste. A final rule published on May 2, 1989 provides a complete explanation of the basis for limiting the "No Land Disposal Based on No Generation" standard in this way (54 FR 18836).

However, most commenters supported the Agency's proposed alternative (i.e., the transfer of concentration-based treatment standards for K019 wastes to K029, K095 and K096). Thus, the Agency is not promulgating the "No Land Disposal Based on No Generation" standard for K029 nonwastewaters nor is it promulgating the "No Land Disposal Based on Recycling" standard for K095 and K096 nonwastewaters.

2. Standards for organic constituents. Commenters pointed out that K019 wastes were more similar to K028, K029, K095 and K096 nonwastewaters than F024 wastes. The Agency reexamined the data and agrees with the commenters. Waste characterization data on K019 nonwastewaters indicate that the K019 wastes do contain higher concentrations of chlorinated organic compounds than the F024 wastes and are more difficult to treat than K028, K029, K095 and K096 nonwastewaters. The Agency is therefore promulgating treatment standards for the organic constituents present in these nonwastewaters based on the transfer of performance data from rotary kiln incineration in K019 wastes rather than F024 wastes.

Because characterization data on K029, K095, and K096 show the presence of treatable concentrations of several organic constituents that the Agency had not found present in K028, the Agency developed standards for these other organic constituents based on a transfer of performance data and existing concentration-based standards for K019 wastes. Details on the rationale for the transfer of performance data and the development of treatment standards for these organic constituents can be found in the BDAT background document for these wastes.

One commenter stated that the proposed organic constituent treatment standards fall below PQLs achievable in the commenter's analytical laboratories. However, the background documents for K019 and for F024 demonstrate that detection levels in ash and scrubber water residuals can be achieved in laboratories. In fact, the limits achieved by the laboratories used in the BDAT studies are well below the proposed or final standards for all regulated organic constituents. The Agency believes this evidence verifies that analytical laboratories that are in compliance with EPA's QA/QC requirements can quantify these regulated constituents at the treatment standard levels. See also a more complete discussion of the relationship of PQLs to BDAT treatment standards in section III.A.1.(b.) of today's preamble.

Several commenters stated that the treatment standards for the organic constituents should be consistent with treatment standards previously promulgated for the same constituents in other waste codes. The Agency disagrees with these commenters. Treatment standards for a particular waste are developed based on BDAT performance data for that waste or for a waste judged to be similar. Treatment standards for particular constituents may vary for different wastes due to differences in the waste matrices which may alter the constituent treatability. The Agency also believes that these commenters concerns may be moot by the Agency's decision to transfer treatment standards from K019 wastes to K028, K029, K095 and K096 nonwastewaters.

3. Standards for metal constituents. In today's rule, only the proposed treatment standards for cadmium, chromium, lead and nickel in K028 wastewaters are being promulgated. These wastewater standards are being transferred based on the reanalysis of the performance data from the lime and sulfide precipitation treatment of metals from K062 wastewaters. The Agency has determined that these metals present in K062 wastewaters are more difficult to treat than when present in K028 wastewaters. K062 wastewaters typically contain much higher levels of these metals as well as other metals (such as iron) and much higher levels of dissolved solids (such as sulfates or chlorides). These higher concentration of metals and dissolved solids interfere with the effectiveness of the precipitation reactions which are intended to remove the metals of interest. Thus, the K062 wastewaters are more difficult to treat than K028 wastewaters. A more detailed explanation of the transfer of these data for metal constituents in K028 is provided in the BDAT background document for these wastes. The Agency did not receive any comments opposing the transfer of these K062 treatment performance data specifically to K028 wastewaters nor were any comments or data received indicating that these

standards could not be achieved. Therefore, the Agency is promulgating these standards as proposed.

Standards for nickel and chromium in K028 nonwastewaters were originally proposed based on performance data for these metal constituents from the stabilization of K048 and K051 incinerator ash. One commenter felt that these data were not demonstrated by the stabilization testing performed, thereby invalidating the transfer of the treatment standards. This commenter suggested transferring treatment performance data from F006 instead.

Meanwhile, the Agency has recently completed an analysis of TCLP extracts obtained from the stabilization of F024 incinerator ash residues. The results of this analysis show substantial reduction of metals in TCLP extracts after stabilization. At the same time, the Agency reexamined the data for the stabilization of F006, K048, and K051 nonwastewaters and concluded that these new stabilization data for F024 wastes may better represent the levels of treatment obtainable for the metals expected to be contained in K028 ash residues (as well as those for K029, K095, and K096). However, since these data were not available for public notice and comment, and since the resultant treatment standards are significantly different from the proposed standards, the Agency has decided not to promulgate treatment standards for these metals in K028 nonwastewaters in today's rule. The Agency is reserving standards for nickel and chromium in K028 nonwastewaters in order to provide notice that these constituents will be proposed for restrictions in a future rulemaking.

Another commenter challenged transferring stabilization data in order to regulate inorganic constituents in treatment residues from K028 wastes because the commenter believed that if the concentrations for metals fall below the levels which define a characteristic waste (40 CFR Part 261 Subpart C), no treatment should be required. The Agency reminds the commenter that the treatment residuals are also considered to be listed hazardous wastes under the "derived-from" rule, regardless of whether or not the waste exhibits a characteristic. See further discussion of the relationship of BDAT to the "derived-from rule in section III.A.1.(d.) of today's preamble.

In a similar manner, one commenter questioned the need to regulate metals constituents in residues derived from a predominantly organic waste. Because incineration is designed specifically to destroy organics and because it does not provide treatment for metals (which end up in the ash), the Agency believes that stabilization of the ash to immobilize metal constituents is a technically valid approach.

Other commenters stated that these metals should not be regulated because these wastes are not listed for these constituents. The hazardous constituents for which a waste is listed are considered by the Agency is selection of constituents for regulation. However, these constituents are by no means an exhaustive list, but merely provide a minimum basis for listing a waste as hazardous. As discussed in section III.A.1.(b.) of today's preamble, the Agency therefore believes that it is not restricted to regulation of only these constituents. The Agency uses waste characterization and treatment performance data collected under the BDAT program to determine the constituents that should be regulated.

At the time of proposal, there was apparently no need for metals standards in K029, K095 and K096 nonwastewaters, because K095 and K096 nonwastewaters were being totally recycled and because K029 nonwastewaters were identified as no longer being generated. The Agency intends to develop standards for metals in nonwastewaters forms of K029, K095, and K096 and propose them with the Third Third wastes prior to promulgation by May 8, 1990.

4. Standards for K029, K095 and K096 wastewaters. The Agency also did not propose treatment standards for the wastewater forms of K029, K095 and K096. The Agency stated that it believed that there was no need for their development because it was unlikely that these wastewaters were being generated nor could be generated. Commenters indicated that they believe that the likelihood for generation of these wastewaters is reasonably good, and thus a need exists for standards. In particular, wastewaters may be generated during the recycling of K095 and K096 (e.g., wash waters, contaminated cooling water, and spill rinsings). (However, if K095 and/or K096 wastes are used as intermediates and thus not discarded, these materials would not be solid wastes, and any residues from their use would therefore not be deemed to be derived from management of a listed hazardous waste.)

The Agency agrees with these commenters that wastewater forms of K029, K095 and K096 may be generated and thus treatment standards are needed. However, today's rule cannot promulgate any treatment standards because no standards were previously proposed. The Agency intends to develop standards for wastewater forms of K029, K095, and K096 and propose them with the Third Third wastes prior to promulgation by May 8, 1990.

K029, K095, and K096 are all considered Second Third wastes for which treatment standards were to be established by the statutory deadline of June 8, 1989. Since the Agency is not promulgating standards for the wastewater forms of K029, K095 and K096 by their statutory deadline, land disposal of these wastewaters shall be regulated by the "soft hammer" provisions in 40 CFR Part 268.

BDAT TREATMENT STANDARDS FOR K028

[Nonwastewaters]

Constituent	Maximum for any single grab sample	
	Total composition (mg/kg)	TCLP (mg/l)
1,1-Dichloroethane	6.0	(1)
trans-1,2-Dichloroethene	6.0	(1)
Hexachlorobutadiene	5.6	(1)
Hexachloroethane	28.	(1)
Pentachloroethane	5.6	(1)
1,1,1,2-Tetrachloroethane	5.6	(1)
1,1,2,2-Tetrachloroethane	5.6	(1)
1,1,1-Trichloroethane	6.0	(1)
1,1,2-Trichloroethane	6.0	(1)
Tetrachloroethylene	6.0	(1)
Chromium (Total)	(1)	Reserved.
Nickel	(1)	Reserved.

[1] Not applicable.

BDAT TREATMENT STANDARDS FOR K028

[Wastewaters]

Constituent	Maximum for any single grab sample	
	Total composition (mg/l)	TCLP (mg/l)
1,1-Dichloroethane	0.007	
trans-1,2-Dichloroethene.	0.033	
Hexachlorobutadiene	0.007	
Hexachloroethane	0.033	
Pentachloroethane	0.033	
1,1,1,2-Tetrachloroethane.	0.007	
1,1,2,2-Tetrachloroethane.	0.007	
Tetrachloroethylene	0.007	
1,1,1-Trichloroethane	0.007	
1,1,2-Trichloroethane	0.007	
Cadmium	6.4	
Chromium (Total)	0.35	
Lead	0.037	
Nickel	0.47	

BDAT TREATMENT STANDARDS FOR K029

[Nonwastewaters]

Constituent	Maximum for any single grab sample	
	Total composition (mg/kg)	TCLP (mg/l)
Chloroform	6.0	Not applicable
1,2-Dichloroethane	6.0	
1,1-Dichloroethylene	6.0	
1,1,1-Trichloroethane	6.0	
Vinyl chloride	6.0	

BDAT TREATMENT STANDARDS FOR K095

[Nonwastewaters]

Constituent	Maximum for any single grab sample	
	Total composition (mg/kg)	TCLP (mg/l)
1,1,1,2-Tetrachloroethane.	5.6	
1,1,2,2-Tetrachloroethane.	5.6	
Tetrachloroethene	6.0	
1,1,2-Trichloroethane	6.0	
Trichloroethylene	5.6	
Hexachloroethane	28.0	
Pentachloroethane	5.6	

BDAT TREATMENT STANDARDS FOR K096

[Nonwastewaters]

Constituent	Maximum for any single grab sample	
	Total composition (mg/kg)	TCLP (mg/l)
1,3-Dichlorobenzene	5.6	
Pentachloroethane	5.6	
1,1,1,2-Tetrachloroethane.	5.6	
1,1,2,2-Tetrachloroethane.	5.6	
Tetrachloroethylene	6.0	
1,2,4-Trichlorobenzene	19.	
Trichloroethylene	5.6	
1,1,2-Trichloroethane	6.0	

h. *Organophosphorus pesticide wastes.*

K036—Still bottoms from toluene reclamation distillation in the production of Disulfoton.
K038—Wastewater from the washing and stripping of Phorate production.
K039—Filter cake from the filtration of diethyl phosphorodithioic acid in the production of Phorate.
K040—Wastewater treatment sludge from the production of Phorate.
P039—Disulfoton
P040—Diethyl 2-pyrazinyl phosphorothioate
P041—Diethyl-p-nitrophenyl phosphate
P043—Diisopropylfluorophosphate
P044—Dimethoate
P062—Hexaethyl tetraphosphate
P071—Methyl parathion
P085—Octamethyl pyrophosphoramide
P089—Parathion
P094—Phorate
P097—Famphur
P109—Tetraethyl dithiopyrophosphate
P111—Tetraethyl pyrophosphate
U058—Cyclophosphamide
U087—0,0-Diethyl S-methyl dithiophosphate
U235—tris-(2,3-Dibromopropyl) phosphate

Today's rule promulgates treatment standards for wastewater and nonwastewater forms of K038, K039, K040, P039, P040, P041, P043, P044, P062, P071, P085, P089, P094, P097 P109, P111, U058, U087 and U235. It also promulgates standards for wastewater forms of K036. 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 principal constituents of concern in each of these wastes are members of a group of organic compounds known as organophosphorus compounds. The majority of these constituents also contain sulfur and are often referred to as phosphorothioates. All of these compounds are somewhat similar in structure and elemental content. Most are typically manufactured for use as pesticides. Therefore, the Agency has classified all of these compounds as one treatability group identified as the organophosphorus pesticides.

In the January 11, 1989 proposed rule for Second Third wastes, the Agency proposed a direct transfer of the concentration-based standards from the incineration of K037 wastes (wastewater treatment sludge from the production of Disulfoton) to some of these organophosphorus pesticide wastes (i.e., those that have analytical methods) and proposed incineration as a method of treatment for the others. The basis of all of these standards is the similarities in structure and elemental composition of all of the organophosphorus pesticides to each other and to Disulfoton, the principal hazardous constituent of concern in K037 wastes. (EPA promulgated concentration-based treatment standards for K037 wastewaters and nonwastewaters with the First Third wastes on August 8, 1988.) In addition, the Agency believes that Disulfoton is one of the most difficult chemicals in this group of organophosphorus pesticides to incinerate. Given that Disulfoton can be effectively treated by incineration and that the chemicals in this group are structurally similar, the Agency believes that all the other organophosphorus pesticides in this section can be effectively treated by incineration, and that the concentration-based standard for each representative regulated organophosphorus pesticide can be identical to that achieved by incineration of Disulfoton in K037 wastes. Therefore, the Agency believes that the performance achievable by incineration represents BDAT for all of the organophosphorus pesticide chemicals and is promulgating concentration-based treatment standards for the wastewaters and nonwastewater forms of K038, K040, P039, P071, P089, P094, P097 and U235 as well as wastewater forms of K036 based on this transfer.

EPA is establishing incineration as a method of treatment for the nonwastewater forms of K039, P040, P041, P043, P044, P062, P085, P109, P111, U058 and U087 Standards for the wastewater forms of these organophosphorus pesticides have been developed based on the performance of biological degradation, incineration and carbon adsorption. These are discussed in detail in the following sections.

1. *Wastes with concentration-based BDAT standards.* The Agency has determined that, currently, there are analytical methods (most of which comply with the EPA, Office of Solid Waste, Publication: SW-846 (generally referred to as SW-846)) that allow the measurement of the principal hazardous constituent (organophosphorus pesticide) contained in wastes and treatment residuals for wastes identified as K036, K038, K040, P039, P071, P089, P094, P097 and U235. Thus, the Agency is able to promulgate concentration-based treatment standards for: Disulfoton in K036 wastewaters; Disulfoton in P039 wastewaters and nonwastewaters; Phorate in K038, K040 and P094 wastewaters and nonwastewaters; and Methyl parathion, Parathion, Famphur, and tris-(2, 3-Dibrompropyl) phosphate in P071, P089, P097 and U235 wastewaters and nonwastewaters, respectively. 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 listed in the tables at the end of this section.

The proposed treatment standards for the wastewater forms of these organophosphorus pesticides were based on the concentrations of Disulfoton as measured in grab samples of scrubber water from the incineration of K037 nonwastewaters. EPA has decided to change these standards in the final rule based on additional performance data for a biological wastewaters treatment system submitted during the comment period. These data were from the treatment of industrial wastewaters containing low concentrations of Parathion. Although, these data (based on analysis of grab samples for influent wastes and composite samples for effluent) were not generated specifically for this rulemaking and do not result from the direct treatment of the RCRA waste identified as P089 (Parathion), the Agency believes that these wastewaters have concentrations of Parathion that are similar to those wastewaters identified specifically as K036, K038, K040, P039, P071, P089, P094, P097 or U235. The Agency has also determined that these data are valid and represent the level of performance that appears to be achievable for this type of biological wastewater treatment system.

The Agency points out that the promulgated concentration-based treatment standards for wastewaters for these organophosphorus wastes are based on the analysis of composite samples rather than grab samples, because this new performance data received during the comment period were based on the analysis of composite effluent samples. See further discussion of when EPA uses composite samples to establish treatment standards in section III.A.1.(f.) of today's preamble.

EPA believes these data to be a preferable measure of treatment performance because where the Agency has performance data (that conform with BDAT methodology) on wastewater treatment processes and data on incineration (constituent concentrations in scrubber water), the Agency prefers to establish treatment standards based on the wastewater treatment processes. [Note.—This does not preclude the Agency from establishing treatment standards for other wastes based on constituent concentrations in incinerator scrubber waters.)

EPA also believes that these data for biological treatment of Parathion can be validly transferred to the wastewaters forms of the other organophosphorus pesticide waste codes. This is due to the structural similarity between Parathion and the other organophosphorus wastes. Thus, today's rule promulgates revised concentration-based standards for the wastewater forms of K036, K038, K040, P039, P071, P089, P094, P097 and U235 based on analysis of composite samples from wastewater treatment. (EPA also intends to investigate if these wastewater standards are appropriate for K037 wastewaters—a First Third waste—as part of the Third Third rulemaking.)

The Agency received one comment disagreeing with the proposed concentration-based standards for P089, P097 and U235, because of a perceived lack of analytical methods to detect Parathion (P089), Famphur (P097) and tris-(2,3-dibromopropyl) phosphate. The Agency disagrees with this comment, and believes that all three chemicals can be analyzed. Famphur and Parathion can be analyzed by Method 8270 of SW-846, and have been proposed in the January 23, 1989 update to the third edition of SW-846. Tris-(2,3-dibromopropyl) phosphate can be analyzed by Method 8350 of SW-846, and will be included in the second update to the third edition of SW-846, due to be proposed as an official method in early 1990. All three chemicals have been previously included on the BDAT List for that reason.

One commenter questioned why, in the January 11, 1989 proposal, standards were proposed for K036 wastewaters, but not for K036 nonwastewaters. The Agency promulgated a BDAT standard of "No Land Disposal based on No Generation" for K036 nonwastewaters with the First Third wastes on August 8, 1988. (See 53 FR 31174). 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 forthcoming proposed rule for Third Third wastes, the Agency intends to propose a standard for other forms of K036 nonwastewaters, such as K036 spill residues or solid residues from the treatment of K036 leachate.

One commenter stated that K036 and P039 may be harder to destroy by incineration than K037 because the concentration of Disulfoton in K036 and P039 may be many times higher than the concentration in K037 The Agency disagrees with this comment. While it recognizes that higher concentrations of Disulfoton may occur in K036 and P039 wastes, the Agency believes that the concentrations would not be significantly different from that measured in the untreated K037 wastes. The data in the background document for K037 show Disulfoton concentrations of 10.4% to 24.6% for the untreated wastes. The Agency believes that these concentration levels would be within the same order of magnitude of those anticipated to be in K036 and P039. The Agency successfully incinerated this high level of Disulfoton such that the concentrations in the residuals were at or near the detection limit in the residuals. Further, the K037 waste tested also contained approximately 75% solids (filter paper and diatomaceous earth filter aid) which the Agency believes could interfere with the destruction of Disulfoton and thus make K037 more difficult to destroy than K036 and P039 wastes that may have slightly higher concentrations of the chemical, but a lesser amount of interferences.

2. Wastes with treatment methods as BDAT. The Agency determined that the analytical methods available during the development of today's rule could not satisfactorily measure the principal hazardous organic constituents (organophosphorus pesticide) contained in wastes and treatment residuals for wastes identified as K039, P040, P041, P043, P044, P062, P085, P109, P111, U058 and U087 Thus, the Agency is unable to promulgate concentration-based treatment standards for these wastes and is promulgating methods of treatment. Although EPA prefers a concentration-based standard (due to both the greater flexibility in choice of technology used to achieve the standard and in the greater control afforded to ensure efficient design and operation of the chosen technology), in the absence of analytical methods (that would measure and assure compliance), the Agency believes that establishing a method of treatment is the only logical alternative for BDAT. In general, the majority of commenters on this issue supported this approach. Further, EPA believes that this is consistent with the promulgated BDAT methodology and with RCRA Section 3004(m) which authorizes the Agency to establish either levels or methods of treatment. Therefore, today's rule promulgates methods of treatment for these wastes.

As discussed previously, the Agency believes that incineration represents BDAT for the nonwastewater forms of these wastes. Besides the fact that EPA does not currently have an analytical method for this group of

organophosphorus pesticides, EPA has currently not identified any organic constituents in these wastes that could be used as a surrogate or as an indicator compound in order to develop alternative concentration-based standards for these wastes. It should be noted that promulgating BDAT standards expressed as specific methods of treatment does not preclude the Agency from establishing concentration-based standards in the future, should an analytical method be developed with sufficient QA/QC that will measure the hazardous constituents or should an adequate surrogate or indicator constituent be identified. Therefore, the Agency is promulgating a BDAT treatment standard of "Incineration as a Method of Treatment" for the nonwastewater forms of K039, P040, P041, P043, P044, P062, P085, P109, P111, U058 and U087 Incinerators must comply with 40 CFR 264 Subpart O or 265 Subpart O.

For the wastewater forms of these organophosphorus wastes, the Agency proposed carbon adsorption as the BDAT treatment method in 54 FR 1086 (January 11, 1989). The residual from this type of nondestructive treatment (i.e., the spent carbon) is still considered to be the same waste code as before treatment, and must be managed as such. It therefore must be incinerated prior to land disposal.

It should be noted that the use of other treatment technologies prior to carbon adsorption is not prohibited by this rule. Carbon adsorption is often used at the end of a treatment train, after the constituent concentrations are reduced by technologies such as chemical oxidation, hydrolysis or biodegradation. Any nonwastewater residues from these treatment technologies prior to and including carbon adsorption would have to be incinerated in order to meet the treatment standard. The wastewater effluent from carbon adsorption would be considered to meet the treatment standard. See section III.A.3.(j.) of today's preamble for a similar discussion on carbon adsorption for wastewaters associated with K027 wastes.

Several commenters suggested that there are cases where it may be preferable to incinerate the wastewater, rather than have the waste adsorbed by carbon. Two examples of these situations occur when: (1) The waste appears as a result of the "mixture-rule" with other waste codes for which the BDAT treatment method requires incineration; and (2) the waste is generated such that it contains a relatively high level of TOC but just under the 1% TOC cut-off and maintains its classification (for purposes of BDAT) as a wastewater. In either case, the Agency agrees with the commenter that incineration would then be the preferred or required (as in the case of the first example) method of treatment. In fact, the Agency did consider incineration as an alternative destructive technology to carbon adsorption. However, it seemed impractical to require all wastewater streams to be incinerated. (Some data indicated that the majority of hazardous wastewaters contain significantly less than 1% TOC.)

For those wastewaters that do contain just under the 1% TOC level, incineration may be more desirable and possibly more effective than carbon adsorption. This might lead one to believe that for these "high" TOC wastewaters, the Agency should therefore dictate incineration over carbon adsorption. However, at this time the lack of a method to analyze for the constituents of concern makes it difficult (but not impossible) to correlate the performance efficiency of the two treatment methods for the constituents of concern to performance efficiency of a surrogate or indicator compound. One possible surrogate to measure treatment efficiency is total organic carbon (TOC); however, the Agency is currently unaware of the level of TOC for which carbon adsorption would be more efficient than incineration.

Thus, the Agency is promulgating "Incineration or Carbon Adsorption as a Method of Treatment" as BDAT for the wastewater forms of wastes identified as K039, P040, P041, P043, P044, P062, P085, P109, P111, U058 and U087 Spent carbon and any other nonwastewater residuals generated up-stream from a carbon adsorption unit must meet the nonwastewater standards applicable to these wastes prior to land disposal, and so must be incinerated. Carbon adsorption units must be operated such that breakthrough of organophosphorus compounds does not occur. (See section III.A.3.(f.) of today's preamble for a discussion on the need for specifying some level of proper operating conditions for carbon adsorption technology.) Selection of a surrogate or indicator compound of this breakthrough should be made on a case-by-case basis (for example, as part of a facility's waste analysis plan). See also the discussion of waste analysis plans in section III.A.1.(f.) of today's preamble.

Commenters asked the Agency to specifically clarify the applicability of the "treatment as a method" BDAT standards to treatment residuals. They suggested that the Agency could clarify the standards by stating that they do not apply to "derived-from" wastes. While the Agency agrees that clarification is necessary, it does not agree that the standards should be identified as suggested for several reasons: (1) all wastes identified as "derived-from" are not necessarily treatment residues (e.g., leachate); (2) all nonwastewater treatment residues (such as spent carbon, residues from recycling, and residues from wastewater treatment processes prior to carbon adsorption) may contain leachable hazardous organics; (3) some wastewaters (such as scrubber waters from steam stripping operations or recovery process waters) may contain significant amounts of untreated constituents.

However, the Agency believes that the previous discussions in this section assist in clarifying the applicability to these residues. As a summary, the Agency points out the following: (1) Scrubber waters from incinerators in compliance with 40 CFR Part 264 Subpart O of Part 265 Subpart O are considered to meet BDAT for these wastes and can be land disposed; (2) the scrubber waters from incinerators in compliance with 40 CFR Part 264 Subpart O or Part 265 Subpart O therefore are not required to undergo "Carbon Adsorption as a Method of Treatment"; (3) incinerator ashes and residues from the treatment of scrubber waters from incinerators in compliance with 40 CFR Part 264 Subpart O of Part 265 Subpart O are considered to meet BDAT for these wastes and can be land disposed; (4) incinerator equipment (such as fire brick) that are derived from sections of the incinerator that have been directly subjected to the high temperatures of the incinerator (that was operated in compliance with 40 CFR Part 264 Subpart O of Part 265 Subpart O) or are downstream from the high temperature zones are considered to meet BDAT for these wastes and can be land disposed. The Agency believes that the hazardous constituents contained in these wastes are destroyed in the high temperature zones of the incinerator and would not be expected to be present in the high temperature zones or in the equipment down stream of these zones; (5) wastewater effluent (and their subsequent nonwastewater treatment residues) from the carbon adsorption units treating wastewater forms of these waters are considered to meet BDAT for these wastes and can be land disposed; and (6) spent carbon (and nonwastewater residues from the pretreatment of these wastes prior to carbon adsorption) from the treatment

of wastewater forms of these wastes are not considered to meet BDAT for these wastes and must meet the BDAT treatment standards for nonwastewaters prior to land disposal.

As noted earlier, when treatment standards are expressed as a specific technology rather than concentration-based standards, it is possible for a generator or treater to demonstrate that an alternative technology can achieve an equivalent level of performance as that specific treatment method (40 CFR 268.42(b)). This demonstration could be based on: (1) A newly developed analytical method for the primary hazardous constituent; (2) a concentration-based standard utilizing a surrogate or indicator compound; or (3) other demonstrations of equivance for an alternative method of treatment. The resultant treatment standard as well as any analytical methodology used in the demonstration could then be proposed by the Agency to be applicable to all wastes in this group.

BDAT TREATMENT STANDARDS FOR ORGANOPHOSPHORUS WASTES K038, K040, P039, P071, P089, P094, P097 AND U235

Waste code	Regulated constituent	Maximum for any single grab sample	
		Total composition, (mg/kg)	TCLP (mg/l)
K038	Phorate	0.1	(1)
K040	Phorate	0.1	(1)
P039	Disulfoton	0.1	(1)
P071	Methyl parathion	0.1	(1)
P089	Parathion	0.1	(1)
P094	Phorate	0.1	(1)
P097	Famphur	0.1	(1)
U235	tris-(2,3-Dibromopropyl) phosphate	0.1	(1)

Not applicable.

BDAT TREATMENT STANDARDS FOR ORGANOPHOSPHORUS WASTES K036, K038, K040, P039, P071, P089, P094, P097 AND U235

[Wastewaters]

Waste code	Regulated constituent	Maximum for any composite sample	
		Total composition (mg/l)	TCLP (mg/l)
K036	Disulfoton	0.025	(1)
K038	Phorate	0.025	(1)
K040	Phorate	0.025	(1)
P039	Disulfoton	0.025	(1)
P071	Methyl parathion	0.025	(1)
P089	Parathion	0.025	(1)
P094	Phorate	0.025	(1)
P097	Famphur	0.025	(1)
U235	tris-(2,3-Dibromopropyl) phosphate		

[1]Not applicable.

BDAT TREATMENT STANDARDS FOR ORGANOPHOSPHORUS WASTES K039, P040, P041, P043, P044, P062, P085, P109, P111, U058 AND U087

[Nonwastewaters]

Incineration as a method of treatment
Incinerators must comply with 40 CFR 264 Subpart O or 265 Subpart O.

BDAT TREATMENT STANDARDS FOR ORGANOPHOSPHORUS WASTES K039, P040, P041, P043, P044, P062, P085, P109, P111, U058 AND U087

[Wastewaters]

Carbon adsorption or incineration[1] as a method of treatment
Incinerators must comply with 40 CFR 264 Subpart O or 265 Subpart O. Spent carbon and any other nonwastewater residuals generated upstream from a carbon adsorption unit must meet the nonwastewater standards applicable to these wastes prior to land disposal. Carbon adsorption units must be operated such that breakthrough of the organophosphorus compounds does not occur. Selection of a surrogate or indicator compound as a measure of breakthrough should be considered on a case-by-case situation.

1. Wastes from 2,4–D production.

K043—2,6–Dichlorophenol wastes from the production of 2,4–D.

Wastes identified as K043 are generated primarily by facilities in the organic chemicals manufacturing industry, specifically those engaged in the production of 2,4–D. The Agency has data that indicate that there is only one current generator of this waste. Detailed technical descriptions of the specific production process generating these wastes can be found in the background document for the listing of this waste code. The treatment standards for this waste are based on data obtained from wastes generated and treated at this facility.

Today's rule promulgates treatment standards for K043 wastewaters and nonwastewaters based on incineration. 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 thirteen organic constituents including tetrachloroethene, six chlorinated phenols, and six polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDDs and PCDFs, respectively). The specific regulated constituents and treatment standards for these wastes are listed in the tables at the end of this section.

The promulgated treatment standards for the regulated chlorinated phenols in wastewaters are based on new data received by the Agency from the sole generator/treater of K043 during the comment period. The original data for wastewaters consisted of two data points. The new data provided six additional wastewater data points. The Agency believes these new data are more representative of treatment that can be achieved for K043.

In general, the comments submitted on the proposed rule for K043 related to four general issues: (1) The establishment of treatment standards for PCDDs and PCDFs; (2) specifying a treatment technology as the treatment standards for K043 rather than establishing concentration-based standards; (3) the validity of the performance data upon which the treatment standards are based; and (4) the regulation of tetrachloroethene in K043.

Commenters were concerned with the treatment standards established for the six regulated PCDDs and PCDFs. Some commenters thought that the PCDDs and PCDFs should not be regulated because K043 is not listed for these constituents. This is not a sufficient reason for not establishing a treatment standard, for the reasons given a number of times earlier in this preamble. (See further discussion of the use of Appendix VII in establishing BDAT in section III.A.1.(b.) of today's preamble and the discussion of the analysis for analysis of PCDDs and PCDFs in F024 wastes in section III.A.3.(b.) of today's preamble.) The Agency thus uses waste characterization and treatment performance data to determine the constituents that should be regulated for a waste. A more detailed explanation of the selection of regulated constituents in K043 is provided in the background document for this waste code.

Another commenter felt that the tetrachlorodibenzo-p-dioxins (TCDDs) and tetrachlorodibenzofurans (TCDFs) should not be regulated because the incineration data (submitted by the commenter) did not indicate the presence of these constituents in K043 wastes. In response, the Agency points out that the availability of specific treatment data for a given constituent in a particular waste, is not a requirement for the selection of that constituent for regulation. This is particularly true when EPA has sufficient additional waste characterization data that indicate the presence of that constituent in treatable levels in wastes other than what was specifically treated. While the Agency did not have specific treatment data for TCDDs and TCDFs in the submitted K043 incineration data, it did not waste characterization data indicating the presence of several of these constituents in other untreated K043 wastes at concentrations that the Agency determined were treatable by incineration.

This same commenter expressed concern that the BDAT treatment standards for these constituents in K043 were transferred from treatment standards for K099. According to the commenter, the wastes are not sufficiently similar to justify transferring standards. As stated in the proposed rule (54 FR 1083), the Agency also has data on six PCDDs and PCDFs in untreated and treated K099 wastes. Since K099 is generated at the same site as K043 (in the next step of the 2,4-D production process) and since they contain similar types and concentrations of hazardous constituents as contained in untreated K043 wastes, the Agency believes that K099 wastes are sufficiently similar in order to justify transferring standards for these constituents to K043 wastes.

In addition, the Agency feels that incineration of K043 waste will treat the PCDDs and PCDFs to levels that are comparable to those achieved by chlorination of the K099 waste. Further, the Agency points out that standards for PCDDs and PCDFs are the same as those promulgated for F024 wastes (which are also based on incineration). The Agency believes that the F024 wastes tested by the Agency are more difficult to incinerate than K043, based on available characterization data, and that the resultant F024 incinerator ash is as difficult or more difficult to analyze than the respective K043 nonwastewater residuals. While the Agency maintains that the transfer of standards from K099 is supportable, the Agency believes that the data from F024 also lends support to establishment of these standards for K043. See section III.A.1.(e.) of today's preamble for a more detailed discussion related to the transfer of treatment standards.

Several commenters expressed general concerns about the ability to comply with the treatment standards for PCDDs and PCDFs because they are too low (i.e., near the practical quantitation limits (PQLs) for these constituents). They claim that the 1 ppb detection limit is not routinely achievable, that only a handful of laboratories can perform the analysis to this level, and that analysis and reporting of these constituents typically takes three to eight months.

The Agency disagrees that these treatment standards are too low and does not anticipate any difficulties in achieving detection at the treatment standard of 1 ppb for either the nonwastewaters or wastewaters. While the Agency has no data for PCDDs and PCDFs in treated K043 residuals, data do exist for these constituents in treatment residues of other wastes indicating that detection limits of less than 1 ppb can routinely be achieved. For example, performance data from incineration of F024 show detection limits of less than 10 parts per trillion (ppt) in residual wastewater and less than 100 ppt in residual ash. The Agency believes that these treatment standards are analytically achievable on a routine basis and points out that quantitation levels for these PCDDs and PCDFs have been achieved by commercial laboratory facilities at low ppt levels in nonwastewaters and low parts per quadrillion (ppq) levels in wastewaters. The Agency also contends that there are a sufficient number of laboratories capable of performing the analysis of PCDDs and PCDFs to the 1 ppb level and that the analysis can be performed in a timely manner, as was the case for F024 sample analyses. Furthermore, because there currently is just one generator of K043, the Agency does not believe that the regulation of PCDDs and PCDFs in K043 will adversely affect laboratory capacity to perform such analyses. See also further discussion of PQLs in section III.A.1.(b.) of today's preamble.

One commenter suggested that the Agency set technology-based treatment standards for K043 instead of concentration-based standards. This commenter felt that setting technology-based standards would be equivalent to establishing concentration-based levels because the concentrations were based on performance data from the sole generator of K043 whose treatment facility is well designed and operated. Though section 3004(m) specifies that BDAT treatment standards may be expressed as either concentration-based levels or as a method of treatment (technology-based), the Agency maintains that where treatment performance data are available, concentration-based treatment standards should be established rather than specifying a method of treatment. Concentration-based standards allow

industry the flexibility to use any treatment technology or combination of technologies to treat K043 as long as the treatment residuals produced (that are destined for land disposal) have concentrations of the regulated constituents less than or equal to the treatment standards. In addition, other facilities in the future may generate K043 wastes and the Agency has no guarantee that such facilities will have treatment systems that are as well-designed and well-operated as that of the current sole generator/treater. Because acceptable treatment performance data were available for treatment of K043, the Agency established concentration-based treatment standards for this waste.

One commenter claimed that the wastewater performance data supplied to EPA were insufficient to establish statistically valid concentration-based treatment standards because the background levels of chlorinated phenols were no different than levels in the scrubber water collected during the test burn. EPA does not concur with the claim that the supplied data are not useful in establishing statistically valid treatment standards for wastewaters. The sole generator provided the Agency with results from the analysis of eight scrubber water samples collected during incineration treatment tests. The concentrations of the regulated constituents in these samples are substantially lower than those in the untreated waste. Thus, incineration has been demonstrated to provide substantial treatment of these constituents. The Agency's own statistical analysis confirms the fact that the levels of regulated constituents found in the scrubber water sampled showed statistically significant reduction from the levels identified in the raw waste. The fact that background samples of scrubber water and the scrubber water collected during the treatment test were similar in their concentrations of regulated constituents indicates simply that the incineration of K043 completely destroys these constituents in the waste.

A concern of the sole generator/treater was that concentration-based treatment standards would force the facility to incinerate dilute K043 wastewaters or seek a treatment standard variance because of difficulties arising from the "derived-from" and "mixture" rules. The Agency does not believe the generator/treater would be forced to incinerate or seek a treatment variance for dilute "derived-from" or "mixed" K043 wastewaters. First, the K043 wastewater treatment standards would apply only if the wastewaters were placed in land disposal units. Second, if such wastewaters are being placed in land disposal units, the facility has the option of delisting the scrubber waters following the incineration of K043 waste such that the "derived-from" and "mixture" rules would no longer apply. Third, the treated K043 wastewaters could be isolated in a land disposal unit such that other plant wastewaters would not become subject to the BDAT treatment standards set for K043 under the "mixture" rule.

Finally, it is clear that the type of problem referred to by the commenter would arise only if the other wastes at the facility also contain treatable levels of the regulated hazardous constituents in K043, in which case it furthers RCRA's goals to have effective treatment of those constituents before land disposal of the combined waste. For example, if waste A has a treatment standard of 10 mg/l for hazardous constituent X and is treated to meet the standard but then is combined with other waste streams and the combined waste stream now contains greater than 10 mg/l of X, the other wastes must contain X in treatable concentrations. Further treatment to minimize threats to human health and the environment thus would be appropriate before land disposal (See also RCRA section 3004(m)).

One commenter believes that tetrachloroethene should not be a regulated constituent in K043 because it is used as a cleaning solvent for K043 process equipment and is not present in the waste as a result of the production process that generates K043. Further, the commenter states that this constituent is already being regulated under the Solvents and Dioxins Rule (under F002 waste) for this use.

In this case, the waste stream in question is a process waste that has become contaminated with small amounts of solvent; it is not a mixture of spent solvent and K043. Furthermore, the K043 waste does not contain a spent solvent since the tetrachloroethene that contaminated the K043 had not been generated as a waste when the contamination took place. Data provided to EPA indicated that tetrachloroethene was present in the untreated K043 as a treatable level and showed substantial treatment by incineration in K043 treatment residuals. The solvent cleaning step is part of the production process and any contamination present in the waste before treatment becomes part of that waste and, thus, can be made subject to BDAT treatment standards. Therefore, the Agency chose to regulate tetrachloroethene in K043 at a total constituent concentration of 0.006 mg/l in wastewaters and 1.7 mg/kg in nonwastewaters.

BDAT TREATMENT STANDARDS FOR K043

[Nonwastewaters]

Constituent	Maximum for any single grab sample	
	Total composition (mg/kg)	TCLP (mg/l)
2,4-Dichlorophenol	0.38	(1)
2,6-Dichlorophenol	0.34	(1)
2,4,5-Trichlorophenol	8.2	(1)
2,4,6-Trichlorophenol	7.6	(1)
Tetrachlorophenols (Total)	0.68	(1)
Pentachlorophenol	1.9	(1)
Tetrachloroethene	1.7	(1)
Hexachlorodibenzo-p-dioxins	0.001	(1)
Hexachlorodibenzo-furans	0.001	(1)
Pentachlorodibenzo-p-dioxins	0.001	(1)
Pentachlorodibenzo-furans	0.001	(1)
Tetrachlorodibenzo-p-dioxins	0.001	(1)
Tetrachlorodibenzo-furans	0.001	(1)

(1) Not applicable.

BDAT TREATMENT STANDARDS FOR K043

[Wastewaters]

Constituent	Maximum for any single grab sample	
	Total composition (mg/l)	TCLP (mg/l)
2,4-Dichlorophenol	0.049	(1)
2,6-Dichlorophenol	0.013	(1)
2,4,5-Trichlorophenol	0.016	(1)
2,4,6-Trichlorophenol	0.039	(1)
Tetrachlorophenols (Total)	0.018	(1)
Pentachlorophenol	0.22	(1)
Tetrachloroethene	0.006	(1)
Hexachlorodibenzo-p-dioxins	0.001	(1)
Hexachlorodibenzo-furans	0.001	(1)
Pentachlorodibenzo-p-dioxins	0.001	(1)
Pentachlorodibenzo-furans	0.001	(1)
Tetrachlorodibenzo-p-dioxins	0.001	(1)
Tetrachlorodibenzo-furans	0.001	(1)

(1) Not applicable.

B. "Soft Hammer" Applicable Treatment Standards

(Note: EPA is not reinterpreting any of the principles relating to the RCRA "soft hammer" provision (RCRA section 3004(g)(6)) contained in the First Third rule and preamble. See 53 FR 31179–31185. The Agency is adding the following discussion, which repeats those principles, solely for purposes of providing information.)

The Agency has not promulgated treatment standards for the First Third and Second Third wastes in Tables B.(a)

and B.(b). If EPA fails to set treatment standards for any hazardous waste included in 40 CFR 268.10 or 268.11 by the August 8, 1988 or June 8, 1989 statutory deadlines, such waste is subject to the "soft hammer" provisions.

Under the "soft hammer" provisions, these wastes may be land disposed in a landfill or surface impoundment only if the generator makes certain certifications, and only if the unit meets the RCRA 3004(o) minimum technological requirements. Among other things, the "soft hammer" provisions require that prior to disposal in a landfill or surface impoundment unit meeting the minimum technological requirements, a generator must demonstrate his good faith effort to treat his waste by the best practically available treatment technology(ies). The Agency has interpreted this to mean practically available treatment that provides the greatest environmental benefit (40 CFR 268.8(a)(1)). Where no treatment is practically available, the generator may so demonstrate. The required demonstration and certification must be submitted to the Regional Administrator. "Soft hammer" wastes become subject to the statutory hard hammer as of May 8, 1990.

The Agency is amending § 268.12 to include wastewater residues derived from the treatment of "soft hammer" wastes by certain processes (shifting such wastewater residues to the Third Third). This action will allow these wastewater residues to be disposed in units not meeting minimum technological requirements and such residues will not be subject to the certification requirements of § 268.8. This action is being taken because a number of companies use BDAT-type treatment to treat "soft hammer" wastes, and then further treat the resulting treatment residues in impoundments that do not satisfy minimum technological requirements, but meet the requirements of section RCRA section 3005(j)(3) or 3005(j)(13). The Agency believes that persons who are substantially treating their wastes to levels that may satisfy ultimate treatment standards are not precluded from further treatment of these wastes in polishing (i.e., 3005(j)(3)) or advanced biological treatment (i.e., 3005(j)(13)) units that are substantially protective of human health and the environment, although not equivalent to minimum technology impoundments from the standpoint of preventing migration from the unit. Furthermore, EPA does not believe that these types of treatment residuals are the types of contaminated wastes deserving of prioritization in the second third of the schedule.

The Agency has identified several treatment technologies that are generally considered appropriate for the nonwastewater forms of "soft hammer" wastes (see 53 FR 31175). These technologies include: metal recovery, leaching/oxidation, metals stabilization, ash stabilization, chemical oxidation, biodegradation, incineration, and PCB incineration. Treatment technologies generally considered appropriate for the wastewater forms of "soft hammer" wastes include: aqueous metal recovery, chromium reduction, metals precipitation, steam stripping, carbon adsorption, oxidation/reduction, chemical oxidation, biodegradation, incineration, and PCB incineration.

The technologies are listed as general categories of technologies that EPA believes have a reasonable probability of application to the waste codes listed. These categories do not specify any particular type of technology (e.g., incineration can represent liquid incinerators, rotary kiln, or fluidized bed incinerators). The actual choice of a particular technology or even train of technologies depends on the physical and chemical characteristics of the specific waste. Specific selection of one technology depends on its functional design.

The Agency notes that many of these wastes, when existing as untreated wastes, are already prohibited from land disposal because they are California list wastes. However, as was discussed in the August 17 1988 final rule, treatment to comply with the California list prohibitions (including the codified statutory prohibition levels) does not necessarily satisfy the "soft hammer" requirements of 40 CFR 268.8 and, in fact, the California list prohibitions represent the minimum treatment required for such "soft hammer" wastes prior to land disposal (53 FR 31187). In the case of an overlap between a "soft hammer" waste and a California list statutory prohibition, the "soft hammer" provisions still apply because they are potentially more protective. However, in no case may a waste be disposed of in excess of the California list prohibition levels.

Where EPA has promulgated a California list treatment standard, however. the soft hammer does not apply. *Id.* Thus, the "soft hammer" does not apply to California list HOCs for which EPA has established a treatment standard. *Id.*

The following tables are presented as an aid to generators seeking appropriate technologies to treat "soft hammer" F- and K-listed wastes. Several technologies are listed for each waste code, in descending order of preference. EPA notes that certain technologies are only appropriate for certain constituent types and that more than one treatment technology may be required (if practically available) to treat the different constituents of concern in the waste.

The Agency emphasizes that these tables are not to be considered as strict treatment requirements. In general, however, EPA will use these tables in evaluating the demonstrations and certifications received for these wastes and is providing this information to aid the generator in determining the best practically available technology (if any) for treating his waste in compliance with § 268.8.

TABLE B.a.—APPROPRIATE TREATMENT TECHNOLOGIES FOR FIRST THIRD AND SECOND THIRD "NONWASTEWATERS"

RCRA Waste Code	Potential California List Applicability	Primary Applicable Treatment Technologies
F019	Cyanide	Electrolytic Oxid. Alkaline Chlorin. UV Ozonation Incineration Ash Stabil.
K004	Chromium	Metals Recovery.
K008		Metals Stabil.
K041	Halogenated Organics	Incineration.
K097		
K098		
K042		
K105	PCBs/Halogen. Organ	PCB Incineration.
K017	Halogenated Organics	Incineration.

TABLE B.a.—APPROPRIATE TREATMENT TECHNOLOGIES FOR FIRST THIRD AND SECOND THIRD "NONWASTEWATERS"—Continued

RCRA Waste Code	Potential California List Applicability	Primary Applicable Treatment Technologies
K073		Biodegradation Ash Stabilization.
K031	Arsenic	Metals Recovery.
K084		Leaching/Oxidation.
K101, K102/high Ar		Metals Stabil.
K046/explosive	Lead	Open Detonate/Burn Oxidation. Incineration Metals Stabil.
K069/$CaSO_4$	Lead	Leaching/Oxidation Metals Stabil.
K085	Halogenated Organics & PCB's	PCB Incineration Biodegradation Ash Stabilization.
K035	Organics and/or Metals	Incineration.
K083		Wet Air Oxidation.
K086 solv. sludges caust. water.		Biodegradation Ash Stabilization.
K106	Mercury	Metals Recovery Metals Stabil.

TABLE B.b.—APPROPRIATE TREATMENT TECHNOLOGIES FOR FIRST THIRD AND SECOND THIRD "WASTEWATERS"

RCRA Waste Code	Potential California List Applicability	Primary Applicable Treatment Technologies
F006	Cyanide	Alka. Chlorination.
K011	Cyanide	Wet Air Oxidation.
K013		
K014		
K025	Halogenated Organics	Carbon Adsorption.
K029	Halogenated Organics	Chemical Oxidation.
K095		Carbon Adsorption.
K096		
K041	Halogenated Organics	Steam Stripping.
K097		Carbon Adsorption.
K098		Biodegradation.
K042	Halogenated Organics	Steam Stripping. Carbon Adsorption. Biodegradation.
K105	PCBs/Halog. Organics	Carbon Adsorption. Biodegradation.
K004	Chromium	Chromium Reduction.
K008		Metals Precip.
K061		
K017	Halogenated Organics	Steam Stripping.
K021		Carbon Adsorption.
K073		Biodegradation.
K022	Unlikely to be applicable	Steam Stripping.
K035		Carbon Adsorption.
K060		Chemical Oxidation.
K083		Biodegradation. Metals Precip.
K031	Arsenic, lead or mercury	Oxidation/Reduction
K046/nonexpl		Metals Precip.
K069/all		
K084		
K106		
K046/expl	Lead	Oxidation. Metals Precip.
K085	Halogenated Organics & PCB's	Biodegradation. Carbon Adsorption.
K086	Halogenated Organics	Biodegradation.
solv. sludges	Metals	Carbon Adsorption.
caust. water		Chromium Reduction Metals Precip.

C. Capacity Determinations

1. Determination of Alternative Capacity and Effective Dates for Surface Land-Disposed Wastes for Which Treatment Standards Are Promulgated

a. *Total Quantity of Land-Disposed Wastes.* The capacity analyses for wastes for which EPA is today finalizing treatment standards were performed 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 (i.e., land disposal). Survey data are part of the record for this final rule.

In addition, EPA recently conducted the National Survey of Hazardous Waste Generators (the Generator Survey). The Generator Survey was designed to gather data on waste generators and exempt hazardous waste treatment capacity, along with detailed waste characterization data. Although the majority of these data are not yet available, EPA used a subset of the data to corroborate conclusions as to the amount of treatment capacity required for the electroplating wastes (F006–F012). These data are available as part of the administrative record.

The various land disposal methods used and the quantities of waste handled are presented in Table III.C.1.a. Since publication of the proposed rule, EPA has received additional data from late-reporting TSDR facilities. Although the new data do not affect any of the national capacity variance decisions for surface disposed wastes, they have been included in this discussion for completeness. Some methods of land disposal, including use of salt domes, salt bed formations, and underground caves and mines, are not addressed in the capacity analyses because of insufficient data on the types and volumes of wastes disposed of by these methods.

The TSDR Survey indicated that about 623 million gallons of wastes for which standards are finalized today were disposed in or on the land in 1986. This includes approximately 3 million gallons of wastes that were stored in surface impoundments, and 1 million that were stored in waste piles. These stored wastes will eventually be treated, recycled, or permanently disposed in other units. To avoid double counting, the volumes of wastes reported as being stored in surface impoundments or waste piles have not been included in the volume of wastes requiring alternative treatment capacity. Furthermore, this final rule prohibits the placement of wastes affected by this rule in waste piles or surface impoundments for storage.

The TSDR Survey indicated that less than 50,000 gallons of the wastes addressed today were treated annually in surface impoundments that do not meet EPA's minimum technology requirements. However, this amount is actually a treatment residual from an impoundment that was replaced with a tank. Because the Agency assumes that this waste is now being sent off-site for treatment, this amount is included as treatment capacity required in today's rule.

In addition, 5 million gallons are treated in waste piles, less than 1 million gallons were disposed in surface impoundments, 10 million gallons were disposed in land treatment units or landfills, and 604 million gallons are injected underground. All of these wastes will require alternative treatment capacity.

b. *Required Alternative Capacity for Surface Land Disposed Wastes.* EPA assessed the requirements resulting from today's final rule for alternative treatment capacity for surface land disposed wastes. EPA first characterized the volumes of wastes for which treatment standards are being established, since these wastes require alternative treatment. Waste streams were characterized on the basis of land disposal method, waste code, and physical/chemical form. Using this information, EPA placed the wastes into treatability groups identifying 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 promulgated today.

Based on this analysis, the EPA estimates that today's rule could affect about 623 million gallons of wastes that are land disposed annually. This total includes wastes that were stored only; consequently, only about 619 million gallons will require alternative treatment capacity. Of this total, 15 million gallons were surface disposed (i.e., excluding underground injection), and the remaining 604 million gallons were underground injected. (See section III.C.3. for determinations of alternative capacity and effective dates for wastes injected underground.)

The volumes of surface land disposed wastes that require alternative commercial treatment/recycling capacity are presented in Table III.C.1.b. This table does not include wastes that can be treated on site by the generator.

As explained in preamble section III.A.1., with limited exceptions, EPA is finalizing treatment standards expressed as concentration limits based on the performance of the Best Demonstrated Available Technology (BDAT), rather than requiring treatment using BDAT. Where the treatment standard is a specific level of performance to be met, then any treatment method may be used to achieve the concentration level specified by the standard. However, BDATs (and technologies that the Agency finds perform comparably) as discussed in preamble section III.A., were used as the basis for determining available capacity.

The TSDR Survey contains data on specific treatment processes at facilities. The data enable EPA to identify specific BDAT treatment (and treatment the Agency finds performs comparably) 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 treatment standards, since a well-designed and well-operated BDAT treatment process should be capable of complying with the promulgated treatment standards.

c. *Capacity Currently Available and Effective Dates.* Table III.C.1.c presents an estimate of the volume 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 is equal to the specific treatment system's maximum capacity less the amount used in 1986, and was calculated using the TSDR Survey data. 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, California List Halogenated Organic Compound (HOC) wastes, and First Third wastes.

It is important to note that some of the wastes, because of their actual physical form, cannot meet treatment 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 rule.

Wastes from Electroplating Operations. For today's final rule, EPA has revised the proposed cyanide treatment standards for cyanide-containing F007 F008, F009 waste from electroplating operations. The final wastewater and nonwastewater treatment standards are based on alkaline chlorination. The treatment standards for metals in treatment residuals from alkaline chlorination are based on chemical precipitation followed by settling and filtration for wastewaters, and stabilization for the nonwastewaters. EPA estimates that 2 million gallons of wastewaters and nonwastewaters will require cyanide treatment before stabilization as a result of today's treatment standards.

After analyzing the TSDR Survey data, EPA has determined that sufficient commercial capacity exists for these wastes (both wastewaters and nonwastewaters). EPA has therefore determined that no long term national capacity variance for these wastes is warranted. However, in order to be cautious and allow time (if any is truly needed) for facilities to adjust existing cyanide treatment processes to operate more efficiently, EPA has determined to grant a 30-day extension for the electroplating wastes (see also the discussion in preamble section II.E.). As shown below, however, EPA believes that there will be ample treatment capacity at the end of 30 days (if not sooner) to accommodate demand for treatment of these wastes.

In response to public comments, EPA reevaluated the amount of alternative treatment capacity necessary to treat F006 wastes as a result of today's final rule. The results of this analysis corroborate the Agency's position that the majority of F006 wastes containing cyanides are already being pretreated on-site to cyanide levels that meet the treatment standard, and therefore, only limited additional commercial capacity is needed.

EPA evaluated TSDR Survey data and Generator Survey data from approximately 1,500 facilities, selected from those generating the largest volumes of F006 wastes. The TSDR Survey contained data on 358 facilities generating F006 wastes in 1986. Of the total volume generated, 69 percent is generated at facilities with on-site cyanide treatment, and 27 percent was determined to be non-cyanide bearing F006. Consequently, only 4 percent of the F006 waste reported as generated in the TSDR Survey would need alternative off-site treatment capacity for cyanides.

EPA also evaluated a subset of Generator Survey data currently available. This analysis involved evaluating data from almost 1,500 facilities. The analysis identified 322 facilities generating F006 waste. Since the Generator Survey contains waste concentration data, EPA was able to identify the volume of wastes with the following: Cyanide concentrations above and below the treatment standards; with unknown cyanide concentration; and where the presence of cyanide is unknown. This analysis showed that only 7 percent of the F006 waste for this data subset was not analyzed by the generator for the presence of cyanide, or the cyanide concentration in the waste was unknown, or had a cyanide concentration in excess of the treatment standard. However, less than 0.7 percent of the volume of the F006 waste had a cyanide concentration above the treatment standard or had cyanides with unknown concentration levels. In summary, 93 percent of this sample reported meeting the treatment standard, approximately 1 percent reported exceeding the treatment standard, and 6 percent reporting unknown cyanide levels. The percentage of compliance could be higher since it is reasonable to assume that most of the unknown wastes will contain cyanides in concentrations less than the treatment standard, otherwise generators would know and report that cyanides were present.

Although EPA has only evaluated data from a subset of F006 generators, it believes this pattern to be representative of the total census of F006 wastes. (As noted in section III.A.3.a.2.i., the data on total cyanide submitted to EPA in the public comments to the rulemaking also showed greater than 90 percent compliance with the final treatment standard.)

In order to be cautious in assessing the need for alternative treatment capacity, EPA is assuming that, as a worst case, 10 percent of F006 waste may need alternative commercial treatment capacity. EPA therefore assumes for this rule that 10 percent of the 129 million gallons of land disposed F006 (or about 13 million gallons) may require alternative commercial treatment. Sufficient commercial alkaline chlorination capacity exists to treat this volume of waste. Consequently, EPA does not believe that any extended national capacity variance is warranted for F006 nonwastewaters. As stated earlier, the Agency is delaying the effective date of the cyanide standard for F006 nonwastewaters 30 days in order to give facilities a short period of time to adjust equipment performance should this be necessary. (Technically, the basis for this 30-day delay is section 3010(b) rather than section 3004(h)(2), as noted in preamble section II.E.)

EPA also has determined that no extended capacity variance is appropriate for the F007–F009 wastes. These wastes are generated in considerably smaller volumes than F006 and are no more difficult to treat. EPA has determined to delay the effective date of the new standards for 30 days, however, for the same reasons as for the cyanide standard for F006. The basis for this action is RCRA section 3004(h)(2).

Wastes from Heat Treatment Operations and Cyanide-Bearing "P" Wastes. EPA is also promulgating in today's final rule treatment standards for F011 and F012 cyanide-containing wastes from heat treating operations and P013, P021, P029, P030, P063, P074, P098, P099, P104, P106, and P121. The nonwastewater treatment standards for cyanide in these wastes are promulgated based on the performance of electrolytic oxidation followed by alkaline chlorination. The wastewater standard is promulgated based on the performance of alkaline chlorination.

One commenter on the proposed rule pointed out than no commercial facilities offer the specific treatment trains identified as BDAT for nonwastewaters (i.e., electrolytic oxidation followed by alkaline chlorination). EPA agrees that no commercial facilities with a treatment train consisting of electrolytic oxidation followed by alkaline chlorination were identified in the TSDR Survey. However, EPA believes that alkaline chlorination alone will meet the treatment standards (see the Background Document on cyanides for the basis of this conclusion). The Agency received numerous public comments supporting this position. Consequently, EPA included commercially available alkaline chlorination capacity in its capacity determinations for these wastes.

After analyzing the TSDR Survey data, EPA has determined that adequate treatment capacity is commercially available to treat the small volume of F011, F012, P030, P063, P074, P098, P099, P104, P106, and P121 wastes (both wastewaters and nonwastewaters) surface land disposed. (As noted above, the nonwastewater form of the wastes are amenable to wastewater treatment because they can by hydrated (i.e.,

dissolved easily.)) EPA does not believe that any extension is warranted for the discarded commercial chemical product wastes. They are generated in small volumes at sporadic intervals and do not have to be treated in existing treatment systems that conceivably require major adjustments.

The F011 and F012 wastes could be treated in such existing treatment systems, however, and EPA has consequently decided to delay the prohibition effective date for 30 days for these wastes as a result. Further, if F011 nonwastewaters and F012 nonwastewaters are commingled with electroplating nonwastewaters, the entire mixture will become subject to the lowest treatment standard for common constituents, in this case 110 mg/kg total cyanide. This limit is not uniformly attainable for the electroplating wastes due to significant concentrations (in some streams, at least) of complexed cyanides. Thus, EPA expects that F011 nonwastewaters and F012 nonwastewaters will be segregated and treated separately—an appropriate result since otherwise the electroplating wastes would interfere with the treatment of the free (i.e., non-complexed) cyanides in the heat-treating wastes. It will, however, take some time to adjust processes to segregate these heat-treating and electroplating wastes. Accordingly, the Agency is deferring the effective date of the 110 mg/kg total cyanide standard and the 9.1 mg/kg amenable cyanide standard for the F011 and F012 heat-treating nonwastewaters until December 8, 1989. Between July 8, 1989 and December 8, 1989 these wastes will be subject to the same cyanide standards as the electroplating nonwastewaters, i.e., 590 mg/kg total cyanide and 30 mg/kg amenable cyanide (the alternative, which the Agency has rejected as contrary to policy and RCRA sections 3004 (h) and (m), being to leave these heat-treating wastes subject to no cyanide standard at all even though some treatment is available and achievable).

The treatment standards for F010 nonwastewaters have not been changed from the proposal. The nonwastewater standard for total cyanide concentration is based on incineration, and the wastewater standard is based on alkaline chlorination. EPA estimates that less than 1 million gallons a year of F010 nonwastewater will require incineration as a result of today's final rule. There is no shortage of this technology, nor would any short term adjustments be needed in the technology's operation. No F010 wastewaters were identified in the TSDR Survey as being surface land disposed. Consequently, there is no basis for delaying the effective date of the prohibition and treatment standards for these wastes.

F019 Wastes. For today's final rule, EPA has decided not to finalize the proposed standards for F019 wastewaters and nonwastewaters (see preamble section III.A.3.a.4.). Consequently, F019 wastes will continue to be subject to the "soft hammer" requirements.

Wastes From Acrylonitrile Production. Nonwastewater treatment standards for K011, K013, and K014 wastes are being promulgated based on incineration. However, EPA is not promulgating the proposed wastewater standards for K011, K013, and K014. Therefore, these wastewaters will be subject to the "soft hammer" provisions of 40 CFR 268.8.

After analyzing the TSDR Survey data, the Agency has determined that enough commercial incineration capacity is available to treat the less than 1 million gallons of nonwastewater K011, K013, and K014 that are not injected underground. Therefore, EPA is not granting a national capacity extension for K011, K013, and K014 nonwastewaters that are surface land disposed.

Wastes From Acetaldehyde Production. Nonwastewater treatment standards for K009 and K010 are based on incineration. For K009 and K010 wastewaters, steam stripping followed by biological treatment has been identified as BDAT. No surface disposed K009 or K010 wastes were identified from the TSDR Survey. Consequently, EPA is not granting a variance to these wastes.

Wastes from the Production of Dinitrotoluene, Toluene, Diamine, and Toluene Diisocyanate. For K027 K113–K116, U221, and U223 wastes, EPA is requiring the use of incineration or reuse as fuel as a method of treatment for nonwastewaters, and carbon adsorption, incineration, or reuse as fuel as a method of treatment for wastewaters. Based on TSDR Survey data, EPA estimates that about 8 million gallons per year of surface land disposed nonwastewaters will require incineration as a result of today s treatment standards. No wastewaters were identified from the TSDR Survey or from public comments as requiring alternative treatment.

After analyzing the TSDR Survey data, EPA has determined that there is enough commercial capacity available to treat the K027 K113–K116, U221, and U223 nonwastewaters and wastewaters. EPA is therefore not granting a capacity extension for surface land disposal of these wastes.

Organophosphorus Pesticide Wastes. For K039, P040, P041, P043, P044, P062, P085, P109, P111, U058, and U087 wastes, EPA is requiring the use of incineration as a method of treatment for nonwastewaters, and either carbon adsorption or incineration as a method of treatment for wastewaters. After analyzing the TSDR Survey data, EPA has determined that enough commercial capacity is available to treat both the wastewater and nonwastewater forms of these wastes. EPA is therefore not granting a national capacity variance to surface disposed K039, P040, P041, P043, P044, P062, P085, P109, P111, U058, and U087 wastes.

For K038, K040, P039, P071, P089, P094, P097 and U235 nonwastewaters, EPA is promulgating treatment standards based on incineration/reuse as fuel. For K036, K038, K040, P039, P071, P089, P094, P097 and U235 wastewaters the standard is based on biological treatment (today's final rule does not affect the "no land disposal" standard for K036 nonwastewaters previously promulgated). After analyzing the TSDR Survey data, the Agency has determined that enough capacity is commercially available to treat the wastewater and nonwastewater forms of these wastes. EPA is therefore not granting a capacity extension for wastes K036 (nonwastewaters only), K038, K040, P039, P071, P089, P094, P097 and U235.

Wastes From Pigment Production. EPA is promulgating a treatment standard of "no land disposal" only for K005 and K007 nonwastewaters generated from the manufacturing processes listed in 40 CFR 261.32 and disposed after June 8, 1989. At this time, EPA is not promulgating treatment standards for K005 and K007 wastewaters or other nonwastewaters (e.g., "derived-from wastes). The TSDR Survey identified about 2 million gallons of K005 and K007 nonwastewaters as being surface land disposed at one facility. However, as stated earlier in this preamble, EPA has determined that this was the only facility generating these wastes, and that the facility is no

longer generating or land disposing K005 or K007

The Agency is not promulgating the proposed treatment standard of "no land disposal" for K002, K003, K004, K006, and K008 nonwastewaters. Since K004 and K008 wastes are First Third wastes, their land disposal will continue to be restricted by the "soft hammer" provisions. Treatment standards for K002, K003, and K006 wastes will be established with the remaining Third Third wastes by May 8, 1990.

Wastes From Chlorinated Aliphatics Production, From 1,1,1-Trichloroethane Production, From 2,4-D Production, and Phthalates and Phthalic Anhydride Production Wastes. Today EPA is promulgating treatment standards based on incineration/reuse as fuel for F024, K023, K028, K043, K093, K094, U028, U069, U088, U102, U107 and U190 wastewaters and nonwastewaters, and for K029, K095, and K096 nonwastewaters. The wastewater forms of K029, K095, and K096 wastes are subject to the "soft hammer" provisions. The treatment standards for metals in treatment residuals for F024 and K028 are based on stabilization.

The Agency estimates that less than 1 million gallons of F024, K023, K028, K029, K043, K093, K094, K095, K096, U028, U069, U088, U102, U107 and U190 wastes will require commercial incineration or reuse as fuel as a result of today's treatment standards. After analyzing the TSDR Survey data, the Agency has determined that enough incineration capacity is commercially available to treat these wastes. EPA is therefore not granting a capacity extension for surface land disposed F024, K023, K028, K029, K043, K093, K094, K095, K096, U028, U069, U088, U102, U107 and U190 wastes.

TABLE III.C.1.a.—VOLUME OF WASTES BY LAND DISPOSAL METHOD FOR WHICH STANDARDS ARE BEING ESTABLISHED

Land disposal method	Volume (million gallons/ year)
Storage:	
Waste piles	1
Surface impoundments	3
Treatment:	
Waste piles	5
Surface impoundments	<1
Disposal:	
Landfills	10
Land treatment	<1
Surface impoundments	<1
Injected underground	604
Total	623

TABLE III.C.1.b.—REQUIRED ALTERNATIVE COMMERCIAL TREATMENT/RECYCLING CAPACITY FOR SURFACE LAND DISPOSED WASTES [1]

[Millions gallons/year]

Waste Code	Capacity required for surface land disposed wastes
First third wastes:	
F007	1.3
F008	2.7
F009	0.3
K011	0.2
K013	0.1
K014	<0.1
K036	0.0
P030	<0.1
P039	<0.1
P041	0.0
P063	<0.1
P071	<0.1
P089	<0.1
P094	<0.1
P097	0.0
U221	0.3
U223	<0.1
Second third wastes:	
F010	0.2
F011	0.1
F012	0.1
F024	<0.1
K009	0.0
K010	0.0
K027	7.6
K028	0.0
K029	0.0
K038	0.0
K039	0.0
K040	0.0
K043	0.0
K095	0.0
K096	0.0
P029	0.0
P040	0.0
P043	0.0
P044	<0.1
P062	0.0
P074	0.0
P085	0.0
P098	<0.1
P104	0.0
P106	<0.1
P111	0.0
U028	<0.1
U058	0.0
U107	0.0
U235	0.0
Third third wastes	
K005	[2] 0.0
K007	0.0
K023	0.0
K093	<0.1
K094	<0.1
P013	0.0
P021	0.0
P099	0.0
P109	0.0
P121	0.0
U069	<0.1
U087	0.0
U088	0.0
U102	0.0
U190	<0.1
Newly listed wastes:	
K113	0.0
K114	0.0
K115	0.2
K116	0.0

[1] The volumes presented here include all types of treatment required (i.e., all phases of treatment trains, where applicable.

[2] Waste no longer generated from the process described in 40 CFR Part 261.32.

TABLE III.C.1.c.—REQUIRED ALTERNATIVE COMMERCIAL TREATMENT/RECYCLING CAPACITY FOR SURFACE LAND DISPOSED WASTES

Technology	Available capacity (mil gal/ year)	Required surface land disposed (mil gal/ year)
Incineration:		
Liquids	282	<1
Solid/sludge	17	9
Wastewater Treatment:		
Alkaline chlorination	33	2
Electrolytic oxidation followed by alkaline chlorination	0	0
Carbon adsorption	2	0
Biological treatment	44	<1
Steam stripping followed by biological treatment	0	0
Stabilization	516	2

These wastes have been included with the wastes requiring alkaline chlorination.

Available capacity has been adjusted to account for 13 million gallons of capacity that may be needed for F006.

2. Extension of the Effective Date for Contaminated Soil and Debris

The Agency is today granting an extension of the effective date for certain First, Second, and Third Third contaminated soils and debris for which treatment standards established by today's rule are based on incineration. RCRA section 3004(h)(2) allows the Administrator to grant an extension to the effective date which would otherwise apply on the basis of the earliest date on which adequate protective capacity will be available, 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 wastes that have heretofore been subject to the "soft hammer" provisions but for which treatment standards are being promulgated today, the Agency 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., June 8, 1989) rather than the date the "soft hammer" provisions took effect (i.e., August 8, 1988). The Agency finds this the best interpretation for two reasons. Extensions of the effective date are based on the available capacity of the BDAT technology for the waste, so it is

reasonable that such an extension initiate from the date treatment standards based on performance of BDAT are established. Furthermore, it is not the intent of the Agency to, in effect, penalize First Third wastes by allowing less time (i.e., 38 months) for the development of needed capacity, while Second and 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, therefore, commences for First, Second, and Third Third wastes on June 8, 1989, and extends (at maximum) until June 8, 1991.

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. The Agency 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).

Analysis of the TSDR survey data indicated that relatively small volumes of soil contaminated with Second Third wastes were land disposed in 1986. However, the Superfund remediation program has expanded significantly since that time. Plans for remediation at Superfund sites indicate far greater excavation of soil and debris requiring treatment, including incineration, and subsequent land disposal in 1989 than in 1986. Because of the major increase in the Superfund remediation program, the Agency believes that capacity is still inadequate for incineration of Second Third contaminated soil and debris. Therefore, a two year extension of the effective date is granted to Second Third contaminated soil and debris for which BDAT is incineration or fuel substitution.

EPA is not promulgating a national capacity variance for soil and debris that are contaminated with any of the prohibited cyanide wastes. The treatment technology on which the Agency based treatment standards is alkaline chlorination (preceded by electrolytic oxidation in certain cases involving heavily contaminated wastes). The record for this rulemaking documents that there is ample commercial cyanide treatment capacity providing alkaline chlorination. It is true that this is a wastewater treatment technology, and that contaminated soils and debris are not liquids. However, contaminated soils could be slurried into liquid form and so be treatable by this technology. The Agency consequently does not believe that a national capacity variance is warranted.

3. Capacity Determinations for Underground Injected Wastes

The Agency received comments from 8 different parties concerning the establishment of effective dates for underground injected wastes. The Agency is taking this opportunity to discuss its position on the two comments which it feels are most crucial to this rule and to the regulated community. A response to all comments made on the January 11, 1989, proposed rule can be found in the Response to Comments Background Document in the RCRA docket.

A number of commenters indicated that treatment capacity variances should commence not from the statutory deadline of RCRA section 3004(g), but rather from May 8, 1990 or from an earlier date which EPA may establish by regulation after promulgating a BDAT treatment standard (and after making a decision on the availability of national protective treatment or disposal capacity). EPA first addressed this issue in the June 7 1989, promulgation of effective dates for the ban on underground injection of certain First Third wastes published in the **Federal Register** on June 14, 1989 (54 FR 25416). EPA adopted the commenters approach for the wastes addressed in that rule, and is likewise adopting the same approach for today's rule. Briefly, RCRA section 3004(g) sets no statutory prohibitions for disposal of hazardous wastes into UIC wells until May 8, 1990. Any earlier prohibition date is set by regulation. Thus, any extension of the effective date would commence from that regulatory prohibition date, and be based on anaylsis of available adequate alternative treatment, recovery, or disposal capacity existing as of the regulatory prohibition date (see RCRA section 3004(h)(2)). For a further discussion of this issue, see 54 FR 25416, June 14, 1989. This decision changes the effective dates for F007 wastewaters and nonwastewaters, and K011 and K013 nonwastewaters from August 8, 1990 to June 8, 1991, as indicated in the January 11, 1989 proposed rule.

Commenters also requested that the Agency defer setting any section 3004(g) prohibitions for UIC wastes until May 8, 1990. As previously articulated in the **Federal Register** on June 14, 1989 (54 FR 25416), the Agency disagrees with this position. EPA believes that it is the intent of Congress to ban the disposal of section 3004(g) wastes as expeditiously as possible upon the establishment of treatment standards and determination of alternative treatment capacity. If capacity exists, then consistent with section 3004(g)(5), the Agency will ban the underground disposal of such waste. Facilities that are able to make a demonstration of "no migration" in compliance with the requirements of 40 CFR 148 and 40 CFR 268.6 or meet the treatment standards in Part 268 may continue to inject hazardous wastes beyond the specified effective dates.

In previous rules, the Agency used a hierarchical approach in making decisions to allocate limited protective treatment or disposal capacity when evaluating national capacity variances (52 FR 32450, August 27 1987· and 53 FR 30912, August 16, 1988). Briefly, available treatment capacity was first apportioned to demand from waste originally destined for surface disposal units, then to wastes from CERCLA remedial actions and RCRA section 3004(u) corrective actions, and finally to wastes disposed in injection wells. For the reasons discussed in the recent Final Rule for a group of First Third Wastes effective June 7 1989 and published in the **Federal Register** on June 14, 1989 (54 FR 25416). This hierarchy has no effect on the Agency's decisions today. The UIC wastes being prohibited are relatively low volume. Prohibiting these small volumes of wastes will not result in capacity becoming unavailable for either wastes that are surface disposed, or for CERCLA/RCRA cleanup wastes.

a. *Effective date determinations for Second Third scheduled wastes for which EPA has not set treatment standards.* The Agency has not set treatment standards for the Second Third wastes listed in Table III.C.3.a. These wastes are not prohibited from land disposal by underground injection until the Agency sets treatment standards and effective dates, or until May 8, 1990, if EPA takes no action.

On January 11, 1989, the Agency proposed, in part, to set treatment standards and UIC effective dates for the following First Third wastes: F019, K011, K013, and K014. In today's rule, EPA is not finalizing the treatment standards or effective dates for F019 wastes, and K011 wastewaters, K013 wastewaters, or K014 wastewaters. These wastes, consequently, remain subject to the "soft hammer" provisions of 40 CFR 268.8. Similarly, the Agency proposed to set treatment standards and UIC effective dates for the following Third Third wastes: K002 nonwastewaters, K003 nonwastewaters, and K006 nonwastewaters. In today's rule, EPA is not finalizing these standards or effective dates. Since the statutory deadline for these wastes is

May 8, 1990, and no prohibitions are being established in today's rule, these wastes are not subject to the land disposal restrictions until promulgation of the Third Third final rule.

Treatment standards for K004 nonwastewaters and K008 nonwastewaters were finalized on August 16, 1988 (No Land Disposal Based on No Generation). Amendments to these standards were proposed on January 11, 1989 (No Land Disposal Based on Recycling). These treatment standards were finally amended on May 2, 1989 (No Land Disposal Based on No Generation for forms of these wastes generated by the process described in the waste listing description and disposed after August 17 1988, and not generated in the course of treating wastewater forms of these wastes; 54 FR 18836). EPA is today rescinding all treatment standards for these nonwastewaters; therefore, all K004 and K008 wastes (wastewaters and nonwastewaters) are under the effect of the "soft hammer" provisions of 40 CFR 268.8.

b. *Scheduled wastes with established treatment standards which current data indicate are not being injected.* The wastes listed in Table III.C.3.b. are wastes for which standards are being established today and for which current data indicate are not being injected. No comment was received indicating that any of these wastes are being underground injected. Therefore, EPA is prohibiting the underground injection of these wastes unless they meet the treatment standards on June 8, 1989. The Agency believes these decisions will have no effect on the remaining national capacity available to treat wastes generated from RCRA/CERCLA cleanup actions requiring the type of treatment associated with these wastes.

The Agency has not established treatment standards for F006 wastewaters; accordingly, today's rule does not ban injection of F006 wastewaters. F006 nonwastewaters were banned from injection on June 7 1989 published in the **Federal Register**, June 14, 1989 (54 FR 25416).

EPA is also banning the underground injection of K009 nonwastewaters and K010 wastewaters. Data received since the January 11, 1989, proposal indicate that these wastes are not being underground injected.

c. *Scheduled wastes with established treatment standards which current data indicate are being injected.* Table III.C.3.c. lists those wastes with treatment standards being established today which are underground injected. The Table summarizes the volumes requiring alternative treatment capacity. Table III.C.3.d. lists effective dates for the prohibitions against the underground injection of these wastes. The Agency believes these decisions will have little effect on the remaining national capacity available to treat wastes generated from RCRA/CERCLA cleanup actions requiring the type of treatment associated with these wastes. Moreover, these waste streams are sufficiently low volume not to affect transportation capacity for these wastes (see 53 FR 30914, August 16, 1988).

(1) Capacity determinations for injected wastes requiring alkaline chlorination or electrolytic oxidation followed by alkaline chlorination (F007 F008, F009, F011, F012, P029, P030, P063, and P098). The wastewater treatment standards for F007 F008, F009, F011, F012, P029, P030, and P098 are based on alkaline chlorination. The nonwastewater treatment standards for F007 F008, and F009 are based on alkaline chlorination followed by precipitation. The treatment standards for F011, F012, P029, P030, P063, and P098 nonwastewaters are based on electrolytic oxidation followed by alkaline chlorination. (As indicated in preamble section III.C.1.c., no commercial facilities with a treatment train consisting of electrolytic oxidation followed by alkaline chlorination were identified in the TSDR Survey. The Agency believes that alkaline chlorination alone will be able to meet the BDAT treatment standards for F011, F012, P029, P030, P063, and P098 nonwastewaters.)

An estimated 130 million gallons per year of these wastes will require cyanide wastewater treatment. Of the 130 million gallons, approximately 128 million gallons are being disposed by underground injection. Table III.C.3.c. gives the volumes of wastes injected for the indicated waste codes. These wastes may be injected in individual streams or as mixtures of wastes.

There is no need to use the allocation hierarchy in this situaiton. A straight comparison of available versus required capacity indicates a shortfall in alkaline chlorination capacity for injected F007 wastewaters and nonwastewaters (33 million gallons available versus 128 million gallons of injected F007). Comments received on the proposed effective date supported that determination. The Agency is therefore granting a two-year national capacity variance for F007 wastes which are underground injected. As indicated earlier in the preamble, EPA will grant a two-year variance not from the August 8, 1988 statutory First Third deadline, but rather from the effective date of this rule.

Over 33 million gallons per year of available alternate commercial treatment capacity has been identified for the low volumes of F008, F009, F011, F012, P029, P030, and P098 wastewaters and nonwastewaters being injected; therefore, no capacity variances were proposed for these wastes. No comment was received on this action. The Agency is banning the underground injection of P029, P030, and P098 wastes upon promulgation of this rule. As indicated in preamble section III.C.1.a., EPA is granting 30-day extensions of the effective date for F008, F009, F011, and F012 wastes. These wastes will therefore be banned from underground injection on July 8, 1989. (See preamble section III.C.1.a. describing the bifurcated treatment standard for F011 nonwastewaters and F012 nonwastewaters).

P063 wastes are reported in the TSDR survey as part of mixed waste streams with K011, K013, and K014. In the proposal EPA requested information on the quantities of P063 being underground injected, indicating a belief that such wastes are being injected in much smaller quantities than the data in the TSDR survey might suggest. Information received since this rule was proposed indicates that only relatively small amounts of P063 are being disposed by underground injection. Consequently EPA is banning the underground injection of P063 wastes upon the promulgation of this rule.

(2) Capacity determination for injected P071, P089, U028, U088, U107 and U190. Treatment standards for P071 and P089 nonwastewaters, and U028, U088, U107 and U190 wastewaters and nonwastewaters are based on incineration. Treatment standards for P071 and P089 wastewaters are based on biological treatment.

These wastes are currently injected in low volumes, if at all (see Table III.C.3.c.). The Agency has determined that adequate treatment capacity exists for these wastes (281 million gallons of available capacity and 44 million gallons of available biological treatment capacity versus a maximum of 300,000 gallons injected). No comments were received on the proposed effective dates. The Agency is therefore banning the underground injection of these wastes upon promulgation of this rule.

(3) Capacity determination for injected K009 wastewaters and K010 nonwastewaters. On January 11, 1989, the Agency proposed to grant capacity variances for all K009 and K010 wastes. New information indicates that only K009 wastewaters and K010 nonwastewaters are being injected. The

Agency is setting treatment standards for K009 wastewaters based on steam stripping followed by biological treatment. Treatment standards for K010 nonwastewaters are based on incineration. Inadequate alternative treatment capacity exists to treat the K009 wastewaters that are annually being injected (0 gallons of capacity available versus approximately 79 million gallons injected). There is adequate alternative treatment capacity to treat the K010 nonwastewaters that are being injected annually (281 million gallons of capacity available versus approximately 5 million gallons injected). Consequently, EPA is today granting a two-year capacity variance to the prohibition of underground injection of K009 wastewaters. The underground injection of K010 nonwastewaters is banned on June 8, 1989. As indicated previously, K009 nonwastewaters and K010 wastewaters not meeting the treatment standards are banned on June 8, 1989, based upon assessment of the best data available to the Agency, which indicate that these wastes are not being underground injected.

(4) Capacity determination for injected K011 nonwastewaters, K013 nonwastewaters, and K014 nonwastewaters. A significant volume of K011 nonwastewaters and K013 nonwastewaters (wastes from acrylonitrile production) are currently being land disposed by underground injection. Treatment standards for these wastes are based on incineration. The data indicate that approximately 282 million gallons of commercial incineration capacity exists versus 347 million gallons of injected K011 nonwastewaters and K013 nonwastewaters requiring incineration.

The Agency received extensive support for the proposed capacity variance for these waste codes. As indicated earlier in the preamble, EPA will grant a two-year variance not from the August 8, 1988, statutory First Third deadline, but rather from the effective date of this rule. K011 nonwastewaters and K013 nonwastewaters will be banned from underground injection on June 8, 1991. At proposal, EPA had treated K011, K013, and K014 injected nonwastewaters as one nonsegregable treatability group for the purpose of the national capacity determination. Upon further evaluation, EPA believes injected K014 nonwastewaters are segregable from K011 and K013 injected nonwastewaters. EPA plans to publish a notice to provide an opportunity to comment on this issue and will set an effective date for injected K014 nonwastewaters after evaluating comments. Thus, EPA is not taking final action on the proposal for setting an effective date for injected K014 nonwastewaters. Until final action, injected K014 nonwastewaters remain under the effect of the "soft hammer" provisions of 40 CFR 268.8.

(5) Capacity determination for injected U221, U223, and P044 Wastes. Table III.C.3.c. indicates that approximately 27 million gallons per year of U221 wastes are being injected underground, and additional volumes of U223 and P044 wastes are being injected in mixed waste streams. Treatment standards for P044 nonwastewaters, and U221 and U223 wastewaters and nonwastewaters are based on incineration. Treatment standards for P044 wastewaters are based on carbon adsorption or incineration. The data indicates that there is adequate treatment capacity for both injected nonwastewaters and wastewaters (282 million gallons of incineration capacity available versus 27 million gallons injected; 2 million gallons of carbon adsorption capacity available versus <100,000 injected). No national capacity variances were proposed for U221, U223 or P044 wastes. No comment was received on this decision. The Agency is therefore banning the underground injection of U221, U223, and P044 on June 8, 1989, unless these wastes meet the treatment standards.

Table III.C.3.a.—Second Third Wastes for Which Treatment Standards Are Not Established

K025 (wastewaters), K029 (wastewaters), K041, K042, K095 (wastewaters), K096 (wastewaters), K097 K098, K105

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, U244

Table III.C.3.b.—Wastes for Which Treatment Standards Are Today Established and Which Are Not Underground Injected

(Banned from underground injection on June 8, 1989)

First Third

K036 (wastewaters), P039, P041, P094, P097

Second Third

F010, F024, K009 (nonwastewaters), K010 (wastewaters), K027 K028, K029 (nonwastewaters), K038, K039, K040, K043, K095 (nonwastewaters), K096 (nonwastewaters), P040, P043, P062, P074, P085, P104, P106, P111, U058, U235

Third Third

K005 (nonwastewaters), K007 (nonwastewaters), K023, K093, K094, P013, P021, P099, P109, P121, U069, U087 U102

Newly Listed Wastes

K113, K114, K115, K116

TABLE III.C.3.c.—WASTES FOR WHICH TREATMENT STANDARDS ARE TODAY ESTABLISHED AND WHICH ARE BEING UNDERGROUND INJECTED

[Millions of gallons per year]

Waste code	Volume of injected waste requiring treatment capacity
First Third:	
F007	127.6
F008	<0.1
F009	<0.1
K011 nonwastewaters	173.4
K013 nonwastewaters	173.4
P030	<0.1
P063	<0.1
P071	<0.1
P089	<0.1
U221	26.8
U223	<0.1
Second Third:	
F011	0.0
F012	0.0
K009 wastewaters	79.0
K010 nonwastewaters	5.0
P029	<0.1
P044	0.0
P098	<0.1
U028	0.0
U107	<0.1
Third Third:	
U088	0.0
U190	<0.1

Indicates wastes are injected in mixed waste streams. Wastes with no volumes indicated may be injected as part of these mixed streams.

TABLE III.C.3.d.—SUMMARY OF EFFECTIVE DATES FOR UNDERGROUND INJECTED WASTES WITH STANDARDS ESTABLISHED IN TODAY'S RULE

Waste code	Effective date
First Third:	
F007, K011 nonwastewaters, K013 nonwastewaters.	June 8, 1991.
P030, P063, P071, P089, U221, U223.	June 8, 1989.
F008, F009	July 8, 1989.
Second Third:	
K009 wastewaters	June 8, 1991.
K010 nonwastewaters, P029, P044, P098, U028, U107.	June 8, 1989.
F011, F012 (590 mg/kg, 30 mg/kg).	July 8, 1989.

TABLE III.3.C.d.—SUMMARY OF EFFECTIVE DATES FOR UNDERGROUND INJECTED WASTES WITH STANDARDS ESTABLISHED IN TODAY'S RULE—Continued

Waste code	Effective date
F011, F012 (110 mg/kg, 9.1 mg/kg).	Dec. 8, 1989.
Third Third:	
U088, U190	June 8, 1989.

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.

Today's 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. When this rule is promulgated, Table 2 in 40 CFR 271.1(j) will be modified also to indicate that this rule is a self-implementing provision of HSWA.

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 interm 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 this regulation will be determined by the promulgation of the final rule in accordance with § 271.21(e). These deadlines can be extended in certain cases (see § 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 final 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 amendments 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 to today's final rule and impact State actions on the regulated community:

1. Under Part 268, Subpart C, EPA is proposing 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 proposing to grant 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 section 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 that 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 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**.

States are free to impose their own disposal restrictions if such actions are more stringent or broader in scope than the actions of Federal programs (RCRA section 3009 and 40 CFR 271.1(i)). Where States impose such restrictions, the broader and more stringent State restrictions govern.

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 Second 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 Second 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

Management of some of the hazardous wastes included in today's rulemaking could 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 become an attractive alternative. In addition, ocean-based disposal could become 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. Air Emissions Regulated Under the Clean Air Act

Some treatment technologies applicable to Second Third wastes could result in cross-media transfer of hazardous constituents to air. For example, incineration of metal-bearing wastes could result in metal emissions to air. Some constituents, such as chromium, can be more toxic if inhaled than if ingested. Therefore, it might be necessary to issue regulatory controls for some technologies to ensure they are operated properly.

The Agency has taken several steps to address this issue. EPA has initiated a program to address metal emissions from incinerators. It has also initiated two programs under section 3004(n) to address air emissions from other sources. The first program will address fugitive emissions from equipment such as pumps, valves, and vents from units processing concentrated organic waste streams. The second program will address other sources of air emissions, such as tanks and waste transfer and handling.

D. 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 LDR 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 waste 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 request and be granted 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). 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, Dec. 21, 1988). However, if the waste is capped in place, removal or "placement" has not occurred and the treatment standards are not legally applicable.

E. 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 when today's rulemaking is promulgated. 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 268.1(c)(5) 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. Subsequent to promulgation of today's final rule, these generators must comply with the requirements of the land disposal restrictions if they dispose a hazardous waste subject to treatment standards of "soft hammer" provisions.

F Regulatory Overlap of Polychlorinated Biphenyls (PCBs) Under the Toxic Substance Control Act and Resource Conservation and Recovery Act

Certain wastes listed as P or U contain PCBs. The PCB component of such a waste mixture is regulated primarily under TSCA, whereas 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 ordinarily 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

1. Purpose

The Agency estimated the costs, benefits, and economic impacts of today's final rule to determine if it is a "major" regulation as defined by Executive Order No. 12291. For all major rules, the Agency is required by the Executive Order to conduct a Regulatory Impact Analysis, and by the Regulatory Flexibility Act to assess small business impacts. The cost and economic impact estimates serve, additionally, as measures of the practical capability of facilities to comply with the final rule.

The results indicate that today's final rule is not a major rule. This section of the preamble discusses the results of the analyses of the final rule.

2. Executive Order No. 12291

Executive Order No. 12291 requires EPA to assess the effect of final Agency actions and alternatives during the development of regulations. Such an assessment consists of a quantification of the potential benefits and costs of the rule, as well as a description of any beneficial or adverse effects that cannot be quantified in monetary terms. In addition, Executive Order No. 12291 requires that regulatory agencies prepare a Regulatory Impact Analysis (RIA) for major rules. Major rules are defined as those likely to result in:

An annual cost to the economy of $100 million or more; or

A major increase in costs or prices for consumers or individual industries; or

Significant adverse effects on competition, employment, investment, innovation, or international trade.

The Agency has conducted cost analysis and has concluded that the final rule is not a major rule. Annual costs to the economy are estimated at approximately $24.9 million to $32.4 million for wastes not injected underground and an additional $3.9 million for those injected underground.

3. Basic Approach

The Agency analyzed costs and benefits using the same approach and methodology that was used for the August 17 1988 First Third final rule (53 FR 31138). The effects of the final rule were estimated by comparing post-regulatory costs, benefits, and economic impacts with those resulting under baseline conditions. The baseline for all Second and Third wastes is defined as continued land disposal of wastes in units meeting minimum technological requirements. The baseline was not adjusted to reflect treatment requirements that would automatically occur in the absence of a rule after May 8, 1990.

The baseline for First Third wastes included in this rule is defined as treatment needed to comply with the First Third Land Disposal Restrictions rule or the soft hammer provisions that went into effect on August 8, 1988. This baseline corresponds to treatments evaluated under Alternative A Scenario 2 in the First Thirds RIA (53 FR 31138, August 17 1988).

4. Results

Table VI(A) summarizes the results of the Regulatory Impact Analysis, as discussed in the following section.

TABLE VI(A)—REGULATORY IMPACT ANALYSIS RESULTS

	Surface Disposal	Underground Injection
Affected facilities:		
Promulgated Wastes	27	20
"Soft hammer" Wastes	8	.....
Total	35	20
Costs (annual) in millions:		
• Promulgated Wastes	24.9	3.9
"Soft hammer" Wastes	7.5	.....
Total	32.4	3.9
Economic Impact: Significantly affected facilities	0	0
Benefits (over 70 yrs.):		
Cancer case avoided	.07	.....
Noncarcinogenic exposures avoided	555	.....

a. *Population of affected facilities.* The final rule will affect 27 facilities that surface-dispose wastes. An additional 8 facilities would be affected by the soft hammer provisions that will take effect on June 8, 1989.

Only 20 injection facilities will be required to either treat wastes or file "no migration" petitions. These facilities will not significantly contribute to compliance costs already incurred by injection well owners/operators managing solvents, dioxins, California list, and First Third wastes.

b. Costs. The standards promulgated by this final rule are estimated to cost industry $24.9 million per year for surface-disposed wastes, and 3.9 million per year for injected wastes. If there is not enough capacity to treat the wastes subject to the soft hammer provisions, the facilities may be able to continue managing their wastes in minimum technology units at no additional cost.

If treatment capacity is available, surface-disposed wastes subject to the soft hammer provisions would need to be treated. The Agency estimated the upper range costs of treating those wastes by assuming these wastes would be incinerated. This treatment could add as much as $7.5 million to the cost of the rule. Less costly forms of treatment would be available for the soft hammered wastes, which would reduce the cost.

In general, the Agency assumed that the least costly treatment would be selected. This assumption had negligible effects on the estimated costs except for the case of a combined waste stream containing K027 and D007 a Third Third chromium waste. The Agency assumed that the combined waste would be treated to comply with the final rule. The Agency also assumed that no treatment of the residual scrubber sludges to remove chromium would take place because treatment standards for D007 have not been promulgated. Promulgation of standards for D007 under the Third Third rule would increase costs for this combined waste by approximately $28 million annually.

The additional volume of injected wastes attributable to the Second Third schedule is small by comparison to the volumes of wastes regulated by previous rulemakings. The Agency performed an analysis to assess the economic effect of associated compliance costs for Second Third wastes and found total compliance costs to be $3.9 million annually and petition costs are estimated at $0.1 million annually.

c. *Economic impacts.* The economic impact analysis for surface-disposed wastes estimates that none of the affected facilities would be significantly affected by the final rule. None of the affected facilities is expected to close as a result of the rule.

d. *Benefits.* The benefits analysis for surface-disposed wastes estimated that, over a 70 year lifetime, the final rule would reduce the number of cancer cases by 0.07 and the number of exposures to noncarcinogenic chemicals above threshold levels by 555.

Benefits other than reduction in human health risk—such as resouce damage avoided and corrective action costs avoided—were not quantified. As a result, the benefits of the land disposal restrictions for Second Third wastes are likely to be understated.

B. Regulatory Flexibility Analysis

Pursuant to the Regulatory Flexibility Act, 5 U.S.C. 601 *et seq.*, whenever an agency is required to publish a notice of rulemaking for a final rule, 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.

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 evaluated the economic effect of the final rule, as required by the Regulatory Flexibility Act, and determined that no facilities would be significantly affected. The Administrator certifies that Part 268 and Part 148 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.

C. Paperework Reduction Act

All information collection requirements in this final rule were promulgated in previous land disposal restrictions rulemakings (other than those for the Underground Injection Control Program) and approved by the Office of Management and Budget at that time. Since there are no new information collection requirements being promulgated today, an Information Collection Request has not been prepared.

For the Underground Injection Control Program, the information collection requirements in this final rule have been approved by the Office of Management and Budget (OMB) under the *Paperwork Reduction Act,* 44 U.S.C. 3501 *et seq.* Reporting and recordkeeping burden on the public for this collection is estimated at 745 hours for the respondents, with an average of 14 hours per response. These burden estimates include all aspects of the collection effort and may include time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, completing and reviewing the collection of information.

Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, (please reference ICR No. 370.09), to Chief, Information Policy Branch, PM-223, U.S. Environmental Protection Agency, 401 M Street, SW Washington, DC 20460 (202-382-2745); and Office of Management and Budget, Paperwork Reduction Project (2040-0042), Washington, DC 20503, marked Attention: Desk Officer for EPA."

D. 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).

VII. REFERENCES

(1) U.S. EPA, "Treatment Technology Background Document. June, 1989. EPA/530-SW-89-048A.

(2) U.S. EPA, "Methodology for Developing Treatment Standards, June, 1989. EPA/530-SW-89-048B.

(3) U.S. EPA, "Best Demonstrated Available Technology (BDAT) for Cyanide Wastes, F006 (Cyanide Only), F007-F012, F019, P012, P013, P021, P029, P030, P033, P063, P074, P098, P099, P104, P106, and P121, U246. June 1989. EPA/530-SW-89-048K.

(4) U.S. EPA, "Best Demonstrated Available Technology (BDAT) for K011, K013, and K014. June 1989. EPA/530-SW-89-048J.

(5) U.S. EPA, "Best Demonstrated Available Technology (BDAT) for K009 and K010. June 1989. EPA/530-SW-89-048I.

(6) U.S. EPA, "Best Demonstrated Available Technology (BDAT) for K043. June 1989. EPA/530-SW-89-048L.

(7) U.S. EPA, "Best Demonstrated Available Technology (BDAT) for Phthalate Wastes, K023, K093, K094, U028, U069, U088, U102, U107 U190. June 1989. EPA/530/SW-89-048H.

(8) U.S. EPA, "Best Demonstrated Available Technology (BDAT) for Organophosphorous Wastes, K038-K040, P039, P040, P041, P043, P044, P062, P071, P085, P089, P094, P097, P109, P111, U059, U087, and U235. June 1989. EPA/530-SW-89-048G.

(9) U.S. EPA, "Best Demonstrated Available Technology (BDAT) for F024. June 1989. EPA/530-SW-89-048M.

(10) U.S. EPA, "Best Demonstrated Available Technology (BDAT) for Waste from the Production of Dinitrotoluene, Toluenediamine, and Toluenediisocyanate, K027, K111–K116, U221, and U223. June 1989. EPA/530–SW–89–0480.
(11) U.S. EPA, "Best Demonstrated Available Technology (BDAT) for Wastes From the Production of 1,1,1,-Trichloroethene K028, K029, K095, and K096. December 1988. EPA/530–SW–89–048N.
(12) ICF Memorandum From Ralph Braccio, Jean Tilley to William Vocke, "Results of Preliminary Analysis of Proposed Second Thirds Land Disposal Restrictions Rule. December 19, 1988.
(13) U.S. EPA, "Background Document for Second Third Wastes to Support 40 CFR Part 268 Land Disposal Restrictions Proposed Rule. Second Third Wastes Volumes, Characteristics, and Required and Available Treatment Capacity June 1989. EPA/530–SW–89–048F
(14) U.S. EPA, "Evaluation of Availability of Alternate Treatment and Disposal Capacity for Injected Hazardous Wastes". Tischler and Kocurek. October 1987
(15) U.S. EPA, "Information Collection Request for the Proposed Hazardous Waste Disposal Restrictions for Class I Injection of Second Thirds List Wastes" Cadmus Group, Inc. November 1988.
(16) U.S. EPA, "Second and Third Thirds Cost Estimate" Cadmus Group, Inc. December 1988.
(17) U.S. EPA, "Response to Comments Background Document for Second Third Scheduled Wastes, Vol. 1". June 1989. EPA/530–SW–89–048D.
(18) U.S. EPA, "Response to Comments Background Document for Second Third Scheduled Wastes, Vol. 2". June 1989. EPA/530–SW–89–048E.
(19) U.S. EPA, "Response to Comments Background Document for Second Third Scheduled Wastes, Vol. 3". June 1989. EPA/530–SW–89–048C.

List of Subjects in 40 CFR Part 148, 264, 265, 268, and 271

Administrative practice and procedure, Confidential business information, Environmental protection, Hazardous materials, Hazardous materials transportation, Hazardous waste, Imports, Indian lands, Insurance, Intergovernmental relations, Labeling, Packaging and containers, Penalties, Recycling, Reporting and recordkeeping requirements, Security measures, Surety bonds, Waste treatment and disposal, Water pollution control, Water supply.

Dated: June 8, 1989.

William K. Reilly,

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 148.14 is amended by redesignating paragraphs (b), (c), and (d) as paragraphs (d), (e), and (g); by revising the introductory text of newly redesignated paragraph (g); and by adding new paragraphs (b), (c), and (f) to read as follows:

§ 148.14 Waste specific prohibitions—first third wastes.

(b) Effective June 8, 1989, the waste specified in 40 CFR 261.32 as EPA Hazardous Waste number K036 (wastewaters); and the wastes specified in 40 CFR 261.33 as P030, P039, P041, P063, P071, P089, P094, P097 U221, and U223 are prohibited from underground injection.

(c) Effective July 8, 1989, the wastes specified in 40 CFR 261.31 as EPA Hazardous Waste numbers F008 and F009 are prohibited from underground injection.

(f) Effective June 8, 1991, the waste specified in 40 CFR 261.31 as EPA Hazardous Waste number F007 and the wastes specified in 40 CFR 261.32 as K011 (nonwastewaters) and K013 (nonwastewaters) are prohibited from underground injection.

(g) The requirements of paragraphs (a), (b), (c), (d), (e), and (f) of this section do not apply:

3. Section 148.15 is amended by redesignating paragraph (b) as paragraph (e); by revising the introductory text of newly redesignated paragraph (e); and by adding new paragraphs (b), (c), and (d) to read as follows:

§ 148.15 Waste specific prohibitions—second third wastes.

(b) Effective June 8, 1989, the wastes specified in 40 CFR 261.31 as EPA Hazardous Waste numbers F010, F024; the wastes specified in 40 CFR 261.32 as K009 (nonwastewaters), K010, K027 K028, K029 (nonwastewaters), K038, K039, K040, K043, K095 (nonwastewaters), K096 (nonwastewaters), K113, K114, K115, K116; and wastes specified in 40 CFR 261.33 as P029, P040, P043, P044, P062, P074, P085, P098, P104, P106, P111, U028, U058, U107 and U235 are prohibited from underground injection.

(c) Effective July 8, 1989, and continuing until December 8, 1989, the wastes specified in 40 CFR 261.31 as EPA Hazardous Waste numbers F011 and F012 are prohibited from underground injection pursuant to the treatment standards specified in §§ 268.41 and 268.43 applicable to F007 F008, and F009 wastewaters and nonwastewaters. Effective December 8, 1989, F011 (nonwastewaters) and F012 (nonwastewaters) are prohibited pursuant to the treatment standards specified in §§ 268.41 and 268.43 applicable to F011 and F012 wastewaters and nonwastewaters.

(d) Effective June 8, 1991, the waste specified in 40 CFR 261.32 as EPA Hazardous Waste number K009 (wastewaters) is prohibited from underground injection.

(e) The requirements of paragraphs (a), (b), (c), and (d) of this section do not apply:

4. Section 148.16 is amended by redesignating paragraph (b) as paragraph (c); by revising the introductory text of newly redesignated paragraph (c); and by adding new paragraph (b) to read as follows:

§ 148.16 Waste specific prohibitions—third third wastes.

(b) Effective June 8, 1989, the wastes specified in 40 CFR 261.32 as EPA Hazardous Waste numbers K005 (nonwastewaters), K007 (nonwastewaters), K023, K093, K094; and the wastes specified in 40 CFR 261.33 as P013, P021, P099, P109, P121, U069, U087 U088, U102, and U190 are prohibited from underground injection.

(c) The requirements of paragraphs (a) and (b) of this section do not apply:

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 E—Manifest System, Recordkeeping, and Reporting

§ 264.73 [Amended]

2. Section 264.73 is amended by revising the first sentence in the parenthetical statement to read as follows: (Approved by the Office of

Management and Budget under control numbers 2050–0012, 2050–0013 and 2040–0042 *).

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 E—Manifest System, Recordkeeping, and Reporting

§ 265.73 [Amended]

2. Section 265.73 is amended by revising the parenthetical statement to read as follows: (Approved by the Office of Management and Budget under control numbers 2050–0039 and 2040–0042).

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

§ 268.7 [Amended]

2. Section 268.7 is amended by revising the parenthetical statement to read as follows: (Approved by the Office of Management and Budget under control numbers 2050–0062 and 2040–0042).

Subpart B—Schedule for Land Disposal Prohibitions and Establishment of Treatment Standards

3. Section 268.12 is amended by removing paragraph (c); by redesignating paragraphs (d), (e), (f), (g), and (h) as paragraphs (c), (d), (e), (f), and (g); and by revising paragraphs (b) and newly redesignated paragraph (c) to read as follows:

§ 268.12 Identification of wastes to be evaluated by May 8, 1990.

(b) Wastewater residues (less than 1% total organic carbon and less than 1% total suspended solids) resulting from the following well-designed and well-operated treatment methods for wastes listed in §§ 268.10 and 268.11 for which EPA has not promulgated wastewater treatment standards: metals recovery, metals precipitation, cyanide destruction, carbon adsorption, chemical oxidation, steam stripping, biodegradation, and incineration or other direct thermal destruction.

(c) Hazardous wastes listed in §§ 268.10 and 268.11 that are mixed hazardous/radioactive wastes.

Suppart C—Prohibitions on Land Disposal

4. Section 268.34 is added to read as follows:

§ 268.34 Waste specific prohibitions—second third wastes.

(a) Effective June 8, 1989, the following wastes specified in 40 CFR 261.31 as EPA Hazardous Waste Nos. F010; F024; the wastes specified in 40 CFR 261.32 as EPA Hazardous Waste Nos. K005, K007· K009 (nonwastewaters), K010; K023; K027· K028; K029 (nonwastewaters); K036 (wastewaters); K038; K039; K040; K043; K093; K094; K095 (nonwastewaters); K096 (nonwastewaters); K113; K114; K115; K116; and the wastes specified in 40 CFR 261.33 as EPA Hazardous Waste Nos. P013; P021; P029; P030; P039; P040; P041; P043; P044; P062; P063; P071; P074; P085; P089; P094: P097· P098; P099; P104; P106; P109; P111; P121; U028; U058; U069; U087· U088; U102; U107· U221; U223; and U235 are prohibited from land disposal.

(b) Effective June 8, 1989, the following wastes specified in 40 CFR 261.32 as EPA Hazardous Waste Nos. K009 (wastewaters), K011 (nonwastewaters), K013 (nonwastewaters), and K014 (nonwastewaters) are prohibited from land disposal except when they are underground injected pursuant to 40 CFR 148.14(f) and 148.15(d).

(c) Effective July 8, 1989, the wastes specified in 40 CFR 261.31 as EPA Hazardous Waste Nos. F006—cyanide (nonwastewater); F008; F009; F011 (wastewaters) and F012 (wastewaters) are prohibited from land disposal.

(1) Effective July 8, 1989, the following waste specified in 40 CFR 261.31 as EPA Hazardous Waste No. F007 is prohibited from land disposal except when it is underground injected pursuant to 40 CFR 148.14(f).

(2) Effective July 8, 1989 and continuing until December 8, 1989, F011 (nowastewaters) and F012 (nonwastewaters) are prohibited from land disposal pursuant to the treatment standards specified in §§ 268.41 and 268.43 applicable to F007 F008, and F009 nonwastewaters. Effective December 8, 1989 F011 (nowastewaters) and F012 (nonwastewaters) are prohibited from land disposal pursuant to the treatment standards specified in §§ 268.41 and 268.43 applicable to F011 (nonwastewaters) and F012 (nonwastewaters)

(d) Effective June 8, 1991, the wastes specified in this section having a treatment standard in Subpart D of this part based on incineration, and which are contaminated soil and debris are prohibited from land disposal.

(e) Between June 8, 1989 and June 8, 1991, (for wastes F007 F008, F009, F011, and F012 between June 8, 1989 and July 8, 1989) wastes included in paragraphs (c) and (d) of this section may be disposed in a landfill or surface impoundment, regardless whether such unit is a new, replacement, or lateral expansion unit, only if such unit is in compliance with the technical requirements specified in § 268.5(h)(2).

(f) The requirements of paragraphs (a), (b), (c), and (d) of this section do not apply if:

(1) The wastes meet the applicable standards specified in Subpart D of this Part; or

(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.

(g) The requirements of paragraphs (a), (b), and (c) of this section do not apply if persons have been granted an extension to the effective date of a prohibition pursuant to § 268.5, with respect to those wastes covered by the extension.

(h) Between June 8, 1989 and May 8, 1990, the wastes specified in § 268.11 for which treatment standards under Subpart D of this Part are not applicable, including California list wastes subject to the statutory prohibitions of RCRA section 3004(d) or codified prohibitions under § 268.32, are prohibited from disposal in a landfill or surface impoundment unless the wastes are the subject of a valid demonstration and certification pursuant to § 268.8.

(i) 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.

Subpart D—Treatment Standards

6. In § 268.41, Table CCWE is amended by removing from the subtable for F006 nonwastewaters "Cyanides (Total) Reserved" and by adding the following subtables to Table CCWE in alphabetical/numerical order by EPA Hazardous Waste Number:

§ 268.41 Treatment standards expressed as concentrations in waste extract.

(a)

TABLE CCWE—CONSTITUENT CONCENTRATIONS IN WASTE EXTRACT

F007 F008, and F009 nonwastewaters (see also table CCW in § 268.43)	Concentration (in mg/l)
Cadmium	0.066
Chromium (total)	5.2
Lead	0.51
Nickel	0.32
Silver	0.072

F011 and F012 nonwastewaters (see also table CCW in § 268.43)	Concentration (in mg/l)
Cadmium	0.066
Chromium (total)	5.2
Lead	0.51
Nickel	0.32
Silver	0.072

F024 nonwastewaters (see also table CCW in § 268.43)	Concentration (in mg/l)
Chromium (total)	Reserved.
Nickel	Reserved.

K028 nonwastewaters (see also table CCW in § 268.43)	Concentration (in mg/l)
Chromium (total)	Reserved.
Nickel	Reserved.

K115 nonwastewaters (see also table CCW in § 268.43)	Concentration (in mg/l)
Nickel	0.32

P074 nonwastewaters (see also table CCW in § 268.43)	Concentration (in mg/l)
Nickel	0.32

P099 nonwastewaters (see also table CCW in § 268.43)	Concentration (in mg/l)
Silver	0.072

P104 nonwastewaters (see also table CCW in § 268.43)	Concentration (in mg/l)
Silver	0.072

7. In § 268.42, paragraphs (a)(3) and (a)(4) are added to read as follows:

§ 268.42 Treatment standards expressed as specified technologies.

(a)

(3) The nonwastewater form of the following hazardous wastes listed in §§ 268.10, 268.11, and 268.12 must be incinerated in accordance with the requirements of Part 264, Subpart O, or Part 265, Subpart O, or burned in boilers or industrial furnaces burning in accordance with applicable regulatory standards: K027 K039, K113, K114, K115, K116, P040, P041, P043, P044, P062, P085, P109, P111, U058, U087 U221, and U223.

(4) The wastewater form of the following hazardous wastes listed in §§ 268.10, 268.11, and 268.12 must be treated by carbon adsorption, or incineration, or pretreatment followed by carbon adsorption: K027 K039, K113, K114, K115, K116, P040, P041, P043, P044, P062, P085, P109, P111, U058, U087 U221, and U223.

8. In § 268.43, paragraph (a) is revised; Table CCW is amended by revising the subtable for F006 nonwastewaters; by revising the subtables for K024 wastewaters and nonwastewaters; by removing K004 and K008 from the subtable for No Land Disposal; by adding the following subtables in alphabetical/numerical order by EPA hazardous waste number, and by adding paragraph (b) and K005 and K007 to the subtable for No Land Disposal 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. The wastewater and nonwastewater treatment standards in Table CCW are based on analysis of grab samples except the wastewater treatment standards that are based on analysis of composite samples for wastes, K009, K010, K036, K038, K040, P039, P071, P089, P094, P097 and U235.

TABLE CCW—CONSTITUENT CONCENTRATION IN WASTES

F006 nonwastewaters (see also Table CCWE in § 268.41)	Concentration (in mg/kg)
Cyanides (Total)	590
Cyanides (Amenable)	30

F007, F008, and F009 nonwastewaters (see also Table CCWE in § 268.41)	Concentration (in mg/kg)
Cyanides (Total)	590
Cyanides (Amenable)	30

F007, F008, and F009 wastewaters (see also Table CCWE in § 268.41)	Concentration (in mg/l)
Cyanides (Total)	1.9
Cyanides (Amenable)	0.10
Chromium (Total)	0.32
Lead	0.04
Nickel	0.44

F010 nonwastewaters	Concentration (in mg/kg)
Cyanides (Total)	1.5

F010 wastewaters	Concentration (in mg/l)
Cyanides (Total)	1.9
Cyanides (Amenable)	0.10

F011 and F012 nonwastewaters	Concentration (in mg/kg)
Cyanides (Total)	110
Cyanides (Amenable)	9.1

Effective December 8, 1989; from July 8, 1989 until December 8, 1989, these wastes are subject to the same treatment standards as F007, F008, and F009 nonwastewaters (see also Table CCWE in § 268.41).

F011 and F012 wastewaters (see also Table CCWE in § 268.41)	Concentration (in mg/l)
Cyanides (Total)	1.9
Cyanides (Amenable)	0.10
Chromium (Total)	0.32
Lead	0.04
Nickel	0.44

F024 nonwastewaters (see also Table CCWE in § 268.41)	Concentration (in mg/kg)
2-Chloro-1,3-butadiene	0.28
3-Chloropropene	0.28

F024 nonwastewaters (see also Table CCWE in § 268.41)	Concentration (in mg/kg)
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
Hexachlorodibenzo-furans	0.001
Hexachlorodibenzo-p-dioxins	0.001
Pentachlorodibenzo-furans	0.001
Pentachlorodibenzo-p-dioxins	0.001
Tetrachlorodibenzo-furans	0.001

F024 wastewaters (see also Table CCWE in § 268.41)	Concentration (in mg/l)
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
Hexachlorodibenzo-furans	0.001
Hexachlorodibenzo-p-dioxins	0.001
Pentachlorodibenzo-furans	0.001
Pentachlorodibenzo-p-dioxins	0.001
Tetrachlorodibenzo-furans	0.001
Chromium (Total)	0.35
Nickel	0.47

K009 and K010 nonwastewaters	Concentration (in mg/kg)
Chloroform	6.0

K009 and K010 wastewaters	Concentration (in mg/l)
Chloroform	0.10

K011, K013, and K014 nonwastewaters	Concentration (in mg/kg)
Acetonitrile	1.8
Acrylonitrile	1.4
Acrylamide	23
Benzene	0.03
Cyanides (Total)	57

K023, K093, and K094 nonwastewaters	Concentration (in mg/kg)
Phthalic anhydride (measured as Phthalic acid)	28

K023, K093, and K094 wastewaters	Concentration (in mg/l)
Phthalic anhydride (measured as Phthalic acid)	0.54

K024 nonwastewaters	Concentration (in mg/kg)
Phthalic anhydride (measured as Phthalic acid)	28

K024 wastewaters	Concentration (in mg/l)
Phthalic anhydride (measured as Phthalic acid)	0.54

K028 nonwastewaters (see also Table CCWE in § 268.41)	Concentration (in mg/kg)
1,1-Dichloroethane	6.0
trans-1,2-Dichloroethane	6.0
Hexachlorobutadiene	5.6
Hexachloroethane	28
Pentachloroethane	5.6
1,1,1,2-Tetrachloroethane	5.6
1,1,2,2-Tetrachloroethane	5.6
1,1,1-Trichloroethane	6.0
1,1,2-Trichloroethane	6.0
Tetrachloroethylene	6.0

K028 wastewaters	Concentration (in mg/l)
1,1-Dichloroethane	0.007
trans-1,2-Dichloroethane	0.033
Hexachlorobutadiene	0.007
Hexachloroethane	0.033
Pentachloroethane	0.033
1,1,1,2-Tetrachloroethane	0.007
1,1,2,2-Tetrachloroethane	0.007
Tetrachloroethylene	0.007
1,1,1-Trichloroethane	0.007
1,1,2-Trichloroethane	0.007
Cadmium	6.4
Chromium (Total)	0.35
Lead	0.037
Nickel	0.47

K029 nonwastewaters	Concentration (in mg/kg)
Chloroform	6.0
1,2-Dichloroethane	6.0
1,1-Dichloroethylene	6.0
1,1,1-Trichloroethane	6.0
Vinyl chloride	6.0

K036 wastewaters	Concentration (in mg/l)
Disulfoton	0.025

K038 and K040 nonwastewaters	Concentration (in mg/kg)
Phorate	0.1

K038 and K040 wastewaters	Concentration (in mg/l)
Phorate	0.025

K043 nonwastewaters	Concentration (in mg/kg)
2,4-Dichlorophenol	0.38
2,6-Dichlorophenol	0.34
2,4,5-Trichlorophenol	8.2
2,4,6-Trichlorophenol	7.6
Tetrachlorophenols (Total)	0.68
Pentachlorophenol	1.9
Tetrachloroethene	1.7
Hexachlorodibenzo-p-dioxins	0.001
Hexachlorodibenzo-furans	0.001
Pentachlorodibenzo-p-dioxins	0.001
Pentachlorodibenzo-furans	0.001
Tetrachlorodibenzo-p-dioxins	0.001
Tetrachlorodibenzo-furans	0.001

K043 wastewaters	Concentration (in mg/l)
2,4-Dichlorophenol	0.049
2,6-Dichlorophenol	0.013
2,4,5-Trichlorophenol	0.016
2,4,6-Trichlorophenol	0.039
Tetrachlorophenols (Total)	0.018
Pentachlorophenol	0.22
Tetrachloroethene	0.006
Hexachlorodibenzo-p-dioxins	0.001
Hexachlorodibenzo-furans	0.001
Pentachlorodibenzo-p-dioxins	0.001
Pentachlorodibenzo-furans	0.001
Tetrachlorodibenzo-p-dioxins	0.001
Tetrachlorodibenzo-furans	0.001

K095 nonwastewaters	Concentration (in mg/kg)
1,1,1,2-Tetrachloroethane	5.6
1,1,2,2-Tetrachloroethane	5.6
Tetrachloroethene	6.0
1,1,2-Trichloroethane	6.0
Trichloroethylene	5.6
Hexachloroethane	28
Pentachloroethane	5.6

K096 nonwastewaters	concentration (in mg/kg)
1,3-Dichlorobenzene	5.6
Pentachloroethane	5.6
1,1,1,2-Tetrachloroethane	5.6
1,1,2,2-Tetrachloroethane	5.6
Tetrachloroethylene	6.0
1,2,4-Trichlorobenzene	19
Trichloroethylene	5.6
1,1,2-Trichloroethane	6.0

K115 wastewaters (see also Table CCWE in § 268.41)	Concentration (in mg/l)
Nickel	0.47

P013 nonwastewaters	Concentration (in mg/kg)
Cyanides (Total)	110
Cyanides (Amenable)	9.1

P013 wastewaters	Concentration (in mg/l)
Cyanides (Total)	1.9
Cyanides (Amenable)	0.10

P021 nonwastewaters	Concentration (in mg/kg)
Cyanides (Total)	110
Cyanides (Amenable)	9.1

P021 wastewaters	Concentration (in mg/l)
Cyanides (Total)	1.9
Cyanides (Amenable)	0.10

P029 nonwastewaters	Concentration (in mg/kg)
Cyanides (Total)	110
Cyanides (Amenable)	9.1

P029 wastewaters	Concentration (in mg/l)
Cyanides (Total)	1.9
Cyanides (Amenable)	0.10

P030 nonwastewaters	Concentration (in mg/kg)
Cyanides (Total)	110
Cyanides (Amenable)	9.1

P030 wastewaters	Concentration (in mg/l)
Cyanides (Total)	1.9
Cyanides (Amenable)	0.10

P039 nonwastewaters	Concentration (in mg/kg)
Disulfoton	0.1

P039 wastewaters	Concentration (in mg/l)
Disulfoton	0.025

P063 nonwastewaters	Concentration (in mg/kg)
Cyanides (Total)	110
Cyanides (Amenable)	9.1

P063 wastewaters	Concentration (in mg/l)
Cyanides (Total)	1.9
Cyanides (Amenable)	0.10

P071 nonwastewaters	Concentration (in mg/kg)
Methyl parathion	0.1

P071 wastewaters	Concentration (in mg/l)
Methyl parathion	0.025

P074 nonwastewaters (see also Table CCWE in § 268.41)	Concentration (in mg/kg)
Cyanides (Total)	110
Cyanides (Amenable)	9.1

P074 wastewaters (see also Table CCWE in § 268.41)	Concentration (in mg/l)
Cyanides (Total)	1.9
Cyanides (Amenable)	0.10
Nickel	0.44

P089 nonwastewaters	Concentration (in mg/kg)
Parathion	0.1

P089 wastewaters	Concentration (in mg/l)
Parathion	0.025

P094 nonwastewaters	Concentration (in mg/kg)
Phorate	0.1

P094 wastewaters	Concentration (in mg/l)
Phorate	0.025

P097 nonwastewaters	Concentration (in mg/kg)
Famphur	0.1

P097 wastewaters	Concentration (in mg/l)
Famphur	0.025

P098 nonwastewaters	Concentration (in mg/kg)
Cyanides (Total)	110
Cyanides (Amenable)	9.1

P098 wastewaters	Concentration (in mg/l)
Cyanides (Total)	1.9
Cyanides (Amenable)	0.10

P099 nonwastewaters (see also Table CCWE in § 268.41)	Concentration (in mg/kg)
Cyanides (Total)	110
Cyanides (Amenable)	9.1

P099 wastewaters (see also Table CCWE in § 268.41)	Concentration (in mg/l)
Cyanides (Total)	1.9
Cyanides (Amenable)	0.10

P104 nonwastewaters (see also Table CCWE in § 268.41)	Concentration (in mg/kg)
Cyanides (Total)	110
Cyanides (Amenable)	9.1

P104 wastewaters (see also Table CCWE in § 268.41)	Concentration (in mg/l)
Cyanides (Total)	1.9
Cyanides (Amenable)	0.10

P106 nonwastewaters	Concentration (in mg/kg)
Cyanides (Total)	110
Cyanides (Amenable)	9.1

P106 wastewaters	Concentration (in mg/l)
Cyanides (Total)	1.9
Cyanides (Amenable)	0.10

P121 nonwastewaters	Concentration (in mg/kg)
Cyanides (Total)	110
Cyanides (Amenable)	9.1

P121 wastewaters	Concentration (in mg/l)
Cyanides (Total)	1.9
Cyanides (Amenable)	0.10

U028 nonwastewaters	Concentration (in mg/kg)
Bis-(2-ethylhexyl) phthalate	28

U028 wastewaters	Concentration (in mg/l)
Bis-(2-ethylhexyl) phthalate	0.54

U069 nonwastewaters	Concentration (in mg/kg)
Di-n-butyl phthalate	28

U069 wastewaters	Concentration (in mg/l)
Di-n-butyl phthalate	0.54

U088 nonwastewaters	Concentration (in mg/kg)
Diethyl phthalate	28

U088 wastewaters	Concentration (in mg/l)
Diethyl phthalate	0.54

U102 nonwastewaters	Concentration (in mg/kg)
Dimethyl phthalate	28

U102 wastewaters	Concentration (in mg/l)
Dimethyl phthalate	0.54

U107 nonwastewaters	Concentration (in mg/kg)
Di-n-octyl phthalate	28

U107 wastewaters	Concentration (in mg/l)
Di-n-octyl phthalate	0.54

U190 nonwastewaters	Concentration (in mg/kg)
Phthalic anhydride (measured as Phthalic acid)	28

U190 wastewaters	Concentration (in mg/l)
Phthalic anhydride (measured as Phthalic acid	0.54

U235 nonwastewaters	Concentration (in mg/kg)
tris-(2,3-Dibromopropyl) phosphate	0.1

U235 wastewaters	Concentration (in mg/l)
tris-(2,3-Dibromopropyl) phosphate	0.025

No Land Disposal for:

K005 Nonwastewaters generated by the process described in the waste listing description, and disposed after June 8, 1989, and not generated in the course of treating wastewater forms of these wastes. (Based on No Generation)

K007 Nonwastewaters generated by the process described in the waste listing description, and disposed after June 8, 1989, and not generated in the course of treating wastewater forms of these wastes. (Based on No Generation)

(b) When wastes with differing treatment standards for a constituent of concern are combined for purposes of treatment, the treatment residue must meet the lowest treatment standard for the constituent of concern.

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. § 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
[Insert date of publication]	Land Disposal Restrictions for Second Third wastes.	[Insert page numbers]	June 8, 1989.

3. § 271.1(j) is amended by revising the entry for June 8, 1989 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
June 8, 1989	Prohibition on land disposal ⅔ of listed wastes.	3004(g)(6)(B)	[Insert date of publication and page numbers of this document.]

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